

Staging 'Open-minded Science': Culture and Evidence in Contemporary
Ayurvedic Laboratory Research in India

A DISSERTATION
SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL OF THE
UNIVERSITY OF MINNESOTA
BY

Ritika Ganguly

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF
DOCTOR OF PHILOSOPHY

Jean M Langford
Karen-Sue Taussig

November 2012

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ACKNOWLEDGEMENTS

This dissertation has been possible because of my friend and partner, Vinod Srinivasan, his love, constant cheering, and unmatched warmth. I am immensely grateful for my family: Kaveri Ganguly and Shamu Ganguly - my first handholds - always inspiring through their art and ability to love, reassure, and question; for Samrat Bose - my very best friend; and for Nilanjana Bose and Shantanu Bose for caring and loving me in a way that only family can.

My advisors Jean M Langford and Karen-Sue Taussig have backed this dissertation with their support, guidance and advice. I cannot thank Jean Langford enough for her expertise, suggestions, recommendations and close reading of my chapters that have enhanced this dissertation, draft to draft. Thanks to David Valentine's vital inputs throughout my graduate career, David Lipset's support, and Simona Sawhney's invaluable insights, reassuring presence, and awe-inspiring teaching.

I am deeply indebted to Padma Venkatasubramanian. Without her, my fieldwork would have remained a well laid out plan on paper. Amina Ather, Alex Hankey, Darshan Shankar, Ashwini Konnur, DK Ved, Subramanya Kumar, GG Gangadharan, Balasubramaniam, Bapuji sir, Iyengar sir, GS Lavekar and Thatha sir have been extremely patient and generous with their contemplations, thoughts and their time. Geetha Ugru, Srivathsa and Dr. Shankar's brilliance and meticulous engagement with my questions and field of study made for an intellectually enriching time in the field. I am profoundly grateful for Dilshaad Begum and Reshma Sulthana's hospitality, neighborliness and friendship, and Subbalaxmi's skills, patience and knowledge of Ayurvedic massage that mended my injured back. Thanks also go to my co-travelers from JNU, New Delhi, Sonali Ghosh and Bijita Majumdar-Mishra for being my allies throughout our graduate study years here in the US. My colleagues at the University of Minnesota Naheed Aaftaab, Ju-Young Lee, Saurav Mitra, Avigdor Edminster, Jianfeng Zhu, Ursula Dalinghaus, Murat Altun and Greta Bliss have been a fabulous set of friends, co-conspirators and provocateurs. Many, many thanks especially to Naheed Aaftaab and Ju-Young Lee for reading and commenting on my dissertation drafts. Pramila Vasudevan and Ishani Baruah are incredible friends, who gave me their homes and hot meals when I needed them the most. Namrata Gaikwad's friendship, softness and genius make this world a gentler place for me. I couldn't do this (or that) without her.

This dissertation was written with the help of the Doctoral Dissertation fellowship from the University of Minnesota and summer stipends from the Department of Anthropology, University of Minnesota. I conducted pre-dissertation fieldwork with support from a Graduate Research Partnership Program at the College of Liberal Arts, University of Minnesota. I am enormously grateful to the National Science Foundation for the Doctoral Dissertation Improvement Grant; the Office of International Programs, University of Minnesota for the OIP Doctoral Fellowship for International Research; and the Societies and Medicines of South Asia Program, French Institute of Pondicherry for crucial dissertation fieldwork support.

DEDICATION

For ma and baba

ABSTRACT

In their analyses of traditional medical systems such as Ayurveda, postcolonial critics of science and technology have often pointed to the hierarchies, inequalities and asymmetries between western and non-western, biomedical and traditional, knowledge claims and practices. This dissertation explores Ayurvedic knowledge-making itself as a site that consolidates hierarchies, produces power, and confers privilege. Ethnographically situated at an Ayurvedic laboratory, this study argues that ‘open-minded science’ – a recent articulation by a Hindu science elite to name the collaborative production of contemporary Ayurvedic knowledge – produces new forms of exclusions that express their cultural authority through a scientific discourse on the revitalization of the Indian medical heritage. Central to this project are the ways in which contemporary Ayurvedic practice brings into view a wider set of relationships – those between knowledges that come to be characterized as codified and folk, between experts and community, and ultimately, between science and politics.

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Introduction

In a very packed conference hall filled with Ayurvedic *vaidyas*, botanists, chemists, biochemists, and Sanskrit scholars young and old, Dr. K.N. Ganeshiah – agricultural scientist and professor at the University of Agricultural Sciences, Bangalore – posed a direct question in his presentation titled “What is *Sañjīvanī*? He was inviting us to ask with him – “how did *Sañjīvanī* become a *fact*?”

Sañjīvanī (hereafter *Sanjeevani*) is a plant that finds its first dated mention in Valmiki’s Rāmāyaṇa (hereafter *Ramayana*) - one of the two preeminent epic poems of the Hindu tradition. The plant is invoked in a chapter in the *yuddha kānda* (the book/section on war) that sets the stage for the later chapters narrating the epic battle between Rāma and Rāvana. When *Lakshmana* (Rāma’s brother and close ally) was wounded by Rāvana (the legendary demon king) by his poisonous arrow, the monkey physician Sushena examines the inflicted and struck-down *Lakshmana* and assures a crushed and aggrieved Rāma that his brother is not dead. *Lakshmana* is described in this scene as being “bathed in blood” and wiggling like a serpent.¹ Sushena, while assessing *Lakshmana*’s state and comforting Rāma, orders Hanumāna (Rāma’s monkey devotee and close aid) to immediately soar and speed to a specific mountain range (which the verse describes as *auśadhī parvatam* / mountain of medicine) to bring back four herbs that would restore *Lakshmana*’s health/life/consciousness. Confronted with the mountain containing the four great medicinal herbs (*mahauśadhīm*) recommended by Sushena, namely, *Vishalyakarani* (which was to be identified as the herb that grew on the mountain’s southern peak), *Sāvarnakarani*, *Samjīvakarani* (*Sanjeevani*) and *Samdhānakarani* that grew alongside several other plants, Hanumān is confused and unable to identify the recommended four. Strength and speed being his qualities, he

¹ ‘*eśa rāvaṇāvegena lakṣmaṇāh patitah kshitau | sarpavadveṣtate vīro mama shokamudīrayan,*’ “This heroic Lakshmana, falling down on earth yielding to Ravana’s prowess, is wiggling like a serpent, causing an increase in grief to me.” (Rāma’s defeated reaction to Rāvana’s attack on his brother. In these lines, he is confiding in Sushena about being overcome with agony at his brother’s death, resulting in an apathy and impassivity to engage in battle, or in life). 6-101-3.

uproots the entire mountain and hurries back to the battlefield just beyond the current borders of Southern India, where *Lakshmana* lay unconscious. No sooner than Sushena - the monkey physician - identifies, pounds and crushes the four specific herbs and administers them to *Lakshmana* through the nose, *Lakshmana* is rid of the spear lodged in his body, regaining consciousness and resuming dialogue with Rāma.

“Can we do a scientific study of this?” Dr. Ganeshaiyah’s PowerPoint slide asked. “Hanumāna was a poor taxonomist, and his GIS (Geographic Information System) equipment was not that strong, so he took the whole mountain, he took a lot of biodiversity, to Sri Lanka. Piracy of knowledge,” he added, with the additional effect of carefully situating his question about the possibility of a “scientific study” of a “mythological plant” within a particular kind of discourse. The audience did not relate to this discourse as just any scientific discourse, but a specifically “modern” one, within which botanical taxonomy, GIS, resources of biodiversity, and “knowledge” as intellectual property made sense. In his next PowerPoint slide named ‘Examining mythology,’ Dr. Ganeshaiyah put forth the proposition that *Lakshmana* was not dead, only in coma. He cautioned that even though *Sanjeevani* has been narrated in the epic as a herb that resurrects *Lakshmana* from a state of death, it is unlikely that there was any herb capable of resurrecting a dead *Lakshmana*. He was perhaps in a “parallel state of death” – coma – medically less understood but corresponding to “a state of unconsciousness where the body is physiologically active, but the neural system enters into an inactive (but not dead) stage.” He writes, “it is likely that *Lakshmana* was in such a state of unconsciousness or coma owing to the heat shock or poison of the arrow and that *Sanjeevani* had properties of awakening or rejuvenating (and in that sense ‘resurrecting’) him” (Ganeshaiyah *et al* 2009; 486). He argues that for a scientific study it is important to speculate that it is the similarities of the coma state and a state of death that has inspired storytellers to refer to the *Sanjeevani* herb as a ‘life giver’. But if *Sanjeevani* “actually does exist,” it should have the ability to bring coma patients back to a normal living state.

Dr. Ganeshaiyah further refined what he understood by “scientific study” by making

an enticing, and to some people present, a tormenting, claim: that “the truth of *Sanjeevani* was not contingent on the truth of *Ramayana*.” He explained that for some people Hanumāna was a fictional character that did not exist, but did that mean that *Sanjeevani* for them should not exist? He confessed that an earlier iteration of this claim at another conference had discomfited BS, then Director of the IIA (Integrative Institute of Ayurveda) on grounds that the claim contained in it the very possibility and the suggestion that the *Ramayana* could have been a figment of imagination, a work of art. Today, at a presentation that was part of a larger series of meetings and workshops titled ‘Scientific research writing’ that was directed at motivating researchers in Traditional medicine to conduct and write about their research “scientifically,” Dr. Ganeshiah’s quoting of that moment of the Director’s unease served to frame his presentation as an exercise in presenting the method and value in distilling “science” from the “cultural base” within which it may occur. “In the true spirit of science,” he writes in an article aptly titled “In search of *Sanjeevani*” in the peer-reviewed journal *Current Science* a few months later,

“it is important to develop certain objective criteria through which we can filter the possible candidates for *Sanjeevani*... Whether or not *Sanjeevani* exists needs to be examined irrespective of whether or not the *Ramayana* is a fact of history or figment of imagination. For several reasons: first, *Sanjeevani* as a concept is deep rooted in the traditional system of Indian medicine. Secondly, as a herb that can resurrect life, *Sanjeevani* figures in other mythological stories as well, such as the story of ‘*Yayathi*’ and thus seems to have a broad cultural base. Thirdly, given its high potential value, it is worth probing lest we miss out a potentially important biological resource. For these reasons, we propose that the process of evaluating the existence of *Sanjeevani* shall follow a logical process of elimination...From these details of the epic it should be possible to develop a set of criteria for searching the candidate herb.” (Ganeshiah *et al*, 2009; 484).

Here we can discern the attempt to distill medicine from mythology, criteria from epic, PowerPoint from poetry, historical fact from cultural history, *Sanjeevani* the “herb” from *Sanjeevani* the “concept.” In the *Sanjeevani* story, minutes after the professor-scientist provocatively claimed that the “the truth of *Sanjeevani* is not contingent on the truth of *Ramayana*,” a slide brought up a reproduction of a Google satellite image zooming in on the present day national boundaries of India and Lanka (the narrative site of the epic

battle between Rāma and Rāvana) and with a click of an animation feature, connected the boundaries of the two geo-political entities by a thick red line drawn with the help of a Microsoft PowerPoint drawing tool. The red line on the slide represented the bridge in the epic story that was constructed by Rāma and his monkey allies to enable the two brothers and their army to reach beyond the shores of the southern seas to where *Rāvana* (Lanka's demon king) had held Rāma's beloved wife captive.

It represented also the fiercely contested and yet unresolved debate over the origin and fate of the *Rāma Setu* (Rāma's bridge) among regional and national political parties, Hindu organizations, national courts and the ASI (Archeological Survey of India – a government organization officially in charge of looking after the archeological heritage of India). A recent government-approved shipping canal project in the shallow waters between India and Sri Lanka proposed that the piece of land connecting the two islands off the coasts of the two countries be dredged in order to ease navigation and transportation by freight traffic and big ocean vessels. At the center of the bridge of contention is the issue of whether or not this piece of land is a “natural formation” due to several millennia of wave action and sedimentation or a “man-made” one, in which case, it must be designated the status of “an ancient protected monument²” whose construction was accomplished, literally, *in the Ramayana*. If one follows the course of the discourse closely – where the ASI points to the lack of historical evidence to “prove the existence of the characters” depicted in the *Ramayana*³, where the Madras High Court transfers affidavits to the Supreme Court challenging the government's proposal to touch the bridge, where the government, for its part, cites a specific vernacular version⁴ of the

² For more on the trajectory of the debate itself, see Dhananjay Mahapatra, 2008 “Ram himself destroyed Setu, Govt tells SC,” http://articles.timesofindia.indiatimes.com/2008-07-23/india/27940951_1_ram-setu-lord-rama-ram-sethu (published July 23, 2008, accessed Sept 2011); Singh, Mahendra Kumar 2008. “Experts’ report said to reignite Ram Setu row” *Times of India*, Jan 8, 2008; <http://ibnlive.in.com/news/ram-setu-not-part-of-hinduism-govt-tells-sc/75806-3.html> (published Oct 14, 2008, accessed Aug 5, 2011).

³ Bhadra Sinha 2007. “Ramayana no basis for Ram Setu debate.” *Hindustan Times*, September 12, 2007.

⁴ As AK Ramanujan has pointed out, Vālmīki's *Ramayana* may be the earliest and the most prestigious telling of the epic poem, but the hosting of a Rāma and a *Ramayana* by various different South Asian and Southeast Asian languages across various narrative genres (epics, *kāvya* or ornate poetic compositions, *purāṇa* or old mythological stories and so forth) makes for at least a hundred tellings of the *Ramayana*. He notes at the outset that Vālmīki's narrative is not always carried from one language to another. This essay, which offers a number of tellings of Vālmīki's *Ramayana* including the Jain, Buddhist and Kannada narratives, acerbated Hindu right wing sentiments in the country and the Department of History at the Delhi University was attacked for having included the essay in its history syllabus. The Academic Council of the university later took a decision to remove the essay from its syllabus based on the ‘observations’ of an ‘expert’ committee formed by a directive of the Supreme Court. Dissenters of this decision

Ramayana to claim that the bridge that was built by Rāma was also destroyed by Rāma in that same text, and where the Supreme Court is awaiting the report of a special committee that is examining alternative routes for the shipping project – the bridge skids, skates, slips and slides from geographical to fictional to cultural to political entity. *And this slippage itself becomes the power of the discourse.*

It is this slippage that I attend to in this dissertation. The displacement of ‘Rāma *setu*’ the fictional entity by ‘Rāma *setu*’ the geographical entity, its re-displacement as cultural entity and its re-positioning as a politico-legal one cannot be analyzed merely as a local instance of a universal “imbroglio of science, politics, economy, law, religion, technology, fiction” (Latour 1993; 2). It is not simply a “mixed-up affair” (*ibid.*), or merely a “seamless fabric of nature-culture” (*ibid.* 7) that sociologists of science and practitioners of Science and Technology Studies ought to follow, separate, or weave back together. It is rather, I argue, a specific strategy of discourse rendered by a Hindu science elite that becomes a crucial form of cultural production in Hindu society. The analytic continuity in *Sanjeevani* the “concept” and *Sanjeevani* the “herb” in Ganeshaiiah’s rendering, much like Ayurvedic knowledge, practice, and pedagogy in the pharmacy, the temple, and the laboratory as we will see in the chapters that follow, becomes a strategy of building a productive alliance between Hindu mythology, history, fiction, science, medicine, modern science, liberal institutions and democratic ideals. As a practice that works because it is “mixed-up,” such slippages as political performatives in science bring desired forms of social order and regulation into being. It is not insignificant that the research for *Sanjeevani* germinated in Ganeshaiiah’s ongoing parallel career in fiction writing. Dr. Ganeshaiiah is a prominent novelist in the Kannada language, specializing in thrillers. He has published several novels and short story collections and is widely known in Karnataka for his distinctive style of weaving characters from 14th century local history with those from present day CBI (Central Bureau of Investigation – India’s central criminal investigation and intelligence agency). The hunt for *Sanjeevani* forms the plot of

criticized the Vice Chancellor for ‘not acting like an academic on the issue.’ For the essay, see AK Ramanujan, 1991 “Three Hundred *Rāmāyaṇas*: Five Examples and Three Thoughts on Translation.” In Paula Richman (ed) *Many Rāmāyaṇas: The Diversity of a Narrative Tradition in South Asia* (Berkeley: University of California Press): 22-49.

one of his recently published thriller novels *Kapi Lipi Saara*.⁵ The thing that his readers like most about his writing in this book is precisely the entangling that I am suggesting empowers its functioning: the interlacing of myths, facts and riddles “in such a way that it makes you think that you are reading real facts,” as one of his readers put so succinctly.

Academic attention to these continuities and slippages in the postcolonial context therefore, must be distinguished from analyzing how facts and opinions are mixed up and will be even more mixed up in the future (Latour 1979; 1993; 2011). The political significance of this mixing up of Hindu medico-mythology, medico-history, and contemporary politico-judicial institutions, derives from its status as a strategy of postcolonial power, modernity, and science making, and not merely an attribute of it.

Examining this slippage in modern scientific discourse as political strategy extends and challenges prevailing analyses. Meera Nanda’s timely attention to the snug relationship between the growth of religiosity and neo-liberal models of development in India brings visibility to the nexus between the government, the Hindu elites, and the institutions of the new global economy. In *The God Market: How Globalization is making India more Hindu*, Nanda describes the ‘State-Temple-Corporate Complex’ that has encouraged a curious blend of nationalistic and religious emotions that appeal to the masses. She writes: “Whereas the ‘religions of the book’, that is, Islam and Christianity, bind the faithful by demanding obedience to the letter and the spirit of their revealed dogmas, Hinduism deploys familiar rituals, festivals, myths and observances - the kind of things children learn on their mothers’ knees- to knit a many-stranded rope that binds the faithful to the faith with so many little ties, at so many different points that one loses sight of the ideological indoctrination that is going on. Ordinary worshipers and the three partners described above - the state, the temples, and the corporate or business interests - perform a choreographed dance, as it were, in which each element merges into another smoothly and effortlessly” (Nanda 2009; 141).

This merging is an urgent issue, and one that, as I have noted above, drives this

⁵ Ganeshiah, KN 2009. *Kapi Lipi Saara*. Bangalore: Ankitha Pustaka.

dissertation. But, rather than examining the merger as an effect, and the “seamless partnership of ‘faith and politics’” (*ibid.* 139), “science,” and “religion,” “mythos” and “logos” as an effect, it is more useful to consider these categories themselves as effects of intersecting practices of power rather than as unitary objects. As the chapters of this dissertation try to show, these categories are themselves complex, not homogenous, or given, and they come into existence through the discourses and politics of its practitioners. The ability of an Ayurvedic pharmacy to become a place of Hindu worship and become a pharmacy again (as I discuss in chapter one) produces ever new and contingent meanings, possibilities, and indeed definitions, of “faith,” “politics,” “medicine,” “science,” “mythos” and “logos.”

The intercourse of these categories is not simply a seamless partnership of pre-political objects or preconditions; it is a political strategy that works because of the multiple permutations between, and re-productions of, “mythological stories,” “history,” “politics,” “imagination” and “Indian medicine” that it allows. It is the slick interaction of these that gives Dr. Ganeshiaiah’s proposal for a “scientific study of *Sanjeevani*” its effectiveness. Let us remind ourselves here that “*Sanjeevani*” for Dr. Ganeshiaiah, is “a concept [that] is deep rooted in the traditional system of Indian medicine....As a herb that can resurrect life, *Sanjeevani* figures in other mythological stories [in addition to the *Ramayana*] as well, such as the story of ‘*Yayathi*’ and thus seems to have a broad cultural base....Given its high potential value, it is worth probing lest we miss out a potentially important biological resource....From these details of the epic it should be possible to develop a set of criteria for searching the candidate herb” (Ganeshiaiah *et al*, 2009; 484).

Here discourses of bio-prospecting (“a potentially important biological resource”) and ‘culture’ (“a broad cultural base”) confront each other in a way that formulate and produce the “traditional,” the “Indian,” the “medicine,” the “mythology” and the “epic.” Integrated further with twenty first century technological tools that extend, expand, enlarge, fill color, and project such formulations onto bare walls and PowerPoints, a “scientific” story of *Sanjeevani* is rendered politically consequential by participating in the politically charged *Rāma Setu* (Rāma’s bridge) story. For example, while Dr.

Ganeshaiah admitted explicitly that he did not want to push through with the issue any further, he summarized his reinterpreting-the-past slide with the observation that about five thousand years ago, the two countries of India and Sri Lanka were not so far from each other geographically and that the level of the ocean was low enough that a small group of men (referring to Rāma and his monkey army) could very well have built the bridge. He stated that his purpose in showing us the satellite image of the bridge was to offer us a way “to read some of the issues of the past...not in terms of the issues that we face today, but the geological evidences, the cultural evidences, the social situations, etc., all to ask the question whether *Sanjeevani* exists or not.” “Science,” “evidence,” “tradition,” “epic,” “Indian medicine” and even the composed work of *Ramayana* now begin to appear not as presumed or pre-political categories, but the effects of a discourse that gains power because of its slippage. The search for the scientific evidence of *Sanjeevani* then becomes a major terrain from which to launch the search for historical ‘evidence(s).’

To examine this mixing up as strategy, and not effect, is to open up paths for the examination of the effects of this strategy. In this dissertation, I analyze scientific knowledge-making as a site that produces, recognizes, and allocates social difference. I explore contemporary practices of Ayurvedic knowledge-making and the institutional forms and discourses of practicing scientists that authorize “relevant” Ayurvedic knowledge to be produced, popularized, disseminated, and “experienced” legitimately. These scientific practices, I argue, are not only intertwined with, but rely on blurring boundaries between, ritual practices, modern scientific evidence, and classical methods of producing Ayurvedic knowledge. In doing so, these practices and discourses and the Hindu science elite that renders them produce contingent and intimate relationships between ‘contemporary’ Ayurveda, ‘global’ pharmaceutical science, ‘Indian’ medical heritage, *Sāstra* (Hindu scriptures), Indian ‘tradition,’ ‘folk’ medical systems, and ‘Indian’ science. In the subsequent chapters of this dissertation, I investigate and analyze three facets of the everyday lives of the practices through which crucial connections between these categories are made.

First, I look at the production and use of a specifically Hindu form of ritual in Ayurvedic laboratory work and the diverse voices from the Ayurvedic scientific community that participate in it. I follow these voices and the discourses that they help articulate around “ritual,” “scientific belief,” “un-scientific practices,” and the revitalization of “useful” “traditional” practices in order to explore the specific manner in which the effectiveness and rationality of a classical Hindu ritual in the lab is constructed *in relation to* other less scientific “endogenous views” of practicing/enacting ritual in the community. This ‘community’ however, does not have an *a priori* presence; it is created in and through scientific work. I investigate in chapter two how Ayurveda is authorized – through the language and discourse of a particular program of state science – as a “codified” knowledge system that can align easily with global pharmaceutical science and that is different from “community” or “folk” systems of medical practice. Rather than examining “community” as a unitary or pre-existing object that then enters into a seamless partnership with other such *a priori* objects, I analyze “community” as an effect of a science outreach pedagogical program led by the lab. Of concern to me here is how the overt distinction that is posited by the government and the Ayurvedic scientific community as one between “expert” knowledge and “weaker community” practices, between the “codified” and “folk,” “Ayurvedic” and “community,” “knowledge” and “wisdom,” become in effect a cover for other, less speakable distinctions of caste and class. ‘Science’ and the ‘laboratory,’ I argue, work with existing relations of caste and community and the privileges that reproduce them in order to produce new configurations of these socio-political categories.

This science also harnesses, imagines, and shapes an ‘Indian tradition.’ In fact, as I explore in my final chapter, the scientists’ design and conduct of Ayurvedic experiments in the lab reinforce Ayurveda’s functioning as *śāstra* – a word frequently used synonymously with ‘Indian science’ in these research spaces. A Sanskrit term rooted in the traditions of Hindu thought, the word *śāstra* denotes *rules* in a general sense, and is widely used as a suffix to name a technical or specialized field of knowledge in a defined area of practice. In the lab and the research spaces around it (as in contexts of Hindu nationalism), Ayurveda *śāstra* is often invoked in a manner that substitutes it for ‘Indian

health science' in general (I elaborate on this later). These substitutions are not fragmented acts of charged vocalizations; they are consolidated in and through consistent and systematic laboratory work. The authority and innovative edge of the Ayurvedic experiment that I follow ethnographically in this chapter derives its status from its firm roots in the *śat-darsanas* - the six philosophical traditions of Hindu thought - as well as in the repertoire of the tools and methods of 'modern' science. This seemingly merely hybrid form of traditional medicine bleeds into (re)installing Ayurveda as "the main Traditional Health Science of India" (Shankar *et al* 2000; 1500) and the main Traditional Health Science of India as a scientific attainment more complete than 'modern' science. The very crucial and critical way in which it does so is, paradoxically, by employing the tools of modern laboratory science to strengthen the "traditional tools" of Ayurveda – the Traditional Health Science of India. It is this complexity of the encounter of 'traditional' medicine with laboratory science that I want to acknowledge and analyze in this dissertation.

While the wider material and social context within which scientists work has been a key concern for laboratory studies (Latour & Woolgar 1986; Knorr-Cetina 1981; Lynch 1985, 1988; Fujimura 1987), and the processes involved in the scientific construction of traditional medicine have formed a core critique of postcolonial and transcultural studies of Asian medicine (Adams 2001, 2002; Anderson 2002; Langford 2002; Farquhar 1994; Kim 2007), the political consequences of the connections, slippages, substitutions and alignments that obtain when traditional medical knowledge is re-produced in the laboratory has received less attention. For it is not just the translation of traditional medical concepts into scientific language through the mobilization of laboratory practices that is at stake here. What is at stake is the legitimization of the larger Hindu philosophical framework as one that produces "valid" knowledge, and the mediation of this claim with the help of the language of that epistemological unit of modern science known as 'evidence.' The pharmacological lab experiment that I discuss is grounded in the concept of *pramā* (valid knowledge), *pramāṇa* (means of knowledge), and the Ayurvedic ways of acquiring that knowledge through the use of the five senses of the human body. These ways are part of the repertoire of the Hindu philosophical body of

work - the *ṣat darśana* (the six schools of Hindu philosophy, literally, the six views, the six insights) - that are themselves born out of the *Upaniṣads*, which are, in turn, part of the *Vedas*. Set into motion in tandem with the criteria and methods of modern sensory science, this experiment advances modern science and Ayurvedic science – the Traditional Health Science of India – as two parallel forms of expertise congealing around two sets of methods of “developing evidence⁶.” These claims of laboratory expertise, when analyzed together with the exclusionary structures, processes and discourses around ritual and useful traditional practices that I consider in the first chapter, and the useful, classical Ayurvedic practical knowledge imparted as “training the community” that I problematize in the second, perform a powerful function in validating existing socio-political arrangements of knowledge and power in contemporary Indian society.

It is true, as Judith Farquhar has pointed out, that in a world of institutionalized accumulations of resources with boundaries that are staunchly defended under the banner of scientific standards, nationalism and enthusiasm for one’s non-western tradition of healing are not positive virtues in the international hierarchy of the sciences (1994; 333). There is nothing to be gained from choosing to remain ‘outside’ western scientific methods for laboratory groups and research institutes seeking to participate as equals in a global scientific conversation. But the inequalities and the material maldistribution of resources and opportunities in an international hierarchy of knowledge claims to which postcolonial critics of science and technology point cannot be taken to mean that “non-western” medical traditions and their attending nationalisms are not active sites for

⁶ To go back to the Ganeshaiyah story, the need to mark and claim in narration the distinctiveness of that study in terms of “evidences” became even more important for the scientists of the study amidst other similar (sounding) *Sanjeevani* claims emerging within cultural discourse. In the same year that the study was being conceived, the mainstream media was reporting other grounds covered, literally, in “locating” *Sanjeevani*. For example, a news report titled “Has Ramdev done what Hanuman couldn’t?” suggested that Swami Ramdev and his team— popularly known as Baba Ramdev, self-styled *yoga guru* with an immense following at home and in the world – has located the particular plant of the *Ramayana* in the Dronagiri Hills of western India. What Hanuman could not find (and that resulted in his lifting the entire Dronagiri Hills), Ramdev and his team found and identified in just six days, suggests the report (See <http://www.hindustantimes.com/News-Feed/Has-Ramdev-done-what-Hanuman-couldn-t/Article1-341123.aspx> published Sep 29, 2008; accessed October 1, 2011. Or, <http://www.ndtv.com/convergence/ndtv/story.aspx?id=NEWEN20080067723> published Oct 05, 2008; accessed October 1, 2011) The scientists’ representations and ordering procedures that seek to build in a step-by-step fashion (remember Ganeshaiyah’s “logical process of elimination”) the “truth” about *Sanjeevani* seek to distinguish themselves from quick and miraculous claims of similar discoveries made by civil society.

producing, enforcing and reinforcing severe hierarchies of knowledge themselves. This is why it is important to track the specific and individual ways in which ‘tradition’ attaches itself to ‘science’ and ‘science’ attaches itself to ‘tradition.’

It is even more important to understand these within the larger history of science and colonial modernity in those non-western contexts. Arresting the two words – Vedic, and Science – within double quotes, overwhelmed by the “sudden” appearance of “Vedic Science” leaves these attachments poorly understood. In Meera Nanda’s work *Prophets facing backward: Postmodern critiques of science and Hindu nationalism in India* and other writings emanating from it, we encounter a concern around the relationship between modern science and Vedic tradition (2002). Nanda presents an account of the Hindu defense of Vedic scriptures as scientific texts and notes that this and other wrongs that come in the wake of Hindu nationalism has been encouraged by postmodernist ideas that unintentionally end up supporting Hindutva’s propaganda regarding Vedic science. The crux of the problem for Nanda is that postmodernist critiques of modern science as an essentially western, masculine and imperialistic way of acquiring knowledge encourage the neo-Hindu claim that all perspectives and ways of knowing are equally true, and true in their own right. This postmodern philosophy, she suggests, buttresses the Hindu nationalistic claim of finding a tradition of empirical science in the Vedas. This is problematic for her because Vedic Science is “doublespeak” and an “oxymoron” (Nanda 2001)⁷. In this account, owing to the over-reliance on postcolonial critical literacy tools seen in the heavy use of single and double quotes, we gain a certain restricted understanding that it is problematic for Nanda that the ‘Vedic’ can claim to be scientific. The logic and rationality that her critique attributes to ‘modernity’ makes her posit the ‘Vedic’ as being the “mythos” that is opposed to the “logos” of Science. Assigning water-tight compartments to Vedic scriptures and modern science, political ideals and cultural ideals, religious knowledge and secular scientific knowledge (2002), and noting therefore that the claim of a Vedic Science is “loud but

⁷ Nanda’s article “The doublespeak of Vedic Science” appeared in an issue of *The Week*, June 21, 2001. It used to be available at <http://www.the-week.com/21jun24/cover.htm> but is no longer available. A reproduction of it can be accessed on various different websites, including <http://www.svabhinava.org/hinducivilization/dialogues/MeeraNanda-frame.php>

false” (Nanda 2005; 223), Nanda prescribes not mixing up the mythos of Vedas with the logos of Science. In doing so, she not only exemplifies the authoritarianism and intolerance that she faults her Hindutva targets with, but also attributes a coherence, independence, logic, energy and internal rationality to “Myth,” “Religion,” “Science,” “Modernity.” Most significantly, it deflects attention away from the unfolding of how, why, and to what effects a seemingly global force – Science – becomes historically and culturally specified as Vedic science.

Scholarly analyses, however, of the scientific construction of traditions, of traditional science, and of traditional medical knowledges have long noted how science itself has been a contested domain between the colonizer::colonized, western::non-western, mainstream::alternative, and the expert::non-expert (Prakash 1999; Adams 2001, 2002; Langford 2002; Farquhar 1994; Nandy 1989; Pandian 2007). Gyan Prakash’s indispensable analyses have helped us understand how the western-educated Indian elite indigenized western science and used it as a counter hegemonic force to resist colonialism in India. Colonial scientific knowledge, in the process, was reshaped and turned against the colonizer. The educated elites positioned themselves as the modern representatives of the ancient indigenous scientific tradition, and brought forth new hegemonies with the help of which to rule the masses and consolidate the idea of the modern Indian nation. Jean Langford, in her important work on the reshaping of Ayurvedic knowledge through institutional practice shows us how the category ‘science’ is itself disrupted by contemporary Ayurvedic practitioners through Ayurvedic practice and pedagogy (2002). Though the word ‘science’ in contemporary Ayurvedic discourse is invoked in order to suggest the unquestioned hegemony of a particular mode and method of knowledge, the criteria for this mode of knowledge, Langford notes, are reconstructed and contested according to particular local and historically shaped aspirations (*ibid.* 148). Many of the generally held criteria of scientific knowledge imparted in modern science courses such as falsifiability, reproducibility of results and repeatability are renegotiated and reinterpreted in the Ayurvedic classroom and clinic to talk about the scientificity of Ayurveda in the language of “universal applicability,” “eternal truths,” and as a specialized branch of knowledge that has developed from “observation” backed by

transcendental intuition” (*ibid.*149). European science in such discourse is rendered as being young, incomplete, still developing, partial (with an exaggerated view and understanding of only part, not whole), and as being concerned with “external phenomena” as opposed to the “introspective mentality” of Hindus (Savnur quoted in Langford 2002; 149). While this does not discourage or limit efforts at correlating, translating, hybridizing or finding equivalences between the two sciences, a predominant and dominantly expressed view of the Ayurvedic practitioners that I have met and worked with assign to Ayurvedic science the spirit of science “and something more” (Gananath Sen quoted in Langford 2002; 149).

It is the political implications of this “something more” that I explore in this dissertation. While Langford’s analysis brings to the fore the social, economic and political factors in colonial and postcolonial society that shape and reshape Ayurvedic practice from a set of healing practices into something more – a sign of Indian national culture – it leaves untouched the complex arrangement of social practices and the hierarchies therein that institutional Ayurveda help reproduce. What are the political and epistemological implications of everyday Ayurvedic discourse that can set Ayurvedic knowledge apart from modern scientific knowledge on the basis of the “introspective mentality” of Hindus? What are the practices, cultural forms, and indeed, privileges through which Ayurvedic science is distinguished as *vijñān* (specialized knowledge; *ibid.* 148), as different from “local health traditions?” What strategies, structures and silences come about when Ayurvedic practitioners begin to prefer *śāstra* to describe the superiority of their science? A *śāstra*, as Langford describes one of her informants as explaining, “is that which instructs, makes you a disciple” (*ibid.* 150).

In attempting to address some of these questions, my dissertation tries to track the manner in which contemporary Ayurvedic practice brings into view a wider set of relationships – those between experts, caste and community, between Ayurvedic elite and Ayurvedic “community,” and ultimately, between science and politics. It argues, inspired by the brilliant works of scholars such as Anupama Rao (2010), MSS Pandian (2007) and Sanjay Seth (2009), that any kind of ‘knowledge-making’ in India has (had) caste as one

of its major constituents, defining identities, demarcating the boundaries of community, and regulating exchange (Rao 2010).

Background:

The Government of India formally announced its Golden Triangle Partnership (GTP) in the year 2004. First formulated by Dr. RA Mashelkar – then Director of the CSIR (Council of Scientific and Industrial Research) – at a meeting in Chitrakoot in the year 2003, the figure of the triangle was used to simultaneously denote the three vertices and lines connecting (a) Traditional medicine, (b) Modern medicine and (c) Modern Science. Dr. Mashelkar argued that while modern medicine had gained due to its strong linkages with modern science, the connection between modern science and traditional Indian knowledges has been poor. His choice of the specific narrative device of the triangle to represent the paths to these connections and to building new relationships among knowledges that have hitherto been involved in unequal transactions was inspired, he tells us, by the growing acceptance of this particular geometric shape in the world of CAM (Complementary and Alternative Medicine) research. Its use is known to replace the function of the pyramid that, as suggested by Cooper in his influential article,⁸ is a stone structure with a flat (usually) square base meets with the sloping sides only at the top. They were built by the ancient Egyptians as a tomb and by the Aztecs and Mayas as a platform for a temple, but have been co-opted widely in nutritional and food science as well as in CAM to arrange items and evidences hierarchically⁹, he writes (Cooper, 2005; 125). Cooper suggests that there is a need to “move the ancient and familiar definition to signify the 21st Century pyramid,” a need to dismantle the old pyramid, to deconstruct it

⁸ Edwin L Cooper, 2005 “CAM, eCAM, Bioprospecting: The 21st Century Pyramid” *eCAM* 2 (2) 125-127.

⁹ With the establishment in 1998 of the National Center for Complementary and Alternative Medicine (NCCAM) by the US Congress at the National Institutes of Health, the use of pyramids to investigate and evaluate CAM modalities has become quite common. The idea is to arrange the range of existing CAM therapies (Ayurveda being a “practitioner-based therapy,” according to the 2007 NHIS, and included in the CAM group) hierarchically, by strength of ‘evidence.’ Medical anthropologists have questioned and contributed significantly to such arrangements of evidence, suggesting that there are evidences, and highlighting the need to critically discuss the parameters of evaluating efficacy of ‘alternative’ medical modalities in terms of simplistic biomedical investigation (Anderson 1992; Barry 2006; Easthope 1986; Kleinman 1981; Nichter; Adams 2002) and the cultural constructions of assessment of the ‘safety’ and ‘efficacy,’ risks and benefits of traditional therapies (Kim *et al* 2007; Sujatha 2011). For the place and status of the Ayurvedic medical system within the CAM set-up in the US, see http://nccam.nih.gov/news/camstats/2007/camsurvey_fs1.htm#therapy (accessed Nov 1, 2011). For examples of how pyramid-style CAM evaluations in the US assess ‘risks’ associated with Ayurvedic medicines, see <http://www.thecamreport.com/category/a-alternative-medical-systems/ayurveda/> (accessed Nov 2, 2011).

from bottom up, so it can be rendered less impenetrable (*ibid*). Against this, he recommends that scientists challenge long-established ways of looking at the world and watch as the pyramid transforms itself into a triangle. In its new form, he tells us, the hierarchy disappears and the balance between three separate elements and the relationships between these parts begin to appear.

The triangle's scope as a conceptual figure for realigning the balance of power between traditional and modern knowledges in the Indian context appealed to Mashelkar, the communicative value of which he proposed to a group of about 50 scientists, bureaucrats, students and farmers of medicinal plants from the neighboring villages of Chitrakoot. The Chitrakoot meeting¹⁰ was a three-day workshop aimed at discussing the challenges, opportunities and prospects for excellence in Ayurvedic research. Over the years, it has become synonymous with Dr. Mashelkar's "Golden Triangle" speech and is commonly remembered in its condensed form – the Chitrakoot Declaration¹¹. Drawing on Mashelkar's special lecture as Chairman, titled 'On building a golden triangle between traditional medicine, modern medicine and modern science,' the Chitrakoot Declaration states that:

This gathering of scientists, technologists, physicians of Ayurveda and modern medicine, Sanskrit scholars, students, social workers, bureaucrats, farmers engaged in cultivation of medicinal plants and manufacturers of Ayurvedic medicines hereby resolves at the historical and holy land of Chitrakoot that, a Technology Mission for the development of Ayurveda and India's Traditional Knowledge-based Systems of Medicine should be set up immediately. It should establish a 'Golden Triangle between Traditional Medicine, Modern Medicine and Modern Science', to ensure that lifelong healthcare is provided to our people by 2010. For this, a 'Golden Triangle Fund' should be created by special budgetary support.

The Declaration draws our attention to the fact that this task of conceiving and committing to the geometric image of the triangle is taking place in a specific geographic location that is both historic and holy. The town of Chitrakoot that is shared by the two

¹⁰ 'Ayurveda Research Scenario — Challenges, Opportunities and Prospects for Excellence,' held at Arogyadham, Chitrakoot and organized by the National Botanical Research Institute (Lucknow) and the Deendayal Research Institute (Chitrakoot), May 24–26, 2003.

¹¹ A summary is available in the 2003 CSIR newsletter *CSIR 30 Aug 2003* (53) 16. It can also be accessed at http://www.niscair.res.in/sciencecommunication/rndnewsletters/csirnews2k3/csirnews_30aug03.asp

present day states of Madhya Pradesh and Uttar Pradesh is a place of great importance in Vālmīki's *Ramayana* where many of the central events in the epic take place and take shape. In fact, promotional materials for a host of post-independent rural development projects in the region regularly cite the religious/cultural/historical/archeological importance of the district to distinguish itself as a recipient of state and center funds¹². Further, the language of the Golden Triangle declaration also tells the reader that a full community of workers, academics and professionals across genres and classes and disciplines is unanimously undertaking a mission to build specific kinds of exchanges between Modern and Traditional Knowledges within the zone of the triangle. The group of students, rural workers and scientists that attended the three-day workshop on Ayurveda in Chitrakoot was not by itself large, certainly only one among numerous other gatherings that meet to discuss new institutional approaches to negotiate Ayurvedic knowledge. The three-day meet culminating in Mashelkar's proposing the Triangle, however, has turned the workshop into an exclusive milestone, making the Triangle itself an emblem of how to think about and communicate the relationship between the past, the present and the future within the same topological space, as it were. In fact, the device of the Triangle (projected as it is – as we shall see – as the three concurrent lines of Traditional knowledge, Modern Science, and Modern medicine, associated with each other in a symmetrical way that then meet in a single point inside the Triangle) allows its advocates to represent, speak about, and produce various distinct discourses (such as that of Rama's bridge, *Sanjeevani* the pharmacological resource, the mythological concept, Science, the *Ramayana*, the Past, and so on) as knowledge. It enables different kinds of discourses to appear side by side (and indeed, be *joined* at the sides as in a Triangle) in a formal system of knowledge-making about Tradition, Science, Ayurveda, and the Modern.

¹² The Chitrakoot Project (officially known as the Campaign for Self-Reliance) likens the self-sacrificing nature of the founder of the project to Rāma himself. See Abha Thani 2008 "Deendayal Research Institute: A Success story" New Delhi: CAPART (Council for Advancement of People's Action and Rural Technology).

In reminiscing about delivering the speech at the Second World Ayurveda Congress held a few years later¹³, Mashelkar reflects on the fact that “an information technologist or scientist” being chosen to deliver the inaugural address at a World Ayurveda Congress was itself a remarkable one. Almost as a historical passage point for himself, he invokes the balance and evenness granted by the aesthetics of the triangle to rehabilitate Ayurvedic knowledge from the “colonial syndrome” – the syndrome of seeing modern scientific knowledge as an adversary to traditional wisdom and traditional knowledge. “I must admit an unfortunate error on behalf of my *own* community...we as modern scientists really lost the plot,” he admits (Mashelkar, 2008; 131, emphasis mine), carving out a role and a responsibility for modern scientists within the logic of the triangle. He recommends that by infusing ancient wisdom with modern science, new paradigm shifts can ensure lifelong healthcare to India's vast population, and reiterates that for AYUSH¹⁴ in particular, the Golden Triangle project meant not merely a triangle, but a Golden one because it presented a golden opportunity to bring these different systems together (*ibid*). The figure of the triangle was formally adopted by the CCRAS (Central Council of Research in Ayurveda and Siddha, AYUSH, New Delhi) in the year 2004, and is regularly, methodically, and enthusiastically invoked in formal and informal AYUSH conversations.

The Triangle has not restricted itself to government circles. Other contemporary researchers in, of, Ayurvedic medicine frequently locate their own work in terms that are offered by the ecology of the Triangle. The Head of the Interdisciplinary School of Health Sciences, University of Pune, Dr. Bhushan Patwardhan is known for his outstanding work on the pharmacological properties of the medicinal root *Aśwagandha* (Latin name: *Withania somnifera*). He interprets the lines of the Triangle as enabling the linking of the three points of innovation, investment and enterprise around the globe

¹³ Held November 5-12, 2006 at the School of Interdisciplinary Health Sciences, University of Pune. *eCAM* carried a report on Mashelkar’s famous speech in its April 2008 issue. See Mashelkar, RA April 3, 2008 “Second World Ayurveda Congress: (Theme: Ayurveda for the future) – Inaugural Address: Part I” *eCAM* 5 (2): 129-131.

¹⁴ Department of Ayurveda, Yoga, Unani, Siddha, Homeopathy, a part of the Ministry of Health and Family Welfare, Government of India. Formerly the Department of Indian Systems of Medicine and Homeopathy (ISM&H) established in 1995, it was renamed AYUSH in 2003 – itself a common Hindu name derived from its Sanskrit meaning: longevity. The Department’s functions of upholding educational standards in the Indian Systems of Medicines and Homoeopathy colleges, strengthening research, promoting the cultivation of medicinal plants used, and working on pharmacopeial standards remain the same.

(2007; 95), and has termed the Triangle “a new discovery engine” for Ayurveda (2004; 797). Figure 1a depicts a graphical representation offered by Dr. Patwardhan of this engine that is held together by pinning up Traditional Wisdom, Modern Sciences, and Modern Medicine as the three points/angles of the Triangle. Dr. Alex Hankey, Editor of the journal J-AIM (Journal of Ayurveda and Integrated Medicine) coming out of the literary research group of the IIA (Institute of Integrative Ayurveda, Bangalore) inverts the terms of the Triangle, and takes the base up (see Figure 1b). In his depiction, we see Ayurvedic medicine and Modern medicine as occupying the two ends of one of the bases, with both meeting Modern Science at the bottom. The area of the thus formed Triangle is simultaneously saturated with many small triangles, all golden in color.

Dr. Mashelkar commenced his speech at the World Ayurveda Congress by recognizing that he was indeed very happy that the concept that he had used for his valedictory envoi at the Chitrakoot meet had become so popular. This speech is of significance to me, for it placed, for the first time since the adoption of the Triangle, “people” on it. By pointing out specific persons in the audience whose presence at that speech he linked to the very promise of the Triangle, Mashelkar helped populate the Triangle landscape that independent scientists and government science departments alike had already begun using in powerpoint presentations as “discovery engines” rather than engines run by people. Mashelkar acknowledged at this assembly two eminent professors from the University of Oxford and Columbia University to refer collectively to all those who “belong to the same community” as him (trained in modern science in top international universities and educational centers), and underlined that it was this kind of openness to Ayurveda, to new ideas and new thinking that he hoped the Triangle would symbolize. He summed up the speech by recommending that “there should be no artificial boundaries, no walls or borders between different domains of knowledge or their practitioners. That is why I am so happy to see the present confluence of these different domains of knowledge and their adherents.” (Mashelkar, 2008; 131).

A corollary of this is that the constituency that the Golden Triangle appeals to is not the Ayurvedic “community,” a theme that animates this dissertation. Many of the

younger, fresh graduates from Ayurvedic colleges who supply the everyday functions upon which the Triangle may stand remain unmoved by ideas about rehabilitating Ayurvedic knowledge from Mashelkar's "colonial syndrome." Rather than claims to repairing a hostile and discriminatory past, they say unequivocally that what the present Ayurvedic research community sorely lacks are bosses, senior researchers and decision makers who will respect the intellects of those who are their juniors and who will pay them well as a demonstration of that respect. By everyday functions, I mean for example, the work of Ayurvedic doctors¹⁵ employed by the Bio-Informatics department of the IIA. This is a large department whose chief aim is to develop a complete, what the IIA calls, a "multi-disciplinary," database on flora, fauna, metals and minerals of traditional materia medica to aid further research in Ayurveda. It employs a diverse workforce trained in botany, Ayurvedic medicine, Sanskrit and Information Technology to generate one comprehensive database containing plant names and plant images in as many languages as possible¹⁶. A typical Bio-informatics researcher's workday, depending on her specific qualification and training, involves several trips to the IIA library a day to collect relevant information from, for instance, primary texts from the 1500 BC through 1900 AD period and then to "enter it in the system."¹⁷ Not only are many junior research fellows always on the lookout for other and better job opportunities that would let them do "real, clinical practice" (for example, it is not uncommon for most BAMS graduates I met to have applied for a license to rent space to start their own private medical practice and work at research organizations such as the IIA while waiting for space and/or funds), there are also those who, in not acknowledging the Triangle steadily refuse to lend themselves to any of the goals of the Triangle or its gatekeepers.

¹⁵ Students of Ayurveda who have completed a formal BAMS degree (Bachelor of Ayurvedic Medicine and Surgery) from a recognized undergraduate institution of Ayurvedic learning. The universal everyday term in India for freshly graduated students who are absorbed into their first, regular jobs is "freshers," and although in informal conversations at the IIA, these doctors will even sometimes be referred to as that, officially, and in meetings, presentations and guest tours of the campus, they are always referred to by their bosses and heads of departments as "junior research fellows." Sometimes the IIA appoints students who are still undergoing their BAMS degree to fulfill the mandatory internship requirement of the BAMS degree in their clinic, but there is no formal designation for them, even though they are on the payroll, with similar (and sometimes more) work responsibilities than full time IIA employees and Ayurvedic doctors.

¹⁶ By now, the Bio-Informatics unit of the IIA has developed a database containing 68, 000 plant names in 32 languages and 16,000 plant images.

¹⁷ Computer system.

The gatekeepers for their part, experience the partial nature and invented-ness of this “community” as well. Dr. Alex Hankey (whose depiction of the Triangle we saw in Figure 1b) shared with me his experience on how difficult it was to get four key scientists to agree to be present at the Chitrakoot meeting. Two of these scientists who required convincing were surgeons and clinical pharmacologists, adjunct and visiting professors at Ivy League American universities, friends and colleagues of the architects of the GTP, regularly publishing, and highly visible as public figures and eminent academics and scientists in their own fields. Their consent and presence was important at the first ever GTP speech for all these reasons and for reasons of government funding. Alex told me that the GTP’s “baptism by fire” were the several months prior to the Chitrakoot speech when these coveted scientists needed convincing to “just show up for the Convention” and express solidarity with the concept by just being present. To have to work around all the “mistrust” that Ayurveda had accumulated over the years and then to have to commit to working with “it” (Ayurveda) is a big move for many modern scientists, he said. Not only are the participants in the ‘Golden Triangle Project’ rarely equal, the ‘community’ projected through it belies the heterogeneity of views and refusal of unanimity even within the elite. Therefore when the word ‘community’ (for Ayurvedic community) gets used in official representations of discourse, it is important to remember that there is no such unitary configuration to speak of, to speak for. The necessary question then becomes: how and through what practices an official ‘bringing together’ that claims to represent such a unitary community, emerges.

Trans-Disciplinary science and the Open-minded scientist

The fact that a triangle can be conceptualized and implemented points to not the non-existence of diverse forms within it, but the capillary forms of power within that can make it possible to think traditional medicine, modern medicine and Ayurvedic medicine in the form of a triangle. At the Indian Institute of Ayurveda (IIA), Bangalore, where I conducted two years of ethnographic fieldwork, the language that has been used to talk about the triangle – the collapsing of “artificial boundaries and walls between different domains of knowledge” in particular, has produced a discourse on ‘inter-cultural

science,’ variedly referred to as ‘multi-disciplinary’ or ‘trans-disciplinary’ science. The IIA is a well-regarded and heavily influential non-governmental Ayurvedic research institution in Southern India with a strong funding record from both the government as well as private industry. In an article published in the year 2007 in *Current Science*¹⁸, the founder-Director and two senior researchers from the IIA introduce the concept of an ‘inter-cultural’ approach to knowledge. They highlight that the theoretical foundations of Ayurveda and Modern science are different, as are the larger epistemological frameworks of which they are a part, and they recommend that different perspectives and ways of knowing cannot be right or wrong, or more superior, or less. Cultural differences in these two knowledge systems, they write, should be celebrated, but the “bridging will however only happen when sensitive, open-minded scientists from the two knowledge systems dialogue in a sustained way and institutions devoted to inter-cultural research are specially created to pursue such interactions” (Shankar, Unnikrishnan, Venkatasubramanian 2007; 1500).

The pressing question for me is how the prefixes - inter/multi/trans - function to not merely name and think a world external to them (that can be “approached” in an inter, or multi, or trans way) but in fact, how they serve to constitute that world. That is, how do particular programs and research projects produce an identity that they presuppose? I take up this question most elaborately in Chapter three, where I demonstrate how a particular state program in science pedagogy *forms* both the object of Ayurvedic knowledge (‘Quality’ as a property of materials and medicinal plants) that it is purported to impart to the community, as well as the subject of this pedagogic program – the ‘community.’ I critically analyze a government conceived and funded program known as ‘Quality control of Herbal medicines’ implemented by the IIA lab and interrogate the specifically political modes of disseminating Ayurvedic and modern science expertise (on assessment of ‘quality’ of medicines) to the ‘folk’/ community. I explore the category of “weaker communities” – a collectivity, object and people that the training was designed to train – and consider the invention of this category in and through the discourse of the

¹⁸ Darshan Shankar, PM Unnikrishnan, Padma Venkatasubramanian, June 10, 2007 “Need to develop inter-cultural standards for quality, safety and efficacy of traditional Indian systems of medicine. *Current Science* 92 (11): 1499-1505.

training program itself. As a trainee/participant¹⁹ in the program conducted in the year 2009, I analyze the set of practices that form the community that merits training, and the complex web of boundaries, exclusions and exceptions that produce and sustain the separation between codified knowledge and folk traditions. At work in this chapter are theoretical and methodological insights gained from Tim Mitchell's commanding analysis of the making of "the economy," politics and expertise in a postcolonial context (2002). Together with the help of Ashis Nandy's work on the pedagogic and imperialist hierarchy between European adulthood and its childish, feminized, colonized Other (1983), I explore in this chapter the discursive strategies through which a folk-ness is produced, that can receive, nurture and preserve the revitalizing force of codified Ayurvedic traditions. At work are the strategies through which the Brahminic is foregrounded as "quality," and 'quality' as Ayurvedic.

The chapter also serves to prefigure the themes that I introduce in Chapter four, where I pry open the implications of the critical practice of Trans-disciplinary knowledge. To introduce those themes, let us return to the article where its advocates make a case for the idea of Inter-cultural knowledge. Here the writers outline the concrete directions that inter-cultural work could take, including the task of producing and sharing knowledge about quality of medicinal herbs as laid out in Ayurvedic medical literature and global modern science (theme of Chapter three, as discussed above), of mainstreaming traditional (Ayurvedic) pharmacological approaches to medicines and materials (theme of Chapter four), and of standardizing the "subjective reasoning" and "inward investigation" (*ibid.*) implied in the *Śāstras* as a path to scientific reasoning (theme of Chapters two and four). They develop the central idea and rationale of an inter-cultural knowledge exchange thus:

"At every level of the structure of the knowledge system such as principles, categories, concepts, logical framework, philosophy and worldview, there are

¹⁹ It has been an excessively difficult exercise for me to categorize my participation in these programs as "trainer" or "trainee" for the purposes of this dissertation. I was a trainee at this program because I was taking classes, doing experiments, industry tours and 'hands-on' training along with the "community" during the day, and I was not a trainee because I was proofreading the training handbook to be distributed to the trainee group the previous night. I allude to the problem of this double-location (Strathern 1999) towards the end of this chapter. For a scholarly discussion of the crux of this fieldwork complexity and the ethnographic effect, see Marilyn Strathern 1999.

major differences between Ayurveda and Western biomedicine. Ayurveda derives from a worldview that regards ‘a living being as a microcosm of the macrocosm outside’, thus accepting the unity between the two (*loka purusa samanya*). On the other hand, modern science is based on the observer–observed dualism, and on the Cartesian worldview. The philosophical foundation of Ayurveda is derived from *sad-darsanas* (six philosophical traditions), mainly the *Samkhya darsana*. Modern science is based on logical positivism, which essentially advocates the idea that the ultimate basis of knowledge rests upon reproducible results. Another basic difference is the means of knowledge. Whereas Western science is mainly based on logical interpretation of empirical data, Ayurveda also gives importance to *āpta vacan*, i.e. impersonal subjective insights.... While there is a contemporary value in applying modern science and technology tools for creating objective and verifiable standards for traditional knowledge products and concepts, currently the approach to creating standards is one-sided.... (We) illustrate the imperative for collaboration between scientists and traditional knowledge experts so as to promote mutual understanding” (Shankar *et al* 2007; 1500)

This passage is saturated with the specific epistemological, political, material and cultural context of inter-cultural work. I approach it from two critical perspectives. The first relates to making visible the ‘subjective’ and ‘internal investigation’ as the site of Indian “difference” in science. The Ayurvedic is foregrounded as the *Śāstras*, and the *Śāstras*, as not Hindu, but ‘Indian.’ Recall here the Ayurvedic author quoted in Langford and discussed earlier on in this chapter. European science, for the author, takes only partial views because “Westerners are concerned only with external phenomena, while Hindus, having an ‘introspective mentality,’ are concerned with internal phenomena as well” (Langford 2002: 149). As a participant and observer in an Ayurvedic experiment in the lab that trains to listen to one’s senses, I analyze in this chapter, some of my own experiences in standardizing the “subjective reasoning” and “inward investigation” (Shankar *et al* 2007; 1500) implied in the *Śāstras* as a path to scientific reasoning.

For the second perspective that I take in this chapter, I take up the implications of IIA’s core critique of the hitherto “one-sided” approaches to hybridizing Ayurvedic and Modern science. Critically reflecting on the content and effects of contemporary studies and initiatives in Ayurvedic research, the Trans-disciplinary lab at the IIA is in the process of developing an experiment that does not merely use the Ayurvedic literature as a “source of leads” for the supply of new pharmaceuticals, but carefully and completely

understand, engage and apply the logic of the foundational principles of Ayurveda in order to build knowledge about materials, medicines and pharmaceuticals. As a Knowledge institution, the IIA self-reflectively and programmatically tries to intellectually engage scholars from different disciplines and disciplinary backgrounds. They interact with, and integrate the work of, medical anthropologists, sociologists and political scientists for instance, that highlight, critique and assess the development of traditional medical systems within the larger processes of globalization and pharmaceuticalization.

Madhulika Banerjee's longstanding work on the mass marketing of Ayurvedic medicines (1999, 2002, 2009) introduces the concept of a "pharmaceutic episteme" (2002; 1136) – an episteme that is focused on retaining Ayurveda's usefulness as a supplier of new pharmaceuticals, but one that dismisses its worldview on the body, health and disease – a limitation of contemporary Ayurvedic drug research that many researchers of Ayurvedic medicine will echo. This episteme has governed post-independent research in Ayurveda in India, and is most commonly seen in the excerpting of a piece of traditional medical knowledge (information about medicinal plants, therapeutic cures, diet prescriptions and proscriptions documented in the textual Ayurvedic tradition or in use by communities) and subsequently evaluating this traditional medical recommendation with the help of modern biochemical, phytochemical, pharmacological and biomedical clinical testing methods (such as Thin Layer Chromatography, High Performance Layer Chromatography, Gas Chromatography, bioassays and Randomized Controlled Trials) to demonstrate and legitimize its efficacy. The lab project I subject to critical analysis proposes, in contrast, an approach to pharmacological knowledge production and drug discovery that demonstrates "Ayurveda's own principles" to demonstrate the "logical reasoning" (Internal Lab Report, 2006; 1) behind foundational Ayurvedic pharmacological concepts. This Ayurvedic experiment is called *Sensory analysis*, and it aims to formulate – out of the classical Ayurvedic classificatory scheme of understanding matter/material/medicine (*dravya*) with the help of the five senses – a "method" to know and understand materials and medicines. Since the epistemological and philosophical foundations of sensory

science are well laid out in the traditional texts, but the “precise” and “exact methods” to apply this epistemological knowledge to drug discovery use are not, the experiment proposes to integrate methods from modern sensory science in order to both develop knowledge about drug discovery, as well as, “give back to Ayurveda.” In this sense, it proposes to develop a methodology in Ayurvedic pharmacology that builds on both (to go back to the quote from the article above) Ayurvedic “impersonal subjective insights” as well as modern methods to achieve “objective and verifiable standards.”

I undertake an ethnographic analysis of this Ayurvedic experiment, for which I trained as what they term ‘sensory analyst’ for twelve months. Being closely involved in a study that trains and analyzes one’s senses, in this chapter I enter headlong into making, and into the making of, modern practices of representation (Mitchell 2002). I draw on my own experiences as participant, my interviews with fellow sensory panel analysts, and my parallelly continuing analysis and observations of the contexts that went into the making of this experiment. In ‘making sense’ of this Ayurvedic sensory experiment, I speak to the literature in anthropology and cultural studies where sense has emerged / is emerging as a focus / frame of analysis. As an object of anthropological investigation and a condition of reflexive anthropology, ‘sense’ has developed from being *something* that was measured in the bodies of “primitive peoples” and recorded through instruments (the 1898 Torres Strait expedition) to a method of cross-cultural study within anthropology. I briefly review anthropology’s own relationship with “sense” and argue that the critiques that led to the sensual turn of the late 1980s and early 1990s take for granted and promote the understanding, imagination and articulability of the senses as discrete, individual and separate categories. In doing so, I submit that both anthropological critiques as well as the Trans-disciplinary researchers involved in the Ayurvedic sensory study succumb to what Kuriyama has termed the “spell of anatomy” (Kuriyama 2006; 50).

But it is perhaps only when read in conjunction with Chapter two that a fuller grasp of the idea of the “sensitive, open-minded scientist” (Shankar, Unnikrishnan, Venkatasubramanian 2007; 1500) discussed in the rest of the dissertation, can emerge. In this chapter I turn the spotlight on the place and function of practices of modern

Hinduism in Trans-disciplinary knowledge production and the place and function of trans-disciplinary knowledge production on practices of modern Hinduism. I follow the complex discourses, relations and networks around the systematic production of Hindu worship rituals in the life of the lab and probe efforts to delineate an open-minded scientist identity through the reconstruction of a discourse on Reason.

I follow the trail of the performance of a particular *puja* (Hindu worship ritual) known as the *rudra abhishekam* (a prayer for Lord Shiva) performed by the Head of the lab as part of a series of *pujas* performed on IIA campus to seek blessings for the efficient functioning of the Institute's projects and for the general health, wealth and welfare of its staff. I juxtapose the participating scientists' framings of this ritual with two expert discourses on ritual – one; a recent collection of essays by anthropologists, historians, philosophers and psychologists theorizing the instrumental and efficacious value of rituals; and, two; an internal series of discussions in the lab that made a distinct distinction between the superstitious rituals of the Community and those, such as the *rudra abhishekam*, that made Science, effective. The meetings where these were discussed were organized to define and delimit the scope of the subject matter of Trans-disciplinary knowledge production, the criteria for deciding “what kind of rituals” or what kinds of medical traditions were worthy of being funded under the label ‘Trans-disciplinary knowledge.’

To attempt to analyze the contradictions, and subsequently, exclusions in these performances and discourses on ritual, I enter into a conversation with Dipesh Chakrabarty, Talal Asad and Gyan Prakash. I theorize, first of all, my own intellectual and political relationship with “religion” as an anthropological category, and I take Chakrabarty's help in articulating this concern. In examining the contexts in which Hindu gods, symbols and idols authorize ‘open-minded science,’ I rely on Gyan Prakash's analyses of the invocation of science's authority in the critique of religion and society in colonial India (1997, 1999). Prakash's understanding of the then emergent western-educated elite that saw itself as uniquely placed to reform and revive traditions is particularly relevant to this dissertation as I try to comprehend a “contemporary” elite discourse on the “revitalization of the Indian medical Heritage.”

A note on this ethnographic production

In this dissertation, I describe thickly. But as a research project that receives its key intellectual impetus from the postcolonial studies project, one cannot leave untheorized the “awkward relationship” (Strathern 1987) between postcolonial thought and the colonizing resonances inhered in “data collection,” “fieldwork” and “thick description.” The postcolonial studies project has inherited a very specific understanding of Western domination as the symptom of an unwholesome alliance between power and knowledge (Gandhi 1998). It recognizes that colonial discourse typically rationalizes itself through rigid oppositions such as developed/developing, progressive/primitive, civilization/barbaric, and so on. Doing ethnography within postcolonial criticism is to acknowledge, in a sense, one’s complicity with imperialist discourses.

The privileging of the senses and the privileging of “experience” in participant observation opens up critiques of colonial realism. Emily Apter in her paper “Ethnographic Travesties,” anchors the realist narrative technique of ethnography in the “evidentiary (1995; 300), specifically the descriptivist culture of writing. Critiquing the poetics of cultural fetishism and visual seduction, the relationship between caricature and cultural identity and the historical role of colonialism in the perpetuation of all of these, Apter also argues that precludes and prefaces that remember to situate the writer/viewer in a redemptive practice is ultimately a re-enactment of the colonial gesture of self-authorization. The “reading” of cultures as ensembles of texts (Geertz 1973) produces what postcolonial criticism recognizes as “colonially cultured positions” (Apter 1995; 301). In fact, it is possible to argue with Barthes’ help, that what is “real” is only an *effect* of particular details (Barthes 1989). The inclusion of trivial details while “writing” cultures (Clifford and Marcus 2010) allows an ethnographic text to perform the ideological function of a one-to-one relationship with the socio-historical context that it is attempting to describe (Barthes 1986; Chakrabarty 2000). Anthropology’s own critiques of models of cultural analysis have moved from sensing to reading to writing to dialoguing cultures, as I discuss in Chapter four. These shifts in reading and critiquing its

own methods of ethnographic production have been marked by various terminological substitutions, such as the use of “storytelling” in place of “text” (Webster 1983), or the use of “negotiation” in place of “description” as in, “ethnography [is located] in a process of dialogue where interlocutors actively negotiate a shared vision of reality” (Clifford 1988; 43). Postcolonial criticism, in directing its critique against the cultural hegemony of European knowledges attaches itself to the project of reasserting the agency of the non-European world (Gandhi 1998), and the positions and oppositions of the observer/observed created in and through the method of participant observation are especially difficult to dismantle from *inside* (anthropology) rather than from outside.

This leads me to a final point about method, field and writing in my research. In a conversation published under the title *Intellectuals and Power*, Foucault and Deleuze exchange their views on the relationship between theory and practice, hinging their discussion on the political involvement of the intellectual (Foucault 1977). Speaking about the need to revise traditional and totalizing ways of viewing practice as an application, as a consequence of theory, Deleuze proposes the concept of ‘relay’ (*ibid*; 206). He says that from the moment a theory moves into its proper domain, it begins to encounter obstacles and blockages that require its relay by another type of discourse. In this sense, practice is a set of relays from one theory to another, and theory is a relay from one practice to another. My original fieldwork proposal aimed to theoretically analyze the 2001 National Policy on Indian Systems of Medicine (ISM) framed by the Government of India - the policy being the first ever exclusively oriented toward the Indian systems of medicine. I hypothesized that this policy produces new terms of legitimacy for Ayurveda at the international level by adapting, appropriating and resituating Ayurvedic science in response to the demand for international accountability in medical science research. The Golden Triangle Partnership (GTP) found a mention in a footnote of one of my grant proposals when it found a mention in my original proposals at all.

It was impossible to foresee then what role the drawing out of the three lines of the Triangle on paper by a junior Ayurvedic doctor sometime around the middle of my fieldwork would play in my observations and analysis of contemporary Ayurvedic

research. She had not heard about the GTP until a social science scholar conducting research on the pharmaceuticalization of Ayurvedic formulations used the term in her talk at the IIA campus. I had missed that lecture, and as the junior doctor (who became a very close friend) was recollecting it for me in one of our interviews, asking me back what and how much I knew about it, she noted especially that if she had a chance, she would replace the triangle with a Circle. Triangles were too limiting, and besides, she could not see her place in this one. Her current work at the IIA precluded the possibility of seeing herself reflected in any of the vertices of the Triangle – Traditional (Ayurvedic) medicine, Modern science, Modern medicine – since she experienced her and many of her colleagues’ work in the literary research unit of the IIA to be nothing more than that of “a data entry operator.” The more I spent time in the field, the more the Golden Triangle as an organizing principle of work gleamed, and the more its implications simultaneously multiplied and divided.

By this I mean that this physician’s use of the word ‘circle’ in the course of our interview eventually led her and I to become aware of other “data entry operators” and junior research fellows at the IIA who were either in disagreement with those that ran the Triangle but continued to work for them, or were in such disagreement that they left, or were asked to leave, the organization. There were also those who were not at all moved by the conversations or the theoretical/political scope of the figure of a dissenting Circle, but who committed themselves to organizing as a group around it nevertheless because of “professional” reasons: low pay being a chief reason. That is, while some junior researchers found themselves disagreeing with some of the core assumptions and methods of the Ayurvedic research programs sparked off by the GTP and the Trans-disciplinary research programs and projects, experiencing their own theoretical views and epistemological inputs as being under-represented and marginalized within the “bridging” discourse of the GTP, there were still others who were drawn to the Circle movement because of their disgruntlement with their bosses and the management over issues of salary and pay. By the time I was getting ready to leave Bangalore, the ‘Circle’ was slowly stimulating and galvanizing many young Ayurvedic professionals with past and present links with the IIA, bringing into its fold folks who had resigned from the IIA

over professional and epistemological differences and were no longer actively working with the organization. As an emergent platform that brought together the concerns of Ayurvedic professionals who questioned the contours of power drawn by the Golden Triangle, the Circle group met all of three times before I left, with one meeting held in my home and two others at one other member's. Ironically, my proximity to, and varying degrees of closeness with, the representatives of the Triangle – the bosses, the management, the Heads of labs and the architects of the open-minded scientist – meant that I was part of both the Circle *and* the Triangle (as were all the rest of us). As a form of political organizing around epistemological and professional discontents, the Circle did not last due to differences over leadership. However, a few months ago, in one of my many moments of immersion in the field away from the field, two of the erstwhile Circle's core members said to me that I had been "away" for too long. Come on some project, they said, alluding to the work remaining on the half-baked Circle.

My analytical emphasis on the Golden Triangle then, is not just the work of observation or the work of analysis, or the work of theory or that of practice. The focus of this research, my object of study, the content of this dissertation and my political interventions in the field are not separable. The complexity that arises out of each creating the other and the acute awareness that these can exist only in relationship to one another is the very state of "immersion" (Strathern 1999; 6) that Strathern describes. Ethnographic writing itself creates relays, it creates, as Strathern has aptly pointed out, a second field (1999; 2). Practice, theory, people, material, method and writing, have for me, throughout the course of this dissertation's career, been absolutely entangled. Not only has this "second field" immersed me even more in the relationships that I have forged in the field, it has also made me feel like a part of their relationships with one another.



Figure 1(a)

Source: CURRENT SCIENCE, VOL. 86, NO. 6, 25 MARCH 2004: Pg. 797

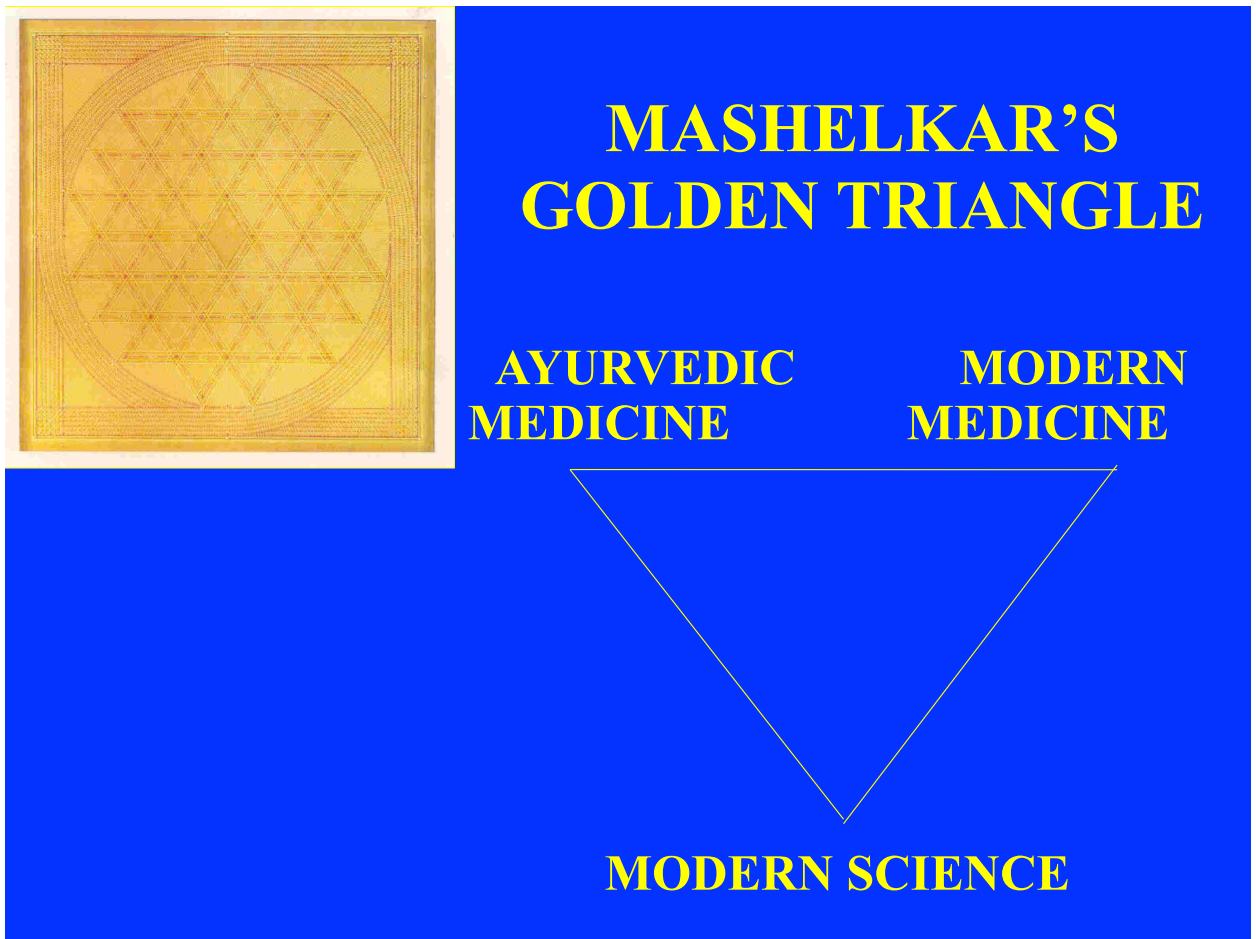


Figure 1(b)

Source: Alex Hankey, Aug 23, 2008. PowerPoint presentation, IGC Convention.

Ritual immersion(s)

A secular subject like history faces certain problems in handling practices in which gods, spirits, or the supernatural have agency in the world.

--Dipesh Chakrabarty, *Provincializing Europe*²⁰

It is an unusually cold Wednesday morning, but nothing about it tells me that it has the quality of an event. I walk into the microbiology section of the IIA lab for a prior scheduled interview, but the lab looks quite empty. Padma, the secretary to the director of the lab shared with me that the staff was away at a *puja* (Hindu worship ritual) organized specifically for the lab. Shekhar [research assistant] was working on a new compound at the product development lab yesterday, and there was a small fire caused by the charring of his sample, Padma said. “So madam [Neeraja, the Head of the lab] has called a *puja* today.” I was struck by Padma’s use of the conjunction “so,” that served to carefully connect the two parts of her sentence (“...small fire caused by Shekhar...so madam has called a *puja* today”), and I prepared to walk to the pharmacy a few buildings away where the *puja* was going to take place. I had been inside the campus pharmacy on a number of different occasions and would walk by it every single day on my way to the library, the Bio-Informatics Center, the Bio-Cultural Herbarium, the IIA hospital, and the canteen. As participant-observer, I had also spent vast amounts of time reading, interviewing, observing, analyzing and talking to other researchers in a lab where instrument/equipment worship was an everyday fact, part of a larger complex of the everyday production of work. That today I was searching my bag for the camera, field diary and voice recorder when I learned about the *puja* in the pharmacy was not incidental but, rather, a political and intellectual conjuncture. The “so,” which Padma used in her speech to establish causality between disaster and remedy, averted disaster and prayer, struck a deep and instant chord in my disenchanting world (Chakrabarty 2001), and I straightaway translated Padma’s explanation as “religious.” Is Padma attributing agency to the idol being worshipped at the *puja* today? Is her linking of yesterday’s event of the charred medicinal sample and today’s *puja* shared by others

²⁰ Dipesh Chakrabarty 2000 *Provincializing Europe: Postcolonial thought and Historical Difference*. Princeton: Princeton University Press. Pg 72.

members of the lab? How do ritual exchange relationships with God (idol worship in order to secure and control uncertain outcomes) mediate other non-religious aspects of work in the lab? My mind was brimming with possible lines of inquiry into ‘religion’ inside the lab, and as I equipped myself with many kinds of recording devices to fully document how religiosity was embedded in the scientists’ daily practices, I was hopeful that my participation in, and recording of, the special *puja* would allow me a fuller access to the symbolic life of the lab.

My prompt reading of Padma’s articulation of the co-relation between the two events as “religious,” while the everyday motifs and symbols of religious representations smeared on lab equipment as not requiring any particular anthropological interrogation brought me to an important crossroad in the field, for it located me simultaneously as insider and outsider. As insider, as someone who has grown up in spaces and inhabited structures and processes where God is ever present, the presence of Hindu symbols on lab instruments was for me both unremarkable and unreadable except by way of thinking of it as another example of machinery worship²¹ – an everyday fact of life in India. Read in this way, as my fieldnotes now remind me, I was theorizing the symbols painted on the lab equipment as an instantiation of the STS (Science and Technology Studies) claim that scientific work is constitutive of cultural worlds (Latour and Woolgar 1979; Latour 1987; Jasanoff 2004; Haraway 1999; Taussig 2009) and as a local, ethnographic example of how God is present and invoked in the laboratory (Roberts, 2010). My reading of Padma’s understanding of today’s *puja* simultaneously co-located me as outsider because the only way that I could make sense of her efforts to connect the previous day’s ‘material’ laboratory procedure (research assistant preparing and charring Ayurvedic medicine sample) with today’s unscheduled *puja* was by assigning it the social science master category of ‘religion.’ As one of the key categories in the imagination of ‘culture,’ ‘religion’ itself becomes a secular way of narrating events and practices in the universal language of social science. Since I had no way of accessing the presence or agency of

²¹ Dipesh Chakrabarty addresses the issue of machine worship, worship of tools (*hathiyar puja*) in his study of workers’ struggles in early 20th century Bengali jute mills. He argues that the worker’s relationship with the machine, instead of being mediated through a technical knowledge, was mediated through the North Indian peasant’s conception of his tools, whereby the tools often took on magical and godly qualities. See Dipesh Chakrabarty, 1989 *Rethinking working-class history: Bengal 1890-1940*. Princeton: Princeton University Press.

gods in the way that Padma or others in the lab did, the only explanatory framework available to me was that of ‘religion’ as a “code” (Chakrabarty 2000; 77) in which one can produce social science knowledge about such events and co-relations²². Yet, as Talal Asad’s essays on religion show us, a transhistorical or universal definition of religion is simply not viable (1993). Through what categories and in what prose then are we to narrate the practices of scientists and the spaces in which they work, when these spaces and practices are organized around presences of gods and idols? How do we enquire into these practices and not translate into a universal language (such as the ‘co-production’ of science and religion) that which belongs to a field of differences (Chakrabarty 2000; 76)? I would propose that the only way to render these practices is to understand why the co-production makes sense to the scientists, what this production means for scientific practice, and for whom its effects are most productive.

The questions for this chapter then become: What are the conditions under which inter-cultural / trans-disciplinary science is authorized, and what is the place of Hindu gods, symbols and idols in this authorizing? How is the practice and discourse on *puja* conceived in relationship to the prefixes “inter” and “trans” in inter-cultural and trans-disciplinary science? How are these conceived in relationship to the “open-minded” scientist? And finally, what are the uses of exclusionary practices in imagining trans-disciplinary research projects that are purported to be “inclusive” and “relevant?” In opening up the space of the lab to explore these questions, I open up also my own relationship to fieldwork constituted through the tension between my role as participant-observer and my political choices in the field.

To hold all of these intellectual / theoretical / methodological questions and concerns together so that they can help in the analysis of each other, I invoke the word

²² Chakrabarty analyses this dilemma through his critique of academic history writing. Academic history writing, he argues, *translates* the practices of people and worlds in which gods, spirits and the supernatural have agency and in which humans are not the only meaningful agents, *into* secular histories that are usually produced by ignoring the signs of these presences. He asks, how can we read a particular festival dedicated to the engineer god Vishvakarma celebrated in parts of North India as a public holiday for the working classes, as different from any working class religious holiday anywhere? We could produce a secular narrative of the festival, but how would that be any different from a narrative of Christmas or the Muslim festival Id except by way of explaining their difference anthropologically, that is, by holding another master code – “culture” or “religion” – constant and universal. Chakrabarty, 2000 *Provincializing Europe: Postcolonial thought and Historical Difference*’ Princeton: Princeton University Press.

“immersion” in the chapter title. I use this word to convey a complex set of meanings and processes. 1) ‘Immersion’ as *Visarjan* is a moment in Hindu festive praxis where a public or quasi-public festival involving collective worship of a Hindu deity culminates in it being taken to the waters and ‘immersed.’ This final day rite is usually preceded by a rite of releasing the *prana* (life, breath, energy) from the *pratima* (image, icon, deity representation) which was put into it in the first place by a priest on the first day of the festival. The IIA celebrates the *Ganesh* festival (dedicated to the auspicious Hindu deity regarded as the remover of all obstacles) for the whole seven days of the bright part of the lunar-solar month (August-September). Although performed with great fervor and devotion as *Vinayaka Chaturthi* in most of South India, popular narrative, mostly among the ‘North Indian’ employees at the IIA attribute the detailed *Ganesh* celebration on campus to the Maharashtrian roots of the Founder and now Advisor of the IIA²³. The spectacular scenes from the campus celebrations where the deity was being paraded on the seventh day on a decorated tractor through the lab, pharmacy, clinic and informatics campus buildings in preparation for the immersion, form some of the most vivid memories of fieldwork images for me. 2) The second sense in which I use the word is the meaning that Tagore gives to it in his 1890 play *Visarjan*, where he employs it to mean “sacrifice.” The play²⁴, which plots and dramatizes an intense conflict between a king and a priest is an allegory of Tagore’s reading of the historical tension between Brahmins (representing ritualism) and Kshatriyas (representing a courage of intellect and self-sacrifice). I engage the word in this sense to constellate a similar tension within the IIA as its researchers think through ‘traditional’ intellect, “subjective” and “scientific” choices. 3) Finally, I use the word as a metaphor for the distinctive methodology of fieldwork. I engage, through the length of the chapter, with the problems and promises of ‘going local’ through participation and observation.

²³ For a lively scholarly account of the performative politics of the *Ganapati Utsav* - Maharashtra’s biggest historical festival, see Raminder Kaur 2003, *Performative Politics and the Cultures of Hinduism: Public uses of Religion in Western India*. UK: Anthem Press.

²⁴ For a fuller discussion of the play, see Anjishnu K Roy (1975)

Of pharmacies and offices of deities

That day of the *puja* on my way to the pharmacy, I join steps with two other lab mates and ask what they think about the unscheduled *puja*. Nisha speculates that it might have something to do with the fire that almost broke out earlier, but Cynthia isn't hazarding any guesses, and she hasn't heard anything. We watch our steps as we make it through the stony and uneven dirt road, past the heaps of slate, building stone and cement that all the recent spate of funding for building renovation and new building construction had brought about on the IIA campus. We know we're approaching a different space when the “*narayana narayana*²⁵” chorus of this devotional song gets progressively louder, and the periodic hammering of the axe's steel head on the stone becomes softer and softer. Both are familiar sounds on campus, and both inspire and require us to act in specific ways. All three of us instinctively start to loosen our sandal straps as we approach the pharmacy steps. We are not at a full-blown Hindu temple, but rather at the lobby of the IIA research pharmacy, where a space has been demarked for invocation, propitiation and worship, and where temple rules apply.

The pharmacy is a remarkable space. Flanked on either side by rows and rows of classical and proprietary Ayurvedic medicines, finished formulations, and drugs in their crude form, the pharmacy hall leads directly to a backroom inscribed as ‘Medicine Preparation.’ The door to this room is rarely open, although I got a chance many months later as part of the Department of Science & Technology sponsored Ayurvedic medicinal quality training team to see the medicine preparation process in this room. At all other occasions, however, I have seen the room function as a storeroom to supply materials such as large stainless steel cooking vessels, tumblers, plates, spatulas and knives and strainers, fruits, *ghee* and other ingredients that are used to prepare the *prasādam* and the larger *puja*. The door has always been a source of intrigue for me. Partly because it is never open, and partly because when open, it is always only ajar, never affording a full view of the processes inside, but constantly bringing forth things and materials that morph the public space of the pharmacy into restricted space within minutes. Of course, Laxmi, Punya and Dr. Kiran all worked there, and there was no reason for me to be

²⁵ *Narayana* is the Sanskrit name for the creative power of Vishnu, one of the three great gods in Hinduism.

denied access to the room if I had asked for it, but I enjoyed that sort of special relationship with that half open door as long as it was to last. One side of this hall has glass chambers labeled ‘Accounts’ – the sale counter of the pharmacy – and ‘Raw Materials’ housing racks and stacks of both freshly collected roots and tubers and other plant parts of medicinal plants, as well as preserved whole plant or plant parts in very large airtight containers. Across from these chambers, on the other side of the ‘medicine preparation’ room is the most remarkable display of the relationship between objects, products, inhabitants and users.

On one end of this wall is a dispensary storing medicines manufactured by three major Ayurvedic pharma brands of South India for use by clinic inpatients and outpatients. On the other end of the wall is the office of Dr. Kiran, a *Rasayana* (Ayurvedic alchemy, rejuvenation science) expert, who oversees the general preparation of medicines in the pharmacy but who is also an encyclopedia of knowledge that is tapped by *Dravyaguṇa* (Ayurvedic pharmacology) researchers in the lab and the herbarium as well as by Ayurvedic physicians in the clinic. The nature of the knowledge that he is supposed to possess as a *Rasayana* expert makes him a fluid, omnipresent sort of a presence wherever one goes on campus. Dr. Kiran’s is a regular office space on campus – with a large desk and chair, two guest chairs, computer, bookshelves, books, pictures and/or calendars of Hindu Gods, incense stands and sticks. Located between Dr. Kiran’s office and the dispensary is the *Vaidya Nadhaeshwara Kshetra*²⁶ translated literally as ‘Chamber of the Physician Lord Shiva²⁷.’ Placed right at the center of this office is not a desk, but one large stone *lingam*²⁸ – an iconic representation of the Hindu

²⁶ *Vaidya*: Doctor, physician; *Nada*: the root of all sound, believed to have emerged from the will of Lord Shiva; *Ishvara*: supreme controller/supreme Being/God; *Kshetra*: Chamber, office.

²⁷ It is worth noting that Lord Dhanwantari, who is considered the God of Ayurvedic Medicine, does not find a place in either the pharmacy or, for that matter, in everyday discourses on Ayurvedic medicine. Dhanwantari is considered a mythical deity born with the immortality conferring nectar in one hand, and a book of Ayurvedic medicine, in the other. The only presence of this deity that I have come across in my fieldwork has been a Dhanwantari statue depicted as *Vishnu* at the entrance to the building of the Central Council for Research in Ayurveda and Siddha (Government of India) and a life-size poster at the entrance of the Director’s office in the same building. Although there are specific Dhanwantari *mantras* (chants) and worship rituals, its invocation and worship is tied to Ayurvedic medical learning. In this sense, it is not a “popular” god in the way that Lord Shiva is. As a deity that is an integral part of the private lives of these scientists, Lord Shiva’s place in the Hindu vocabulary of health consolidates the choice of Shiva as the preferred deity of the lab, underscoring the political nature of the divine preferences of these scientists.

²⁸ One of the many representations of Lord Shiva. While most other representations are anthropomorphic images, this form is not. It is interpreted by many as the symbol of male creative energy / phallus positioned on a stone base that symbolizes the female creative energy. The *lingam* stone installed in the pharmacy comes in this combination.

deity Shiva – and empty space around it to walk around the deity symbol (known as *pradakshina* in Hindu temple worship). This room has an extra artificial ceiling constructed under the ceiling of the building, creating an inner sanctum within mundane building space under and within which the image of Lord Shiva is installed. The door to the office of Lord Shiva is never closed, since, unlike at a thorough Hindu temple where there is a large dedicated space for devotees to do *darshan* (gazing up at the idol), *puja* (offering food, flowers, to the idol), *bhajan* (singing prayers and devotional chanting) and *pradakshina* (walking around the sanctum sanctorum), here pharmacy space is limited, and all elements of temple worship must be performed in the general congregation hall of the pharmacy itself, but with full physical and sensorial access to the deity. The spatial order (Lefebvre 1991) that this chamber imposes on the pharmacy, and indeed the entire campus, creates a milieu where everyone who passes by the pharmacy already knows the norms that will fall into place when one enters it. Lord Shiva has a special place in the Hindu vocabulary of health, and as the bestower of welfare and destroyer of suffering, remover of premature death and the giver of longevity, he is the deity to whom countless sacrifices, offerings and fasts are made. Ironically, being one of the few – or the only – depiction of a god that isn't anthropomorphic, Shiva is known as the most easy to access and easy to please gods in the Hindu pantheon, making him a god deserving of an office of his own on this campus. For his unique qualities he is considered by many as the “global physician,” as Shashi had once joked, except, as the office room sign suggested (‘Chamber of the Physician Lord Shiva’ inscribed in Sanskrit), he wasn't joking at all.

When Nisha, Cynthia and I arrive at this hall, the music has become so loud that we prefer not to raise our voices above the devotional chants for mundane banter. At the center of the hall an altar is being put together. By the same hands, it strikes me, that wear surgical gloves to conduct our weekly drug sensory analysis experiments and with the same ease and dexterity that facilitate and run chromatography tests on alkaline compounds. A low brick fortress is being constructed, brick by brick, within which the sacred fire is to burn, and around which incense, banana leaves, photocopies of the classical chants for this particular *homa* (sacrifice) offering, and *homa* supplies including 5 kilos of *ghee* and 108 types of herbs and raw materials to stoke the *homa* fire are being

placed and prepared. Watching on from the steps is Kala, the microscopist who looks at plant anatomy to authenticate contemporary plant specimens according to classical textual descriptions of plant morphology. She invites me in with a warm smile “it is just starting, come!” I casually ask what all this was for. “This one is specifically for the lab,” she said, making the presumption that I wasn’t asking about the conducting of the *puja* itself but merely who, which “group” on campus, was going to be the beneficiary of this particular *puja*. I returned to Padma’s “so,” the linking of today’s event with yesterday’s averted fire. She categorically denied that co-relation adding that “this is just for praying. We will worship Lord Shiva today, followed by some other *puja*.”

In the distance, Shashi and Ajay’s knowledge on the protocols of getting the space ready are being taken very seriously. “Are they going to perform it?” I step closer to a pharmacy staff to ask. “No, no. They know what is to be done.” Knowledge of *how* to do what-is-to-be-done plays a hugely important part in ritualized actions. The whole relationship between Vedic ritualism and Hinduism is one of adherence to a complex system of rules and meta-rules. All standardized ritual elements seen at the scene (objects, chants, bodily postures) are in some rule-bound combination or the other with a protocol laid out in the *Vedas* on what the minutest minute of that specific *puja* should look like. Ajay and Shashi are certainly not the ones with any priestly duties here, but prior experience with this *puja* gives them the know-how and part-time authority to maintain ritual order within this space. As a ritual that has been prescribed for householders, this *puja* is commonly organized by the householders of upper castes themselves in their homes. By being “meant” for the purpose of “financial prosperity and overall success,” as Subbu iterated in plain terms, this ritual doesn’t prescribe a culturally specific context of work or home, it could be technically performed for “overall success” wherever there was a combination of a *yajamāna* (patron) who was commissioning the *yajña* / *homa* (rite), the *Brāhmaṇa* (Brahmin priest performing it), the high priest, and a *sankalpa* (purpose, pledge).

No one in the pharmacy who is actively involved in the setting up of the altar for the *homa* is actually moving a muscle without Ajay and Shashi’s approval, not even

Neeraja, their boss, whom Shashi and Ajay are otherwise terrified to confront in the lab. One has to remind oneself that the woman who stands across from her colleagues in the pharmacy today with that hesitant look on her face is Neeraja, the head of the lab, Joint Director of the Institute, who, with her bold, confident, positive and fearless demeanor inspires as well as disquiets. She, who often renders her lab team speechless and incapable of interpreting their own data points in monthly lab review meetings now looks to her junior colleagues for the “right” direction that she will be facing when conducting the *puja* and for technical advice on how she will be using a particular object of ritual offering. One has to wonder how the demarcated space of the temple accords its own logic of hierarchy not only to deity and devotees, but to the interaction among devotees – Neeraja and her junior male colleagues, who are directing their boss to do things with certitude, authority and confidence that they rarely ever exhibit in the lab.

A labmate from the depths of the hall waves at me and gestures me to take my spot on the sheet that has been spread out around the altar for the attendees of the *puja*, also playing the vigilant friend notifying me to give up my camera and documentary film approach to the gathering, and join the group in praying for the lab. More importantly, even though my ethnographic presence on campus was cleverly named as the “shadow” by a senior organic chemist (and adopted very quickly, lovingly, as the term that the lab staff would use to refer to my “omnipresence” on campus), my “official” ethnographic identity was perceived to be tied to the lab’s, particularly in public spaces that were the constitutive “outside” of the lab. For the purpose of this *homa* for the lab, I was every bit part of the collective *sacrifier*, the subject to whom the benefits of sacrifice accrue, or who undergoes its effect (Hubert and Mauss 1981).

The *homa* is about to start, and I take my place, shutting off audio-video mode and tuning in to the senses. The coconuts, camphor, coins, turmeric powder, sandalwood powder, flowers, special garlands, *ghee*, *panchagavya* mixtures, sugar, honey, milk, yogurt, are all on their trays and designated spots, and Neeraja, as the director and the head of the projects for which blessings are being sought today, is lighting the *ghee* lamps, wick by wick. The lab has booked two official IIA priests for the day who are

dressed in bright orange and red bordered *veshtis* (a sarong garment worn traditionally by Hindu men). Around them were the Institute's current Director, former Director and now Advisor – BS, and the three Joint Directors of the Institute, and one other male in a *veshti*, not a priest. I had asked Neeraja shortly before she was summoned to play her role in the *puja* about that man whom I had never seen before, and she clarified that he was the brother of BS (former Director and now Advisor) who was called in especially to proxy perform the ceremony on behalf of BS who had a bad back and could not have sat through the three hours at the fire-altar, who in turn was going to perform it on behalf of Neeraja who couldn't perform it since she was a woman. Although she *was* the patron who was commissioning the rite, she could not officially *be* the patron.

The official patron's hands were now being ritually cleansed and he was being offered a plate of dried coconut while Neeraja lit the lamps. The father and son priest duo commence the ceremony and recite from memory the *Śri Rudram* hymn from the *Yajurveda*, an important verse prayer from one of the *Vedic samhitas* which is solely dedicated to *Rudra*, an early form of the god Shiva. Most of the ceremony is being performed in Sanskrit, with very rapid chanting of the *Rudra* hymn that enumerates a thousand names of the master physician Lord Shiva. Neeraja sits by one side of the altar, backed by half of her lab staff, while the other half (of which I was a part) watched her periodically offer herbs and other combustibles into the fire, synced with the last words of certain repeated verses. Before starting the main mantra, the father priest declares the intent, time, place, and people that are present at the *puja*, a declaration that is known as the *sankalpa* – the resolve, the mission statement of the offering, as it were. He announces that for the purpose at hand the “*prayashcitta sankalpa*” would be pledged (*praya*: sin, *citta*: destruction, so one can keep oneself away from sin). His Hindi isn't all that strong, but being the universally accessible language in that space, he speaks a string of everyday words not necessarily strung into a sentence: “Ayurveda... *śāstra* *sanstha* (organization)*kaam* (work)... *phala* (result)...*unnati* (success)...*sankalpa* (pledge)...”

The *Sri rudram* prayer is now being chanted, repeated out loud by the proxy male commissioner of the rite, and the flames of the sacrificial fire are now blazing wide and high and reflecting on the glass shelves of the section named ‘Medicines’ in the pharmacy, making it one surreal picture of hundreds and thousands of Ayurvedic medicine bottles, pastes and tablets glowing intensely, burning almost, in the crimson flame of the fire. I stare at the pharmacy glass, unblinking, and long enough not to notice that it is the substances being added periodically into the fire that are making the flames rise and not the chanting that is growing progressively louder and impassioned and more fervent every second. The human chorus then breaks all of a sudden by a highly digitized ringtone of a cell phone. We all look around frenzied checking our own phones and our neighbors’, desperately turning off anything that resembled a button until it becomes quite clear that the phone belongs to none other than the head priest himself and that the synthesized Nokia music was bursting out of the tiny leather case dangling from one side of his *veshti*. Unfazed, one hand on the phone, the priest instructs Neeraja to donate the *dakshina*²⁹ - a sum of about two hundred and one rupees for the *prayashcitta sankalpa*.

It has been four long hours, and the very detailed *puja* on a work-day midweek is continuing with flourish and moving on to other rituals. Different prayers are being accompanied by different actions: one for the pouring of the *panchamrut* (a combination of milk, honey, sugar, curd and *ghee*) over the *lingam* installed in the God physician’s office; one for the ritual washing of the *lingam* with water; one for the offering of the fruit plate to the *lingam*; one for the *prasadam*. At the very end of it, the lab technician was going from person to person with a tray in hand. “*Pancha dravya?*” I asked him curiously, as I accepted the *prasadam* (deity paste offering consumed by devotees). “*Gavya, gavya*” he said brusquely, and moved on. I wasn’t sure what that could mean, but *pancha* in Sanskrit meant ‘five’ – the number five – and *dravya* – a household word in a lab that does drug research – meant ‘material / substance with healing properties,’ and it would make perfect sense to me if that paste was said to consist of five materials with healing properties. *Gavya*, on the other hand, would mean ‘cow.’ *Panchagavya* would then stand for ‘five of the cow.’ I clarified with Om sitting beside me, what the

²⁹ S/he who meets the expenses, claims the fruit of the pledge and vice-versa.

paste stood for, and spreading out five sticky fingers, Om invited me to count with him: “*ksheera* (milk), *dadhi* (curd), *goghrita* (clarified butter from cow’s milk), *gomutra* (cow urine), and *gomaya* (cow dung).

I felt a strong revulsion for what I had just done. But on the other hand, with the cow’s fecal and other body fluids now mixing with mine, could there have been a more fundamentally moving moment, a rite of passage *into* ‘fieldwork’ more intense? With the *panchagavya* paste entering me, I had “entered” the “local,” I thought. A substance revered locally as deity offering, blessing, medicine, crop fertilizer that promised me neither offering / blessing / therapy / fertility but the mere materiality of a transaction of a local object that was first pounded into a paste and then morphed into a morality, through ritual. I invoked Mauss in thinking about the object of common sharing, of a piece of the “thing that is given” (2000; 72).

I was beginning to wonder if the thing that caused such extraordinary aversion in me didn’t go beyond a mere distaste for the material itself, to a point where I was, in fact, hesitant to enter into a system of fruitful alliance with deities and devotees, into a contract that would locate me in a state of perpetual dependence (Mauss 2000; 82) towards some aspect of the “local.” A contract that would demand a forfeit of my own academic and /or identity politics. The very next moment when the head priest instructed us all to rise and step closer to the altar for the *pradakshina*, I stumbled and stepped back. Neeraja asked me personally to join in, but I unthinkingly disclosed to her that it was that time of the month when I was ‘ritually unclean’ and when I should not be seen hanging so close to the deity. Three of my friends from the lab were now prostrating before the *lingam* and even though I was present at the scene of worship, wishing sincerely that the lab succeed in its projects, I hastily made my way back to the periphery of the pharmacy hall where I was spotted with my camera in the first place and from where it all began. Perhaps it was my pre-occupation with “self location³⁰” that failed to “fully” (if fully was a desirable or

³⁰ Rajeswari Sunder Rajan teases out this problem as the problem of “the postcolonial theorist as a component of postcolonial theory.” She argues that in the theoretical mode of producing postcolonial theory, the pre-occupation with ‘self-location’ becomes integral to intellectual production. See Rajan 1997, “The Third World Academic in Other Places; Or, the Postcolonial Intellectual Revisited.” *Critical Inquiry*. 23 (3): 596-616. *Front Lines/Border Posts* (Spring, 1997)

even possible condition of participant observation) co-opt me within the common life that was animating the pharmacy at that juncture. Or – as I reasoned and theorized for days and weeks after I rejected that invitation to “go local” as it were, I was experiencing an entanglement of two desires: one, to not be locatable within a specific form of exchange relationship in the field that was so severely visceral³¹; and two, to re-attach the purpose of my ethnographic account as understanding the perspectival and political fracturing of cultures *within* the “observed” (as opposed to the fracturing of cultures *of* the observer and observed).

“Contemporary relevance” and the politics of Ritual

A recent collection of essays³² by anthropologists, historians, philosophers and psychologists theorize with care how scholars may approach the study of ritual in a way that does not regard it as something out there in the world, whose characteristics can be classified, enumerated and analyzed. The papers makes two substantial points in their argument: one, they speak to the cultural assumptions that have effects on both popular and academic ideas about the nature of ritual, in particular, attempting to move away from a “representational theory” of ritual (that interprets ritual in terms of underlying ideas, emotions, structures, or relations that it represents, symbolizes or expresses) to “the ends toward which it conduces” and ask the question “how they might be instrumental, how they might actually *do* things” (Sax 2010); and, two, that against the assumption that ritual is ineffective, their task as scholars of ritual will be to explain “*how* rituals accomplish things” (*ibid*; emphasis mine). These questions are themselves inspired by Talal Asad’s genealogical analysis of ritual. Asad distinguishes between premodern Christian, modern Christian, and secular understandings of ritual. The earlier view of rite in premodern Christian monasteries was organized around actively learned skills and instrumental behaviors that formulated a connection between “outer behavior and inner

³¹ Diane Bell brings this idea of ritual to the fore in her study of ritualized actions. Rejecting the study of ritual as an object with a finite set of characteristics, she argues that ritualized actions produce “ritualized agents” and that they do so not by means of representation but rather through embodied practice. With their emphasis on sensory experience (prescribed bodily postures, music, incense, food), rituals work primarily on the body and not exclusively by cognitive means. See Diane Bell 1992. *Ritual theory, ritual practice*. New York: OUP.

³² This collection came out of two conferences titled ‘The Dynamics of Rituals’ and ‘Ritual Dynamics and the Science of Ritual’ held at the University of Heidelberg in June 2007 and Sep-Oct 2008, respectively. William S Sax, Johannes Quack, Jan Weinhold 2010 *The Problem of Ritual Efficacy* Oxford: Oxford University Press.

motive (Asad 1993; 58). This view changed in the modern period as ritual came to be seen as signifying behavior, “classified separately from practical, that is technically effective behavior” (*ibid.*). Asad’s genealogy of ritual allows us to see that the conventional anthropological analysis of ritual as “symbolic of” something else, or as signifying a deeply held belief, might not adequately represent the experiences of those that anthropologists of ritual study.

Towards this end, Sax’s opening argument in the introductory chapter advances a working definition of how rituals might “work.” He acknowledges here ritual’s “unusual relation to the modern episteme,” where “ritual is precisely the negation of the modern, scientific episteme” (Sax 2010: page #). I am interested here in problematizing and politicizing this assumption in collaboration with the ‘native.’ As a way of entering into the concerns that I laid out at the beginning of this chapter, I propose to set up an exchange between this intellectual premise underlying a multi-disciplinary exposition of a “modern theory of ritual” (Sax 2010) and the diverse voices from a scientific community that strongly negate the view that ritual has to be a *negation* of the “modern, scientific episteme.” Out of this exchange will emerge, I hope, certain predispositions and assumptions of the ‘native’ that scholars of ritual “study,” and some equally significant silences within ‘expert’ discourse on ritual.

What makes this scientific community a remarkable community to be studying ritual with, is precisely their commitment to building a “total knowledge institution³³” through consistent self critique and reflection and a critical engagement with skepticism (a theme that I take up in Chapter four). This derives in part from their perceived mediating function between classical knowledge holders and systems, and more modern forms of knowledge and knowledge structures. To set out with the goal of analyzing native ritual’s “hidden logic” here (Sax 2010) is not only an impossibility, but an unexciting and fruitless endeavor. BS one day posed a straightforward question to me at

³³ In his introductory speeches to guest lectures at the IIA and in personal conversations and interviews with me, BS (former Director, now Advisor) repeatedly uses the term “knowledge institution” to define IIA’s goals in the world. He does not directly invoke any reference to the Durkhemian / Maussian “total social phenomena,” but implies in his usage a similar meaning for his “total knowledge institution,” where all kinds of inquiry and curiosities are given expression at one and the same time – medical, juridical, social, modern, indigenous, scientific and religious.

the steps of the pharmacy as it was being prepared for another lengthy and minutely worked out *puja* on another occasion: “how do *you* interpret all of this?” he asked. I hazarded a Durkhemian ‘collective conscience’ inspired answer, but he seemed dissatisfied, as if suggesting that I could be less inhibited and tell him what was *really* on my mind. Adopting an ethnographic stance then to investigate the things that rituals “really” represent is made supremely challenging by an expert community that is engaged in co-producing with the anthropologist knowledge about their own community. BS then offered me an example of what he was looking for in response to his question. “You know Maarten Bode’s work, right? Have you seen his soon-to-be-released book cover?” “The one with the sage inside the test tube?” I confirm. “Yes,” he smiled, “see, that’s one interpretation...tradition *inside, within* the symbol of modernity³⁴ – the lab.”

For the director of the lab, however, “tradition” had a much more direct relationship with “science,” and as I will take up shortly, “reason.” On that day of the *puja*, Neeraja had approached the steps of the pharmacy where Kala and I were standing, and made a joke about my plans to photograph *even* this event. I used that chance to ask Neeraja what the meaning of the *puja* for the lab was. Displeased at my insinuation of a co-relation between the charred sample and these prayers, Neeraja demanded to know in turn “who is spreading these things?” She shook her head meaningfully and seriously, distancing herself from any seemingly “un-scientific” explanation that I might have been offered. “No, not at all,” she added, “we have been receiving a lot of Government funds in the past year. This *puja* is for the projects that we’re kick-starting this quarter.” She then interrupted herself to ask, “and why are you finding this so odd? Haven’t you ever prayed before an exam?”

Neeraja’s objection and careful posturing in detaching herself and the Real purpose of the *puja* from the meaning that her team was assigning to it underscored the line that she was drawing between superstition and effective science. She qualified this

³⁴ Maarten Bode has been working for several years on the commercialization of Ayurvedic and Unani pharmaceuticals in India, and has aroused a lot of interest at the IIA with his book *Taking Traditional Knowledge to the Market*. The cover of the book shows a *ṛṣi* (sage) caught inside a test tube with his mortar and pestle – depicting two sets of tools, modern and traditional, used in the making of Ayurvedic medicines – one caught inside the other.

by highlighting the *puja* as a general requirement of good round-the-year futuristic research performance rather than a call to action based on some danger that was averted in the past. As a call to future action, it made the means more proportionate (and appropriate) to the ends. Neeraja's investment in a rationally, carefully, and scientifically worked out understanding of the "real" reason behind the *puja* shapes her critical distancing of herself from Other people's 'beliefs,' as we will see in a transcript shortly, as well as challenges the premise of modern theories of ritual where ritual is understood to be "the negation of the modern, scientific episteme" (Sax 2010;).

The very significant way in which Neeraja displaces and challenges the assumption behind recent studies of ritual is fundamental to the very historical self-consciousness that the lab group and the IIA works with. The institute at large, but the lab in particular, is guided by a philosophy that "revitalizes" traditional medicine from the crisis brought about by a misguided approach to education and research in traditional medicine in colonial and post-colonial India. The IIA sets itself the intellectual task of entering into a collaborative charting of effective ways to make the "classical" "relevant" to contemporary times³⁵. Its mission statement for Trans-disciplinary science enumerates the following goals:

1. Conservation of natural resources used by Indian Systems of Medicine;
2. Demonstrate the contemporary relevance of traditional knowledge;
3. Revitalization of social processes for transmission of heritage.

It is of particular importance to note that it instates its approach to "traditional" knowledge systems not as "new," but as "relevant," a word whose semantic history is itself bound up with that of "modern." Grazia, in her exceptional article 'The modern divide: From either side' theorizes the "modern" as a period concept and writes: "...the medieval/modern break does more than separate one period from another. Whether you

³⁵ The word "relevant" has a fieldwork moment associated with it. As the content writer for the lab's website, I had suggested to Neeraja that we try a different word to describe the lab's goals. It was difficult for me to label the lab's significant interventions in Ayurvedic research as "relevant" because naming and marketing its work as "classic, but relevant" could corporatize and trivialize the public perception of the lab's goals. Neeraja admitted that "showing relevance" was the "whole point." The website today reads: "The key purpose of this Centre is to undertake cross-cultural bridging research to demonstrate the Contemporary relevance of Traditional Pharmacognosy (*Dravyaguṇa śāstra*, the study of raw drugs) and Pharmaceutics (*Baishajya Kalpana*, the study of the products) of Indian Systems of Medicine and Modern Science."

work on one side or the other of the medieval/modern divide determines nothing less than relevance. Everything after that divide has relevance to the present: everything before it is irrelevant...it works less as a historical marker than a massive value judgment” (Grazia 2007) She further goes on to say that ‘modern’ became a period designation when it lost its dyadic relation to *ancient*, when it ceased to relate to the ancient either as mere adjunct or as rival. “Once it lost that relational status, *modern* came into its own; indeed it defined itself as the repudiation of what has come before” (ibid).

Further, that the lab and the IIA formally use the word “contemporary” to describe their work and their goals is not fortuitous, but rather a strategic, political move. Dipesh Chakrabarty reminds us that the word “contemporary” involves a double gesture of both inclusion and exclusion, and an implicit acceptance of this gesture is the condition that enables the sentence (“demonstrate the contemporary relevance of traditional knowledge”) to communicate its point (2000). He suggests that on the one hand, “contemporary” refers to all that belongs to a culture at a particular point (in this sense, everyone is part of the contemporary, technically inhabiting the “now” of the author of that word). Yet, at the same time, it works against plurality by claiming to represent the dynamic aspect of the word, the direction and the path of progress along which the “now” must move. Thus, the imagination of historical time and historical consciousness is built into the very use of the word “contemporary.” In the remainder of the chapter, I turn to this very exclusionary effect of the imagining and operationalizing of the mission sentence of Trans-disciplinary science – ‘Demonstrate the contemporary relevance of traditional knowledge.’

The rationale of setting up the ‘School of Transdisciplinary Studies’ of which the lab recently officially (as of June 2010) became a part came after a series of workshops and discussions among the authors of what counts as ‘trans-disciplinary.’ In a brilliant debate among the top management (the Director, the Advisor, and the three Joint Directors of IIA) about the top choice of word to describe IIA’s work, three candidates were shortlisted: ‘inter-disciplinary,’ ‘multi-disciplinary’ and ‘trans-disciplinary.’ It was agreed that the prefix “trans” had a theoretical and methodological inclination that would best suit their historical project of communicating across paradigms of science,

communicating between pasts and futures, and co-exploring *Sāstra* and Science. The discussion got particularly charged when BS objected to defining trans-disciplinarity as an “inquiry between, across and beyond disciplines” arguing, instead, for replacing “discipline” with “paradigm.” Neeraja and her colleagues disagreed with this objection, adding that paradigms themselves consisted of several disciplines, and a weighty word like trans-paradigmatic would be too infinite in scope and difficult to delimit. Later in the discussion, there was consensus among all that ‘paradigm’ was too broad, and that the disciplines in question would have to be carefully defined, or at least, as BS put it, be *defineable*. BS qualified this by adding – and this is what is crucial for us in understanding the exclusionary gesture in the trans-disciplinary knowledge making process – that “it [trans-disciplinary science] should be definable for the odd case that a native community demands a scientist/researcher to consult ancestors on a transdisciplinary collaborative Malarial case study because ancestral cult consultation is regarded as a discipline by that community. One cannot include *n* number of possibilities of disciplines here.” It was eventually agreed upon at the meeting that the definition of “transdisciplinary” be modified to include the word “concerned” disciplines, where the disciplines would already be pre-defined by the trans-disciplinary IIA researcher.

Another meeting named “Challenges of Transdisciplinary Research” organized at the IIA in the year 2009 has had a significant impact on concretizing the goals of what the IIA views as an alternate episteme. It was outlined that the need of the transdisciplinary framework was going to have to be “scientific, yet overcoming the modern scientific apartheid.” Olivier Vanden Bergh³⁶ stirred up minds by summing up the challenges as follows: “endogenous development is about building economies, retaining local benefits, and building research on local needs, local beliefs and local knowledge. There must be a shift from universality to diversity and the many material,

³⁶ Olivier is a visiting advisor and lecturer for an international program of cooperation between universities and research centres, NGOs and rural communities in Africa, Latin America, Asia and Europe. The program is a heavily funded international collaborative that specifically brings together 16 universities from four continents to cooperate and share experiences in “enhancing research, capacity building and field work in support of endogenous development that is based on locally available resources, local knowledge, culture and leadership.” The IIA has been an affiliate centre of excellence that represents India in this collaborative for its “pioneering role in developing field methods for revitalizing indigenous knowledge and health traditions and research and curriculum development in India.” Currently, ten IIA scientists/researchers are enrolled as PhD students within the scope of this program.

social and spiritual ways of science and knowing.” At this point in the meeting, BS interjects to take issue with the word “universality,” suggesting to replace it with “uniformity,” since “the principles of Ayurveda” - which form the core of IIA’s transdisciplinary program - “are universal, sometimes non-material, and eternal but diverse....It is the beauty of the universal that it has taken into account all diversity. So universality cannot be opposed to diversity, it has risen above it,” BS stated. What followed was an exemplary instance of the making of an *episteme* and the making of an *episteme*’s dependence on, almost synonymously with, *techne*³⁷.

(Neeraja cuts BS off) --

Neeraja: But *what* should we be revitalizing? There are so many diverse practices as well as worldviews in different communities. Like probably: sacrifice [animal sacrifice]. Sacrifice is a worldview as well as a practice that supports that worldview. “Revitalization” could technically cover even that.

BS: No but we made it clear from day One that the transdisciplinary program would only be supporting those projects that are part of the [IIA] mandate.

Neeraja: Right, but that is also a worldview, is it not. If you went to a local healer who told you that if you sacrificed an animal for this god or goddess, because it was part of their LHT [Local Health Tradition], then

(BS interjects)

BS: If that practice is embedded in a certain knowledge system that is the mandate of the IIA³⁸, then yes, we would have to think about it. But we won’t per se be pursuing sacrifice.

Neeraja: No of course we won’t be pursuing sacrifice. But I’m saying *who* decides? Who decides that it is essential for the community or for our transdisciplinary framework or not?

BS: We do! The institute does, in the PhD research work mandate!

Neeraja: No, institution is a narrow way of looking at it. I am saying who decides eventually what is right and what is wrong....who decides what kind of knowledge, associated ritual and endogenous practice do we want to revitalize and explore?

BS: But that is what the whole research is about. That we explore it. We need not take the decision on that on day One....the “themes” are what will be selected on the basis of IIA’s vision and mission.

³⁷ Where *techne* is defined as the rational method involved in producing an object or accomplishing a goal or objective. For the complete definition see Richard Parry “Episteme and Techne.” 11 April 2003. *Stanford Encyclopedia of Philosophy*.

³⁸ Name changed.

Sri: In a purely scientific endeavor you cannot take that stance. Dogs have been sent to space to see if they survive, if they survive the journey. So if you called a community worldview that supports animal sacrifice a “bad practice,” then you should also take a stance that you will never do testing on animals in your pharmacology lab. So it is not a position of right and wrong. It’s a position of whether it is of utility or not. Even animal testing is one sort of animal sacrifice.

Neeraja: But who decides is what I am asking.

BS: No, but Neeraja is raising a very pointed question. She is saying that supposing the endogenous view is that in order to improve rainfall it is necessary to sacrifice five goats a day (somewhere hypothetically, if that’s a belief), the question is whether you will explore such a belief when it involves such an extreme practice. In fact I will go a step further and say something even more distasteful, what if it involved a human sacrifice?

Venu: No, that’s revolting.

BS: To *your* sensitivity yes, but not to people who are doing it. Therefore we have to be very clear about what the themes of transdisciplinary research will be, what kind of research we will encourage. If the PhD student has some solid defense of any position, whatever be that position, if he is able to convince us of its use, us – the selection committee – then we will have to consider even that... But he has to demonstrate its use.

Dr. Narayana: One example in Andhra Pradesh village, when we went there we asked them why you are sacrificing animals. They all come there and sacrifice and cook and eat. If they do start taking non-vegetarian everyday they will not have any animals. So they do it only for conserving those small animals. Only two days of the year they take that non-vegetarian. So they explain [to] me why they sacrifice. If such a rational way if they can explain....I don’t know...maybe we can approve....

Neeraja: No no no. The reason why I brought this up at all is *what should we be revitalizing*. [The] question is, who are we to decide what their rational practices are if that is an important part of their worldview? In between the logic and the practices of traditional knowledge, there are some rituals also which may or may not be very beneficial to the society over a long period of time...we cannot be judgmental, but we have to be aware [of] how we are going to select those good practices.

Dr. Narayana: We need not go beyond the useful practices...Presently we have not taken up any project on spirituality. Because it may be a very sensitive issue.

Neeraja: Why is spirituality sensitive?

Dr. Narayana: Rituals are not a part of our intellectual work.

Neeraja: Rituals as *you* know it. It could have been part of *their* past.

Dr. Narayana: The work that we did in Tamil Nadu, we did not include any of their rituals. We just took their knowledge.

Neeraja: But that's an important part of their knowledge! And if it is useful for them then why is it not part of our agenda?

Olivier: This is a very important discussion. This morning, Surya presented his research plan on the malaria project in Orissa. If you asked the community, they would say that malaria is caused by eating rice of yesterday or [from] bad water, etc. The way they treat is through *mantra* (invocation, chant), *yantra* (geometrical representation of deity on paper or metal plate) and sometimes *tantra* (ritual practice generally associated with the worship of *Shakti* and *Shiva*). But you only picked the herbs, all the other things you did not take into your research. But that is the choice. I don't know how the *mantra* and *tantra* work, but maybe in their mind there is some kind of a scientific logic that we cannot understand by our limited approach. But they work. That logic works for them. So we need to be prepared to have a dialogue with them. Why only herbs. You can take some other piece of evidence and do research on that together with the community. So don't ignore it if it is important to solving the community's problems just because you want to pick what sounds scientific to *you*.

Neeraja: That is what I am saying. They also do devil worship for the same. So if it works, it stays within the scope of transdisciplinary. Shall we say that?

BS: If the researcher is able to convince us with a solid argument about the [community's] knowledge system from which these rituals/practices emerge, with a proper methodology to investigate it, to show that these form an important part of their worldview, then we as the selection committee will have to be open-minded to at least let him explore it.

This complex exchange mobilizes a particular mode of "open-minded" rationality towards building a modern, scientific episteme that is based on a "means-ends" charting of one's own ritual as episteme, and other people's "ritual" as *techne*. It is noticeable that this scientific community's authoritative reading of Other rituals as positions and practices as something that deserves a place within the transdisciplinary episteme only after its "logic" has been *demonstrated*, stands in striking opposition to the usefulness of its own rituals, that, in some senses, already come demonstrated. (Recall here Neeraja's sense of being confounded at my question about the *puja* for the lab, when she pauses to ask, "why are you finding this so odd? Haven't you ever prayed before an exam?")

The *puja* and the full set of Hindu worship practices indulged in by the lab and the IIA are exempted from being *demonstrated* as "relevant" / "effective" / "useful" / "good practice." This exemption works by invoking their own politics *as belief*, and their belief

as being self-evidently “rational.” Holding a PhD degree in Biochemistry from Cambridge University and a researcher rooted in “modern” science but “fascinated and stunned by the depth of logic in Ayurveda,” Neeraja’s larger framing device in official interactions – be it her informal motivational speeches for junior colleagues in the lab, research presentations to audiences at national pharmaceutical and herbal medicine conferences, lectures at Ayurvedic institutes and pharmaceutical companies and global pharmaceutical meetings – has hinged on concretely plotting the things in Ayurvedic knowledge that “work.” One of her favorite phrases, which I would often joke that she couldn’t do without using at least once a day to refer to a number of things that “worked” - was that “the proof of the pudding lies in its eating.” The limited times that we could candidly speak about worship on campus, Neeraja argued that there was no way to “prove” faith or *puja*, but it was nevertheless personally proven to be effective because it “extends and expands the individual beliefs of scientists into their work space” to bolster faith in the success of their own work.

The debate among the authors of open-minded science in the transcript above resonates deeply with a late 19th century dispute over *shrāddha* – a ritual of ancestor worship – documented and discussed by Prakash (1997). The dispute, which broke out between a Hindu revivalist group and orthodox Hindu intellectuals, centered on the rationality and legitimacy of the ritual of ancestor worship. Although the Hindu revivalist group attacked the ritual (and its orthodox defenders) as superstitious, unscientific and diverging from the scientific wisdom contained in the Vedas, the debate helped demonstrate a shared conviction between the parties involved in the antiquity and authenticity of Hindu science. This conviction, Prakash’s study tells us, was shared by Hindu intellectuals ranging from religious reformers to practicing scientists who spoke passionately of a forgotten but true religion of the ancient Hindus and contrasted it with the “irrationality” and “corruption” of contemporary Hinduism (1997; 537). What is important for us to learn from this debate is the process of the *framing* of the authority of Hinduism. As Prakash shows us, it is not the criticism of indigenous traditions that is important to note, but the invocation of science’s authority in the critique of religion and society.

Professor ML Thathachar³⁹, Head of the Center for Literary Research, IIA, founder of the Academy of Sanskrit Research at Melkote, Karnataka, and Vice Chancellor of Madras University, had more faith than Neeraja in the ability of Science to “find proof for everything including the *gayatri mantra*” (a highly revered but common Vedic Sanskrit verse from a hymn of the Rigveda). The town of Melkote in Mandya district of Karnataka is regarded as a prominent and sacred place by many Kannadiga and Tamil Brahmins for being home to the 12th century *Vaishnava* philosopher Sri Ramanujacharya. Thatha traces his descent from a devotee of Sri Ramanujacharya and pays keen attention to his dress as an aspect of what can be quickly slotted as “religious,” but that he contests as being his “philosophical,” identity. I have never had anything less than a provocative discussion with him. At the end of an hour-long session of a chorus chanting of the *mahamrityunjaya mantra* (literally translated as the “great death-conquering chant”) held every Monday at the IIA for the well-being of patients and overall good health of employees, I walked into Thatha’s office and invited him to give that event a name, since it was one of the few regular events on campus that were not classified under any category. There was no separate budget head for it, nor was there ever any mention of it on the weekly IIA calendar. “Would you call this a *puja*?” I asked. I had a feeling that he would grab that opportunity to express how futile and incompetent he thought the exercise to be (since it was common knowledge to any insider that he and his two sons who are also Sanskrit scholars and work in the literary research wing of the IIA, have officially boycotted the Monday *puja* for being rooted in the philosophy of *Saivism* as opposed to the Melkote tradition of worshipping Lord *Vishnu* and his associated *avatars*). But he was in the mood for discourse, and went ahead and supplied a word for the event: *samskara*. “There is no translation in English,” he said as he got ready to talk more and took his glasses off, “but you can say they are mental

³⁹ Thatha, as we would call him, has been a grandfather-like figure in my fieldwork. An orthodox *Vaishnava* Brahmin, he is as vociferous about displaying - through his dress - his particular *sampradāya* (religious identity), as he is about expressing his views to the Government of India (on whose Planning Commission he serves) on how best to celebrate Indian knowledge and language systems. Apart from the *veshti*, he sports a bold Y shaped *thiruman* (religious marker on the forehead drawn with ash and vermillion) daily, which grows darker and more striking the drier it gets. Always willing to debate with me, he let no opportunity go by to tell people how proud he was to see a student from a US university work on Ayurveda – a “modern young girl of today,” who is “making everyone proud by doing research on the Indian heritage.” When cautioned about diverse and critical readings of the Indian heritage, he would sportingly reply that even negative publicity was good publicity. “The curiosity of the West should at least be aroused,” he had once exclaimed.

impressions....inbuilt tendencies might be a better word.” “Inbuilt tendencies?” I objected. “Why did I think they had more to do with a cultural practice, more like ‘outside’ tendencies...” He was giving that slow nod of the head by now, which was always my cue to abandon talking and start listening. “They get inbuilt over a period of time. Cultural practices like the food you eat, who you talk to, who you eat with and what you say, get inbuilt over a period of time. They get imprinted in [on] your mind and then you do it because it’s *in* you now.”

As a concept, *samskara* is central to Hinduism. AK Ramanujan, in his brilliant translation of Anantha Murthy’s 1965 Kannada novel ‘*Samskara* – A rite for a dead man’ notes in his foreword the entire paradigm of things and processes that the word may denote. It may be understood to mean “a rite of passage or a life-cycle ceremony, the realizing of past perceptions, preparations, making ready, transformation, rituals, refinement of spirit” (Ananthamurthy 1965).

It is quiet significant that Thatha chooses to talk about *samskara* in terms of such intimate relation to the human body so as to place it *inside* the human and give it the status of a “mental impression, inbuilt tendency.” It is significant because Sanskrit (*Samṣkr̥ta* the “refined, perfected language”) itself is part of the *samskara* paradigm (Ramanujan 1978), where the word *saṃskṛta* denotes something that has been purified or polished or “worked” by culture, as opposed to the languages that were called “*Prakrits*” literally denoting those that are natural or first-made - in a state that has a more intimate relation to human beings (Sawhney 2009). By restoring *samskara* to a natural “impression/tendency,” he reinstates the meaning of a practice that first came from the body, then got worked upon by culture, and then re-turned to the body. This interpretation comes closest to an 1894 definition of the word in the Kannada-English dictionary that gives its meaning (among other meanings) as “forming well or thoroughly, forming in the mind, conception, idea, notion; the power of memory, faculty of recollection” (Kittel cited in Ananthamurthy, 1965). The sense in which this is meant links it to the concept of the “unconscious” – where *samskaras* are understood as “impressions left on the mind from the experiences and deeds of previous incarnations” as discussed by Langford (Langford 2002; 232). In the latter meaning, which is mobilized

in modern Ayurvedic psychotherapy, *samskaras* are already present as impressions on the mind from a previous birth, but that can get activated by external stimuli or as a result of their own maturity or motivation (ibid). Thatha, however, is clearly arguing for a different end to end process here: something that starts as cultural practice gets rooted in one's self over time (inbuilt/*samskara*), which then brings about further performance of ritual/study of texts (*Samskara*).

It is from here that his conviction in Science's talent to produce a language for proving the effect of *samskaras* flows. At a meeting with the Director of the National Magnetic Resonance Unit, AIIMS, New Delhi, he became quite excited and spoke too closely into the microphone, highlighting the importance of what he was saying in very dramatic and excessive ways: "the job of Science is to find out the impact of *mantras* on the brain. Wherever they (classical philosophical texts) talk of *mantras*, they talk of two types of *shaktis* or potencies: one is the *śabda shakti* (the power of word), and the other is *artha shakti* (the power of meaning). Now, it doesn't have to be a word, doesn't have to have a meaning, but even when a *varna* (letter) is pronounced in the right way, just the pronunciation of the phoneme has an effect on the brain. The *gayatri mantra* is bound to activate the brain in a certain way. Scientists must do studies on these things to show how."

It was far more difficult to talk about *samskaras* with younger researchers and scientists at the IIA, who were not particularly curious or keen about debate and argument. In contrast, the senior ranks were composed of people with two kinds of responses, both exciting in their own ways: one, by those who were stimulated by these questions and took them as opportunities to conduct open debates; and second, by those who suspected any question bordering on "these" issues as being potentially misconstrued as participation in the *Hindutva* (literally Hindu-ness, a radical right politics of "being" Hindu) project. Debate or defense, either way, the engagements were always qualitatively serious. But sustained discussion on the *puja*, *any puja*, or sign associated with branches of Hindu philosophy that had made its way into the lab with the younger research population was not only fraught with difficulty, it was nearly impossible to ask

about these signs without attenuating the question itself or evoking in me mostly an intellectual, but also moral, crisis for having asked. The response I got from Subbu, senior research fellow at the lab whose current project is to genotype a rare Ayurvedic plant species, kept me from broaching this subject for days. We attended together a day long *puja* for the inauguration of the new product development lab facility, and could not sustain a long conversation on our way back home on the bus that evening:

R: So what did the day mean to you as a researcher? What did you do today?

Subbu: Taking the blessings for my work...

R: Ya, the priest touched every piece of machine....tell me, this has never clashed with your work or your science in any way, right...?

Subbu: Meaning?

R: Like the DNA work that you do----

[Subbu cuts in]

Subbu: Why you ask this? Aren't you Indian?

This was not a question that he meant as a reproach or in a jeering manner at all, as he clarified later. It was rather an honest and immediate response to a question that he had not permitted himself to ask or investigate. The two variables in my question could not be perceived and grouped together in one “grid of identity” (Foucault 1970) by him except to make sense by way of one (*puja*) strengthening the other (work). It was a question that, to him, ground its positivity in some space unknown to him, a space that I could not inhabit unless I was not “Indian.”

“Now they call *me* the breaker of the TSM⁴⁰”

On November 26, 2008, the city of Mumbai experienced shooting and bombing attacks in several popular and hi-profile locations across the city. The event was made into a spectacle of live frame-by-frame televised violence for a reality TV audience as the National Security Guard combated terrorists in “flushing out” operations that lasted three days. Sentiments of “national” hurt ruled the day, and the sense of public revulsion and horror caused by a “live” unfolding of events brought a familiar enemy (Pakistan, where the terrorists were allegedly trained and belonged) back into the public sphere in a very specific way. Politicians, industrialists, celebrities, not to mention the mainstream media,

⁴⁰ Traditional Systems of Medicine unit, IIA's nascent department in its initial years set up to develop bibliographic databases on medicinal plants and classical Ayurvedic formulations found in “various classical textbooks” from 1500 BC through 1900 AD. More information on this department unit is available in the ‘Annual Report: 1999-2000.’

in their excitement to strongly condemn on behalf the “people,” called further international attention to the brutal massacre by labeling the attacks “India’s 9/11.” The parallel had the not-so-fortuitous effect of legitimizing an Islamophobic rhetoric on the streets, in restaurants, living rooms, offices, kitchens and laboratories. Old demands were being made in 9/11 language,⁴¹ and Hindu extremists appropriated the “fight on terror” rhetoric to unabashedly and publicly demonize minorities, taking cover behind the sanction of the international “war on terror.”

Disgusted and distressed, I wrote an article on Islamophobia and other Othering discourses in the wake of the attack, making special efforts to write for a non-academic audience. It was published as a comment piece in a popular English daily, with very wide circulation on the Internet. Several blogs posted it on their websites, with Muslim organizations also writing in to seek permission to re-post. For weeks my inbox was overflowing with love and hate mail, the most severe of them coming from Praveen Togadia, Secretary of the Vishwa Hindu Parishad (the World Hindu Council), issuing a threat to “stop this leftist feminist nonsense.” Reshma Akram, who was a former Unani researcher at the IIA read the piece and urgently called to know if anyone at the IIA had confronted me on it. She was concerned that my fieldwork would suffer “unnecessarily.” I had made no special effort to disseminate the published article on campus, and I had chosen not to bring it up even as small talk since it was progressively becoming clear through the months that the ethos of trans-disciplinary knowledge production was neither open-minded nor a shared cultural universe.

For weeks following the attacks, the air was thick with vigilance. Airport security was beefed up, every bomb threat hoax telephone call was investigated, new television ads with explicit nationalist messages were blaring out of TV and radio sets, public service “national integration” films were being broadcast, and everything from toothpaste to tarmac came wrapped in the national flag. Nazrullah, the much trusted auto-rikshaw driver who would meet me at 8.30 in front of my building every morning brought news

⁴¹ Analyzed superbly by Priyamvada Gopal in her forceful and much needed article after the attacks, “Comparing Mumbai to 9/11 diminishes both tragedies.” *The Guardian*. Dec 4, 2008.

of trouble brewing on account of a bunch of hooligans dropping a piece of pork at the gates of the neighborhood mosque on the day of the Friday prayers. “*Kal kuchh log ghalata kiya. Abhi thode din ghar pe rehne ka*” (yesterday some folks made mischief. Stay indoors for a few days). The morning had begun on a slightly ominous note already with the newspaper carrying headlines about Pakistan’s decision not to co-operate with the investigations, India’s strengthening of security and strategy to build up international pressure, local and national level inflammatory speeches by the BJP and its related right wing cultural outfits....We had been sharing news all these days about every new lead on Ajmal Kasab (the lone surviving terrorist of the attacks), but today we had a quiet journey following news of the riots that had broken out in my own neighborhood. We approached the last leg of the one hour ride to the fieldsite when a uniformed CRPF (Central Reserve Police Force) personnel stopped our auto. He looked inside, took one long look at Nazrullah, checked his driver ID tag (which auto-rikshaws in Bangalore are required to display), examined the passenger, and let us go. The last part of the 3.5 km journey into the field was through a *kutchha* (dirt) road, and this was our regular route. Today there were more than a hundred CRPF personnel lined up on either side of the field at regular intervals, firing gunshots. I suddenly became fully aware of what I was wearing and wondered if the brief investigation had anything to do with the scarf and the sunglasses that were fully covering my face (which I wore everyday for the extreme dust and pollution conditions in Bangalore). Did I look too “Muslim?” Did Nazrullah? I wasn’t sure what I was supposed to do or which “side” I was supposed to display belonging to. I barely managed to ask him what he thought was going on. He replied in the most unruffled way in his Kannadiga Hindi “*parvah nahin madam, yeh normal hai*” (no worries, madam, this is normal). “*Kya normal hai? Roz to nahin rokthey hain humein...*” (what the hell is normal? We don’t get stopped like this every day...) I asked in panic. “*Aise ich, yeh log check karta chupke. Yeh training hai, normal hai*” (Just like that, these people, they check. Just like that. This is a [CRPF] firing training, its normal).

It was a Monday. The day for the *mahamrityunjaya homa* ceremony at the pharmacy. I knew that this was, in the words of the organizer Kamalavasini, “for the emotional, mental and physical health of employees and patients” at the IIA, and indeed

one that I have attended several times on other Mondays, but today the chorus of the chants – given the week’s and that morning’s events – was nothing more than a collective Hindu noise that triumphed and celebrated. I ran into the comforts of the lab, but the ash, turmeric and vermilion pastes smeared on the HPLC machines, printers, autoclaves and on the doors of the microbiology and chemistry labs seemed to come alive today and speak in altogether exclusionary tones. I stood at the steps of the lab building and looked again at the freshly drawn *svastika*⁴² and *hamsah*⁴³ symbols on the main building door. Later that week, I set up an interview with Dr. Reshma Akram.

Dr. Akram had joined the IIA as a researcher with the TSM unit in 2003. She is a Unani physician, and her job at the TSM involved referencing Ayurvedic and Unani classical texts to develop the TSM medicinal plants database. Her disgruntlement and professional dissatisfaction with the IIA echoes the concerns of several other junior researchers and they include low pay, excess work, “too much hierarchy,” and “not (being) allowed to be creative.” None of these had much to do with her minority status as a Muslim in a predominantly Hindu research organization. She glorifies a time at the IIA when her famous *jeera* rice (cumin and rice preparation, a popular Kannada meal) was the most popular lunch food that “even Dr. Nair ate” and remembers fondly how her greeting cards that were made from leaf cuttings were a total rage. She assures me that the IIA would not ever celebrate *pujas* back then. Machinery, equipment and doors to IIA buildings did not always bear Hindu religious markings. And there was no idol on campus. “It was much more subdued.” The only polarization of identities that she was highlighting so far had much more to do with professional standing in the IIA than with religious standing.

The first signs of estrangement for Dr. Akram began appearing the week she gave in her resignation papers. She narrated the story of a collective resistance to her emails to the IIA list. She would often forward Internet jokes and greetings to employees in various

⁴² A mark of auspiciousness in Hinduism, it is a juxtaposition of two Sanskrit words: *Su* = good, well; and *asti* = to be. The suffix *ka* is a diminutive, and *svastika* might be translated literally as “that which is associated with well-being.” The *svastika* is one of the 108 symbols of the Hindu deity Vishnu and in its geometric representation, it represents the four directions of the sun’s rays.

⁴³ *Hamsah* in Sanskrit means swan, and is an important motif in the Advaita branch of Hindu philosophy.

IIA departments, as would they, but remembers one particular day regretfully. There were four to five blank emails in a day, she recollects, circulated among the same list by two other employees. These emails came with no text in the body except ‘*SRI RAM*’ at the end, in block capital letters. Dr. Akram remembers that she was taken to a different room by a friend only to be requested to delete the signature message on her gmail account, which read: ‘*allah haafiz*’ (commonly used as a parting phrase by many Muslims). Dr. Akram was told by her friend that her use of the *alaah haafiz* phrase was stirring up emotions and upsetting many (Hindu) IIA employees. Her friend explained that the Sri Ram messages were meant as a befitting parting phrase in return. The IIA intranet had already become a site of surveillance, offence, resistance, defense, with cultural conduct within that space modulated, regulated and contained. One of the only three Muslim employees in IIA’s history, as a Unani Muslim researcher, Dr. Akram’s presence was sought, in fact, appreciated, as long as it preserved the singular wholeness of identities and the putative integrity of a Hindu identity.

But Dr. Akram’s reading was not as political as mine. She did not partition “Unani,” “Ayurveda,” “Siddha” because “it is the same Hippocrates everywhere. We call it Ayurveda and Unani here, the Malays call it Malaysian medicine, but it is the same book, the same Arabic origin...only different pages.....when the same medicine reaches different people cultural practices get mixed into it and the systems start looking different....and if some traditions believe that cure will come faster if they pray then yes, they *should* pray.” Spirituality is the touchstone of her private clinical experience. She asserts, “it is sometimes *the* thing that can put you on this side of the line or that. I often give my patients advice on how their family elders can read specific verses from the Koran to them, not medical text, but Koran. Just listening to it can make all that difference. Two of my own patients whose reports showed hostile womb(s) conceived again and again with this. But yes, you have to have trust in the wisdom of your doctor..... I don’t look like a ‘*hakim*’ (Unani practitioner), I mean institutionally I am, but the word comes from *hikmat* = wisdom, I don’t look like I have earned it, plus I am a woman. So yes, if *vaidyas* in IIA wear a *tika* and that helps patients trust in them, there is nothing wrong.”

We had a much longer conversation on divinity and spirituality that made Reshma argue that “social” and “cultural” practices of physicians and scholars at the IIA was not the least of her problems, since she understood well as a Unani practitioner that it was “foolish” to separate medicine from its “larger spiritual practices....If they want to develop Ayurveda and not Unani specifically that is also fine....they can wear whatever dress, do whatever *puja*.” It is the “Brahminized circle” and their “eternal fear that the system (computer) should be cleaned if you touch it” that sums up her experience of exclusion at the IIA. She relates a disturbing personal story of how some years after she had left the Institute but was nevertheless involved in ad hoc work for the IMH (Indian Medical Heritage – a video module that the IIA was designing that year), she went back to the TSM in her third month of pregnancy. She says: “I could see Vishwa, this new person who they got in someone else’s place (who) was sitting on my system (computer). There was a picture of a goddess on my table and he wasn’t allowing me to touch my own system....I was so shocked that I couldn’t access my own files on my own system, I thought I had lost all respect in the TSM. There was always one free chair in that area that people from outside or guests or others sat on. I was feeling so unwell and my back was paining so much that I just pulled the chair and asked Shilpa to get me some water.”

She continues: “When I started drinking, the two manuscript ‘*juttus*’ came in.” She made a small wave of her index finger over her head when she said the word “*juttus*.” I had never heard of it, but it sounded like some version of the Bengali word “*jhoonti*” - a regular ponytail. Together with her description it looked like she was getting at the lock of hair that many upper caste Hindu men leave on their shaven heads and tie up into a small ponytail. “Do you mean Dr. Srinivasan and Ajith?” (Brothers, Thatha’s sons) I asked, scanning the IIA staff list in my head and coming up with the faces of three people who fit her description. “Ya ya I call them *juttus*. The two *juttus* of manuscripts. They come, they just look at me, they stare at the bottle and both of them start speaking in Sanskrit. As if I don’t understand Sanskrit⁴⁴. My language was Sanskrit till class 12.

⁴⁴ Dr. Akram, like many other BUMS (Bachelor of Unani Medicine and Surgery) students have good to excellent reading proficiency and comprehension in Sanskrit. It is easier to score in Sanskrit, and many students prefer it to other language options in high school.

They're saying and now Dr. Shankar also joins them and they're saying that she's Muslim, she's sat on the chair, we are not going to use that chair and we have to clean that place. And that is our water bottle so we have to get it thrown. I understood everything they said, Ritika, and my eyes were completely filled with water. Shalini looked at me, Vivek looks at me and both of them ask me to control.....Then they call the housekeeping lady to take the bottle away. I was so insulted.....I never wanted to go there again. That is also the first time I met you. Remember? In 2007? You didn't know me but you saw me on the steps and asked why I was crying?"

There was a brief moment of pause in our conversation at this time. What animated this charge and the next is not the language of polar religious or homogenized identities of "Hindu-Muslim," but that of "Brahmins" or "not." She continued to describe the experiences of another TSM researcher Annalaxmi, who belonged to the scheduled caste, and who got along fine with all concerned. But when she cleared her MD exam and left IIA, "the *day* she left Dr. Shankar cleaned her whole system (computer), *table dhoya*, *chair dhoya*, *phir uspe baitha* (...washed the table, the chair clean, and then sat on it)." I wanted to know what the reaction of the TSM team was, whether they ever brought it up even in the cafeteria amongst themselves. "Of course!" she said. "We were all very good friends! But Dr. Shankar is JJ's (Joint Director, Nambudiri Brahmin from Kerala)'s nephew..." For reasons of higher pay and shorter commute, several employees from the TSM started to leave or look for other avenues. Dr. Akram regrets that her intellectual contribution to the TSM remains under-appreciated and that she is remembered at the IIA today as the "breaker" of the Traditional Systems of Medicine.

The orientalist construction of a unified Hinduism with the Brahmin (often racially conceptualized as the Aryan) as its epitome of moral virtue and spiritual guardianship was enthusiastically embraced and advanced by many Brahmins (Pandian 2007; 187). Pandian, in his study of 'Brahmin' and 'non-Brahmin' as categories in contemporary politics suggests that the colonial context was the single-most important cause of the rise and particular shape of the two opposed figures. Identity formations around the figure of the Brahmin were tied to new forms of 'speakability' brought in by colonialism (*ibid*; 12). The British represented the Brahmin variedly as the bearer of

Indian authenticity, as being of common racial stock (like themselves) but having degenerated over time, and as the clever upholder of an immoral priesthood (*ibid.*). It is not as if Brahmins were never spoken about in the pre-colonial period, but the discourse then was largely confined to the realm of ‘religion,’ whereas they were now taking place in the modern ‘disenchanted’ public sphere inaugurated by colonialism. In the new ‘speakability’ about the Brahmin, both colonizer and colonized participated, and this gave rise to a discourse that Pandian describes as “epistemic” as opposed to “ontic” (*ibid.*). While ontic discourses provide people with a way of being in the world, an epistemic discourse provides a way of *seeing the world*. So, while the ontic disposition would make people content to be part of a ritual, the epistemic disposition would make them look for a *meaning* in the ritual.

The institutional practices and epistemic dispositions authorized by a discourse on “open-minded science” that I have tried to outline in this chapter have much to do with new forms of ‘speakability.’ Studies on the history of colonial and postcolonial Ayurveda in India have shown how attributes of Ayurvedic learning have been pieced together and recast in a political idiom to represent the scientific authority of Hindu Ayurveda (Langford 2002; Shivaramakrishnan 2006). Langford’s analysis of contemporary Ayurvedic knowledge practices carefully demonstrates how the idea of “true” Ayurveda is a skillfully maneuvered political tool whose meanings may alter with historical circumstances *as long as* the control over its meanings remains in Ayurvedic hands (2002; 62, emphasis mine). My intention in this chapter has been to show the political practices of an “open-minded” Ayurvedic elite that are able to produce a discourse on ‘trans-disciplinary’ science, paradoxically, only by producing exclusionary practices. We cannot assume the categories of “Indian,” “Hindu,” “Muslim,” “Brahmin” and “not” as self-evident in this space. Rather, they are fashioned by discursive and interpretive strategies, rituals, performative processes in the daily life of scientists. To exclude in order to include is an intensely contradictory exercise that works only because it produces new forms of ‘speakability’ and authority. In the chapters that follow, we will see the ways in which these forms of speakability and authority allow the trans-disciplinary elite to align themselves and Ayurvedic science with global pharmaceutical science. Let us first turn to the discourse on ‘quality.’

Keywor(l)ds:
Expertise, Community, Science, Society: Folk, Laboratory, Plants, Quality.

There should be no snot on the nostrils...A peasant wipes his nose on his cap and coat, a sausage maker on his arm and elbow. It does not show much more propriety to use one's hands and then wipe it on one's clothing. It is more decent to take up the snot in a cloth, preferably while turning away.

--Erasmus, *On civility in Children*, 1530

One should not sneeze, laugh, or yawn without covering one's mouth. One should not pick one's nose, nor aimlessly scratch at the ground. One should not move one's limbs gracelessly, nor spend too long sitting on one's haunches.

--Vāgbhaṭa, *Aṣṭāṅgahṛdaya*, 7th C AD (approx)

We gave them hands-on experience in microbiology and other things which would be useful to them...They were not comfortable with all this...but they did very well. Many of them are prepared for the next round of exposure.

--Dr. Ram Shastri, Senior Organic Chemist, IIA lab, 2009

In the year 2003, the Department of Science and Technology, Government of India (DST, GOI) created an important and heavily funded scientific program called 'Science and Society.' Its mandate places special emphasis on "motivating scientists to apply their knowledge and expertise to the problems of weaker communities."⁴⁵ The idea is to make the benefits of technological growth "reach" the majority of the population, "particularly the disadvantaged sections, leading to an improved quality of life for every citizen of the country."⁴⁶ The Program Director's words echoed the official statement of the DST. In her words, "this program is specifically for the *unreached*...If India has to develop, then *they* have to develop" (emphasis mine). Further, one of its main objectives has been to "preserve and upgrade skills of traditional artisans as *natural carriers* of Science and Technology (S&T) knowledge / capabilities and enable their transition to S&T based production organizations (emphasis mine)."⁴⁷ What does a "preservation" and "upgrade" of "traditional scientific knowledge" look like when "experts of scientific

⁴⁵ <http://www.scienceandsociety-dst.org/staws.htm>

⁴⁶ <http://www.scienceandsociety-dst.org/>

⁴⁷ <http://www.womenenvironment.org/detail.php?pageId=102>

knowledge” approach their “natural carriers?” What new cultural objects are produced in the process of “improving” the health/medical knowledge/traditional skills of “weaker communities?”

The previous chapters traced an emerging consolidation of the authority of Ayurveda along the lines of a particular discourse of trans-disciplinary knowledge that sets out to demonstrate Ayurveda’s contemporary relevance. Specifically, I suggested that an articulation of open-minded science by the Hindu Ayurvedic elite produces new forms of exclusions and speakabilities that express their cultural authority through a ‘scientific’ discourse on revitalization. In this chapter, I look at how Ayurveda is authorized – through the language and discourse of a particular program of state science – as a “codified” knowledge system that can align easily with “modern science” and that is different from “folk” systems of medical practice. I will look specifically at how research programs produce the “folk/community” as pedagogical objects that do not have an *a priori* historical presence, but are rather produced in and through political modes of pedagogical programs. The terms of the ‘Science and Society’ program introduced at the beginning of the chapter are framed as “capacity building” measures, and they obliterate too easily the issues of power, knowledge, caste and class that are inhered in it. Though the overt distinction that is posited by the government and the Ayurvedic scientific community is one between “expert” and “natural carriers,” “codified” and “folk,” “Ayurvedic” and “community,” “knowledge” and “wisdom,” these distinctions become in effect a cover for other, less speakable distinctions of caste and class.

The three epigraphs quoted at the beginning of the chapter are meant to animate this point – Erasmus’ treatise in the middle ages on the ideal of civilized behavior and bodily propriety; Vāgbhāṭa’s medical treatise on good manners, virtue and long life; and a valediction speech at a DST training program by a researcher of an Ayurvedic research laboratory – are somehow all imbricated and meshed together in a very intricate and fascinating way in science pedagogy in India today. Erasmus’ exposition, which was being written in the sixteenth century for good manners that were best instilled at an early age, marked an important episode in the formation of Western manners or “civilization”

(Elias 1978; 53). Vāgbhaṭa's Aṣṭāṅgahr̥daya, which was being memorized by students throughout India's medieval period as one of the greatest Ayurvedic texts (Wujastyk 1998) lays out the ideal of the good life through microscopic adherence to the details mentioned in the *dinacharyā adhyāya* (daily regimen) and the *ṛtucaryā adhyāya* (seasonal regimen). The emphasis on norms of doing things appropriately, that is, the things / means prescribed (*vidhi*) and the things / means proscribed (*nishedha*) form the crux of the medical teachings of the *br̥hatrayī* texts (the great threesome⁴⁸). To be in tune with the special qualities pertaining to one's environment and seasons is vital to the ideal of health and long life in these teachings. In fact, so inextricably linked are "good manners," the ideal of "good life," regimens that forbid "getting wind, sunshine, dust, dew or harsh gusts in one's face; sneezing, burping, coughing, sleeping, eating in a crooked position....making music with one's arms and legs, mouth and fingernails" (Vā.2.40-44) and those that advise against keeping one's knees bent for too long, historians of science and medicine in India have often called the science of Ayurveda as being predisposed to being practiced by the "leisure class." What I want to do in this chapter is to demonstrate contemporary expressions and (re)incarnations of Ayurveda as itself a site that produces power and consolidates privilege. I want to examine the relationship between "expert science" and "community" in a way that recognizes the complicity of Ayurvedic science and "modern science" in cultivating a science elite in India, as a means of finding a conceptual way out of the Ayurveda/biomedicine binary⁴⁹. And as Sanjay Seth reminds us, any kind of elitism in India has caste as one of its major constituents (Seth 2009; 12). For an understanding of what this might mean, I turn the

⁴⁸ These are the three formative texts of Ayurvedic literature: the compendia of Caraka, Suśruta and Vāgbhaṭa, composed over the classical age. There is disparity in the status and authority of texts within the tradition of Ayurvedic literature itself, with the more recent books by Mādhava (c. 700), Śārṅgadhara (c. 1300) and Bhāvamiśra (16th C) collectively known as the *laghutrayī* (*laghu* translated literally as 'light,' the opposite of 'not heavy') or the "lesser threesome." For more on this, see Wujastyk, *The Roots of Ayurveda*, 1998.

⁴⁹ The phenomenon / process that Clarke et al identified as "biomedicalization" to refer to the contemporary transformation of American medicine has been used frequently as a conceptual tool to understand biomedicine/ western medicine/allopathy and modern science's relationship with Ayurveda and other indigenous medical knowledge traditions in postcolonial societies. Scholars have noted that the technoscientific changes in the constitution, organization and practices of traditional knowledge systems have been shaped by biomedicine and modern science and "modernity's" presence in these encounters. Although a large part of this chapter and the next trace that very trajectory, it is important to be attentive to the ways in which the Ayurveda-modern science relationship is not oppositional, and the ways in which Ayurvedic "science" is not necessarily the democratic other of modern science or biomedicine. For more on biomedicalization as a way of understanding the links between the body, biopolitics, technology, health and society, see Clarke et al 2010, *Biomedicalization: Technoscience, Health, and illness in the US*. Duke University Press.

spotlight on the materiality of the transactions between two neatly separated entities in official thinking – “science” and “society.”

Soon after it had set up the ‘Science and Society Division,’ the DST recognized the IIA as a ‘national lab’ fit for conducting the project *Medicinal plants programme for health and livelihood security of Scheduled Tribe communities in selected areas* under the aegis of its STAWS scheme (S&T Application for Weaker Sections). In 2008, it funded its biggest IIA project *Quality control of herbal medicines* to train women Self Help Groups (SHGs), NGOS and Small Scale Manufacturing Units (SSUs), and appointed Neeraja as Principal Investigator to design a training program “to increase awareness and build capacity” among the identified (weak) communities. In this chapter, I undertake a close ethnographic reading of that program conducted in the year 2009. I draw on James Scott’s *Seeing like a state* to analyze the research practices of the IIA – a non-State research organization that paradoxically, in several of its own institutional programs on ‘revitalizing the Indian medical heritage’, formulate, and are premised on, a critique of the State. I show first of all that the “problems⁵⁰” that are worthy of being counted as “scientific” in this program are those for which global pharmaceutical science needs solutions. This leads to a striking paradox in the transfer of knowledges that has been the institutional goal of the lab since its inception: highlighting the irony of State-led programs that intend to both motivate “expert” scientists to “apply their knowledge” to “weaker communities” as well as “preserve and upgrade” “traditional skills” and S&T knowledge of these communities. What makes this paradox even more remarkable in complexity is the structure of these training programs that align “classical” Ayurvedic knowledge with expert “global” pharmaceutical science, so that together they may be consolidated as “scientific” knowledge that is separate from “folk” knowledge. This consolidation is, of course, helped by decades of research in post-independent India, with its emphasis on translating Sanskrit Ayurvedic concepts and terminologies into English – the language of cutting edge research in science and technology and the logic of the Nehruvian model of development. I therefore spend some time in this chapter illuminating what one of the senior chemists of the lab refers to as the “English problem.”

⁵⁰ Recall the government mission statement “motivating scientists to apply their knowledge and expertise to the ‘problems’ of weaker communities,” quoted in the opening paragraph of the chapter.

Laboratory and the creation of value

The scientist was not trying to use the field as a laboratory; rather, he sought to use the laboratory to mark boundaries of exchange regimes.

--Warwick Anderson, *The collectors of lost souls*⁵¹

The date of the training program was drawing near and there was palpable excitement in the lab. For months, Neeraja had been preparing her staff and fellow researchers for the scale, seriousness and import of the event, given how prestigious it was to have been chosen to be funded by the DST to deliver its (IIA's) own scientific research achievements to the larger community. As a research lab, the CPPP (Center for Pharmacognosy, Pharmaceutics and Pharmacology) was established to develop and demonstrate the use of "modern methods and tools for interpreting traditional knowledge in a culturally sensitive way" (Annual Report 2006-07; 24), and this was an important testing ground for their "unique philosophical goal of evaluating traditional medical knowledge *within the context* in which it arose." In interviews as well as at monthly lab meetings, Neeraja would make it a point to stress that this lab, unlike other herbal or natural products research labs, did not merely take a medicinal plant and test it for its bioactivity and chemical compounds and DNA. It went "right into the origin, the knowledge system in which it arose," to try to understand its "full potential" to the community within which it was found in use, and the "context within which" it was being used as medicine. So for instance, if the medicinal plant *Tulasi* had to be evaluated for its pharmacological effects on the body, this lab would not see the plant as an *Ocimum sanctum* (Latin name for *Tulasi*) that had to be run through the botany, chemistry and bio-assays lab in a "disjunct" way, but rather "go" to the context in which it was used as cough reliever. This would not only give us all the possible pharmacological uses of the plant, but also the "logic" behind its use as cough reliever or as adaptogen or immunity enhancer, anti-viral, anti-bacterial, anti-inflammatory, and so on. "Start from the wisdom of the knowledge system," Neeraja is often found saying, so that one understands first the

⁵¹ Anderson, Warwick 2008, *The Collectors of Lost Souls: Turning Kuru scientists into White Men*. Baltimore: The Johns Hopkins University Press.

logic behind the multiple uses of the plant, what makes it work in certain dosage forms only and not in others, at certain times of the day and not at others, and with certain kinds of food, not with others.

- **Expertise.**

Just two months ago an ordered, systematic space, where everyone worked in accordance with an established mode of procedure, the CPPP lab has been unusually unkempt this month. The lab has been undressed for a large-scale construction project that has separated the Ayurvedic product development lab facility from the larger biochemistry within which it used to be housed, and is currently laying down the bricks for many more physical, and by extension epistemic, changes including the new and improved instrumentation hall, an extended and revamped microbiology unit, a larger work space and more computers for an expanding research team, and a brand new pharmacology lab⁵². Equipments, offices and files are split between two floors and over four directions, and preparing for a DST training program – a milestone in itself – amidst all this excitement of growth has rendered the lab space even more high-spirited. Sticking out of a disordered mass of books on the lab reference desk are two separate, but related, pieces of literature.

One is a flier advertising a *Health Awareness Kit for Neo-Literates*. In bold orange, the top left corner reads – ‘Sensitizing and motivating neo-literates to take charge of their own Health – Combination of interactive materials.’ A green ribbon runs through the length of the flier, saying ‘Awareness will lead to Action...Awareness will lead to Action...Awareness will lead to Action...’ with a backdrop of a smiling community of rural men, women, sons and daughters, grandfathers and grandmothers of, presumably, “village India,” backing this call for awareness that will lead to action. On the left hand margin is the take-home message of the Health Awareness Kit specifying that “people need to know about their entitlements to take charge of their own health.”

⁵² New pharmacology testing facilities were already underway when I was there, and the team was excited about getting the Brine-Shrimp assay facility – a set up that tests actions and interactions of drugs on living organisms. Brine shrimp are very resilient creatures that make them excellent test samples in experiments for testing toxicity of chemicals.

Almost as an illustration of how this taking charge might be put into effect, the other bunch of stapled papers that is extending out of the pile is a progress report submitted by the CPPP lab to the DST in order to be awarded funding for the training program. The seven page report lays out all the different ways in which centers of scientific expertise might “take charge” of “people’s...own health” (to re-quote the flier for neo-literates). It requires participating labs to show that their science will indeed “promote research, development and adaptation of science and technology for improving quality of life of weaker sections.⁵³” For this, the DST has a section on the report format titled ‘need assessment for S&T intervention in project area’ asking participating organizations and labs such as the CPPP to enumerate a list of replicable technology packages and field models that the project would result in. It is followed by questions about the ‘community background’ of the community where the funded project intervenes, and suggests in parenthesis that it is looking for information on the ‘caste and occupation’ of the community. The questions get more demanding as the report format progresses, managing and shaping aims, objectives and procedures of ‘productive work’ among the target group for training. It asks for a description of the ‘systems approach adopted’ and a final formulation of how the ‘R&D component’ of the training program would result in ‘new innovations and observations.’

In addition to endorsing government through the twin passage points of economic efficiency and good practice (Strathern 2000), the questions on the form serve to carefully sculpt the lab and other centers of expertise into objects that make possible new forms of value, new kinds of equivalence, new practices of calculation and new relations between human agency and the non-human (Mitchell 2002). The opposition between ‘people’ and ‘S&T’ doesn’t come already formed; it is made through these questions and their responses. The introductory section of the funding form enumerates six areas that the lab assesses as ‘problems encountered by the stakeholders⁵⁴.’ A closer reading of these would hint that these are not in fact problems encountered by the community but

⁵³ <http://www.scienceandsociety-dst.org/staws.htm>

⁵⁴ Stakeholders – the ‘community’ in which it proposes to intervene.

rather problems that are encountered by the herbal pharmaceutical industry to validate its products based on international norms of drug discovery and distribution. In short, the problems listed are:

- a. Ignorance regarding modern quality standards;
- b. Improper methodologies followed in semi-processing and storage of medicinal plants;
- c. Stability and shelf-life of products;
- d. Lack of proper documentation of batch processes and product details for record tracking;
- e. Identification of authentic plants from adulterants;
- f. Lack of awareness of collection methods.

The Director of the Product Development Initiative, Himalaya Drug Company⁵⁵, articulates the problem succinctly by urging us to understand that the Indian Ayurvedic industry is marked by the presence of “both organized and unorganized players.”⁵⁶ He goes on to say that many unorganized players produce low quality drugs that not only have an adverse effect on the patient’s health but also “damage the reputation of the entire industry as a whole.” It is this class of players that the training program seeks to *train*, and that, in the Introduction section of the report is loosely referred to as “the women” – a correlation I turn to shortly. The section reads: “many a times plants collected by the women does not fetch much revenue owing to unclean or infested materials. This in turn becomes an economic loss to them. Training them in QC (Quality Control) parameters and using S&T tools would not only enhance their understanding of the current requirements but also build capacity in Quality Control” (Lab DST Report 2008).

⁵⁵ A very successful modern Ayurvedic company in India today, the Himalaya Drug Company was itself founded in 1930 “to bring Ayurveda to society in a contemporary form and to unravel the mystery behind the 5000 year old system of medicine” (http://www.himalayahealthcare.com/about_himalaya/cprofile.htm, emphasis mine). Their manufacturing falls in the category of ‘patent’ medicines – a category of Ayurvedic product manufacturing that makes new formulations and new dosage forms from established Ayurvedic knowledge. This class of Ayurvedic drugs differs from what are known as ‘classical medicines’ that are based on Ayurvedic texts as well, but are manufactured in the traditional forms suggested in these texts. Madhulika Banerjee’s work on the pharmaceuticalization of Ayurveda points to the relationship between these classes of Ayurvedic drugs and the ideological-political process of “standardizing” and “scientizing” in order to be able to sell Ayurveda. For more on that, see Madhulika Banerjee 2009. *Power, knowledge, medicine: Ayurvedic pharmaceuticals at home and in the world*. Hyderabad: Orient Blackswan Private Limited.

⁵⁶ “Transforming Ayurveda” *ExpressPharma*, Aug 16-31, 2008: 7-10.

- **Quality.**

To grasp the increased interest in processes of exchange involving plants and plant compounds one may turn to the word “thinginess” (Whyte et al 2002; 5). As substances, medicines can be exchanged between social actors, making meanings, and moving from one meaningful setting to another (*ibid*). Plants are substances whose materiality – thinginess - allow them to be attributed a power to transform food, air, rituals, and the body, in some discernible way. They are also commodities with economic significance and resources with political value. As medicinal substances, plants are not only the principal raw material in Ayurvedic drugs, but also products in themselves that can be exported to markets in the European Union and USA as over-the-counter products sold without prescription (Banerjee 2009). Although exporters are not required to have records of their efficacy and safety, crude drugs are at least required to be standardized in quality and form.

The most comprehensive official effort to bring together concerns around the ‘quality’ of medicinal plants came with the 2006 two-day conference⁵⁷ organized by the AYUSH, GOI in collaboration with the National Institute of Science Communication and Information Resources (NISCAIR) – one of the 39 labs and research institutes under the umbrella of the Council of Scientific and Industrial Research (CSIR), India’s largest scientific R&D organization. A preliminary look at the three sponsors – the WIPO (World Intellectual Property Organization), WHO, India (World Health Organization,) and APCTT (Asian and Pacific Center for Transfer of Technology) – can offer a picture of the specific kind of production of knowledge about quality that emerged from this conference. Named the ‘International Conclave on Traditional Medicine,’ one of the main accents of the conference was to acknowledge that “diverse TM (Traditional Medicine) practices have been developed in different cultures and regions, but without a parallel development of international standards and appropriate methods for evaluating TM” (ICTM 2006; 6). It further admits that “requirements and methods for research and

⁵⁷ ‘International Conclave on Traditional Medicine,’ 16-17 November 2006, New Delhi, India.

evaluation of the safety and efficacy of traditional medicines are more complex than those for conventional pharmaceuticals....safety and efficacy are closely correlated with the quality of the source materials used in their production,” suggesting that the WHO’s “GMP (Good Manufacturing Practices) lays down many requirements for quality control of starting materials, including correct identification of species of medicinal plants as well as proper sanitation....” It also notes that “analysis of adverse events related to the use of toxic herbal medicines is more complicated than in the case of conventional pharmaceuticals” (ibid).

One of the conference presenters representing the *Herbal Drugs and Bio-remedies Cell* of a CSIR laboratory introduced her paper by acknowledging that “due to the powerful ‘green wave’ sweeping across the world, the demand for herbal drugs has increased several folds” (Mallavadhani 2006; 63). In order to provide safe, consistent and efficacious drugs, “certain controlling parameters become absolutely necessary.” The drugs and formulations that she refers to as “herbal” are Ayurvedic, and the “controlling parameters” are WHO’s protocols for standardizing herbal drugs. She calls them “triple P based screenings – Pharmacognostical screening; Physico-chemical; and Phytochemical.” Another researcher from the Department of Biotechnology, Ministry of Science and Technology, GOI, makes a case for microscopic screenings for quality from a more macro perspective. He reasoned that with the modernization of Ayurveda in the 20th C came its transformation into “commercial medicine.” Such a transformation led to the production of bulk drugs to meet ever increasing demands, and the “casualty was quality” (ibid 69). “In the past, there used to be highly experienced plant collectors who had the experiential wisdom used to collect the raw drugs in (at) the right time and from the right habitat (to) help the physicians to get the right quality product. With the commercialization, such aspects were forgotten, and the result was loss of quality” (ibid 68).

As an attribute then, “quality” in formal discourse is not limited to the thinginess of medicinal plants alone. It is assigned a temporal property, a distinctive characteristic of a time and an era when collecting the right plants from the right habitat at the right time

was a quality in itself, possessed by plant collectors and physicians by virtue of their “experiential wisdom” (not knowledge). But “experience” and “wisdom” are not qualities that can be arranged to be disseminated from “scientific experts” to “communities.” “Knowledge” is. Therefore, it must be the knowledge-about-quality *as* a quality that may be arranged to be socially exchanged and transferred (*even* when these communities are assumed to be the ‘natural carriers of S&T’)⁵⁸.

How is “scientific” knowledge about “quality” produced? An already complex issue in Ayurvedic research today, the question gets more complicated when the site of training programs in medicinal plant quality is the laboratory, because then it first begs the question: what is the nature of the knowledge about quality that becomes available for distribution through the lab? A close reading of the interaction between the community of “experts” and “community” brings out the delicate workings of how scientific knowledge about the “quality” of Ayurvedic plants and products inscribes new kinds of relationships with the “expert”, with laboratory equipment, and with “technology.”

“Do people already know the difference between these three words – quality standardization, quality control and quality assurance?” asks Neeraja on Day 1 of the training program by way of introducing the agenda for the week-long meeting. The audience is composed of the target audience for the training program - plant collectors, cultivators and manufacturers from community Non-Governmental Organizations (NGOs), Small scale Units (SSUs) and Women’s Self Help Groups (SHGs) selected from across the country - and “experts” from the industry, the research laboratory (including pharmacognosists and botanists), and AYUSH (Government Of India). In the words of the training manual, the target audience of the workshop are “those who have minimum technical qualification (Science/Traditional Medicine) background to carry out the ‘tests’” (A Manual; 2009, 5). When no one in the audience volunteered a response to Neeraja’s question about quality, she went on to say, “we take quality very casually. We have to look at it more seriously.... the turnout for the training has been good for us, and that indicates that people who are in the peripheral sector, particularly the collectors of

⁵⁸ Stated as a DST objective mentioned earlier on in the Introduction.

medicinal plants, are very keen to know about quality control and they have enrolled for this workshop.”

She further goes on to state that collectors, who form an important part of the supply chain of Ayurvedic herbs, are not aware of “modern scientific techniques” in quality. In her speech, Neeraja often used “modern scientific techniques in quality” to mean “quality” itself. “At the moment it is quite random, (done in) haphazard way, where a majority of them are women (who) go into the forest or degraded lands in the cities and collect the medicinal plants and give it to the traders – the middlemen. This has to change. They have to be oriented on the importance of how to collect good herbs, how to sustainably collect, what is a good quality herb and so on; so at least at the morphological and the botanical level, the quality is right.....we all need to be committed to quality.”

The practices of seeing “women,” “community,” “haphazard,” “unclean,” “infested materials” as entities all rolled into one that serves to stand in for lack of quality is not uncommon at all. Mobilized together, they enable the forming of the category of the “folk” as separate and different from “classical” knowledge about plant material collection, storage and use. The construction of this separation was very well illuminated at the ‘ROTP (Re-Orientation Training Program) on the Knowledge base of Indian Medicinal Plants’ organized by the IIA and sponsored by the Department of AYUSH, GOI, in early 2009. The week-long program had its events, papers and presentations themselves categorized and divided along the lines of how *Dravyagūṇa Vijñāna* (the science of Ayurvedic materia medica) is classically studied and taught as a body of knowledge.

The first day of the ROTP was labeled ‘*Nāma Gyāna*’ (knowledge about the logic of naming a *dravya*/ plant/substance) and translated on the program sheet as ‘Nomenclature Information;’ Day 2 was *Rupa Gyāna* (knowledge about ‘form’ or plant morphology and identification); Day 3 *Gūṇa Gyāna* (knowledge about properties and usage). The remaining days of the program were bunched up as an application of the knowledge arising out of the first part of the week, with Day 4 discussing issues of conservation and

trade of medicinal plants; Day 5 examining the National IPR policy; and Day 6 being the day for ‘Primary Healthcare,’ where papers were presented to demonstrate the application of *Dravyaguna* knowledge on ‘communities.’

The principal of a postgraduate Ayurvedic college in Chennai introduced the problematic of her paper on the final day as taking “science” to a place (society) where “Ayurveda is only a notion.” In Tamil Nadu, “no one knows that there is a science called Ayurveda, they only know Siddha,” she protested. As scientists from the Ayurvedic community who were committed to both “health” and “real medical treatment,” she suggested that the quickest and most effective way to achieve “decentralized Ayurveda” was to take it to the “lady at home.” The well-being of the family and the community, we were told, depended on “educating the lower class housewives” about cleanliness and hygiene. She argued that it was “easier to educate the educated classes, but the lower classes don’t even know what they are actually getting and cooking,” and this made the Ayurvedic community’s onus to “educate” even greater. In this sense, the trajectory of her talk at times confirmed her paper title ‘Distinguishing traits of Ayurveda in home remedies,’ when she claimed that housewives are “already practicing Ayurveda” when they reach out for grains, greens and spices on their kitchen shelves; but paradoxically also urged the community of Ayurvedic experts present in the room to be careful in “identifying the capabilities of persons to use home remedy.” It was the combined task of the Ayurvedic physicians familiar with the community and the grassroots NGOs serving the community to discern the ideal community recipient of Ayurvedic knowledge so that the housewives knew “when to stop home remedy and opt for a real, technical manner” of treating medical problems in the family.

In his paper ‘Primary Healthcare Experiments with medicinal plants: Model for endogenous development,’ also in the second segment of the ROTP, Dr. Shiva notes that a “rapid” approach to an assessment of local health traditions is important because erosion of local health traditions is taking place rapidly. He is the program director of RALHT (Rapid Assessment of Local Health Traditions) – one of IIA’s oldest and most successful programs in the country that uses a participatory methodology to revitalize

“folk” traditions. He presented a slide showing a group of eight barefoot smiling women who were holding their children of varied ages and standing in a line in front of a mud house in Northeast India. “Look at them. They don’t even have slippers. What do we do about them? ...You can’t give them lectures, they don’t know lectures. They are *arogya mitras* – friends of nature, whose knowledge is like water – keeps on percolating.” It was 3 in the afternoon and the slideshow roused and stirred us out of our post lunch slumber for various different reasons. After days of discussing the emollient properties of plants and stomata of leaves and red-listed species found in “nature,” here was a presentation that humanized the discussion on medicinal plants by bringing into the room “friends of nature.” People had all sorts of questions for Dr. Shiva about these women who did not resemble in dress the “folk” that the audience had ever encountered in their lives. “Have they ever seen 100 rupee notes?” “Do they have TV?” “Do they have a script?” they asked (implying, presumably, a written language script). Dr. Shiva responded by universalizing “nurture” as the feminine principle of “nature” saying that although they looked different and dressed differently, “they are like all our friends here in this room in saris and *salwar kameez*” (referring to all the women in the room who wore either of these two garments).

Popularized by the academic intervention of Vandana Shiva - an environmental activist identifying herself as “eco-feminist” - the philosophy of women being inherently better at preserving “nature” and promoting endogeneity gained much currency in India in the late 1980s and early 90s. In her book *Staying Alive*, she argues that femininity and ecology on the one hand and femininity and ethnicity on the other are natural allies, mutually synergizing each other and often synonymous in practice. This idea finds itself being put to use in different ways by different social movements that seek to conserve, revive or preserve traditional practices in contemporary India. The most unique expression of this that I have personally encountered was on IIA campus, when most female IIA staff were found missing from their desks one afternoon, seen picking up pieces of trash and tobacco wrappers and banana skins from the campus grounds. When I spoke to Anthony – the HR manager about the idea behind the half-day off for the female staff of the Institute – he said that there was too much trash generated by the families of

the construction workers on campus. “What women can notice in the environment, we men don’t even see.” He joked that it was an HR decision to pick women and not men for the job of picking trash because the men would give us a clean campus after an entire day’s work, whereas women would achieve the same in “a matter of hours.” This gives rise to an interesting paradox – one where women are “naturally” better preservers of “nature,” but are sloppy and unhygienic when it comes to *systematically* collecting it (Recall the IIA lab language on the DST report stating that plant collected by women does not fetch much revenue owing to unclean or infested materials. Or then Neeraja’s introduction of the problem of ‘quality’ as – “at the moment it is quite random, (done in) haphazard way, where a majority of them are women (who) go into...degraded lands in the cities and collect the medicinal plants and give it to the traders...This has to change. They have to be oriented on the importance of how to collect good herbs, how to sustainably collect...)

Dr. Shiva continued, “they have the patience. They will pound it, boil it and show it” (referring to the use of medicinal plants/*dravyas* to treat health problems at home) “We men are not that much nurturing in nature. These women are patient. They are the best *ārogya mitras*” (friends of nature). The presentation was concluded with Dr. Nambisan – the main organizer of the ROTP and a very well regarded *Dravyaguna* teacher hailing from Kerala, who stepped up to the presentation area and urged the audience to applaud Dr. Shiva for his efforts. “The Ayurvedic community should thank him for popularizing Ayurveda in rural areas,” he said. Dr. Shiva stood there humbly bowing, smiling, thanking, and was heard saying that he always told his Ayurvedic friends that *they* were “the biggest enemy of Ayurveda, not allopathy.” His remaining thank you words then got lost somewhere in the roar of the applause.

The practice of interpreting healing traditions as classical and folk, great and little has shaped and continues to shape scholarly interpretations of South Asian religious and healing practices, as suggested by Langford (2002). As a “knowledge institution” that intervenes in the health of the community by researching the basic principles of Ayurvedic science and putting this research “out there,” the work of the IIA is itself

guided by an orientalist separation between “codified traditions which are based on sophisticated theoretical foundations” and “folk traditions” of “ethnic communities” that consist of “amazing innovations” (Shankar and Unnikrishnan 2004; 7). Although the IIA rarely uses ‘class’ in the sense of “lower class housewives” as a population category that appeared in the talk of the Post Graduate Ayurvedic college principal, it does, in its discourse and work on/with the ‘folk,’ refer to divisions between the (masculine) revitalizing Brahminical force of codified traditions and the receiving/preserving ability of the “folk/community.” Femininity has a very specific place in this kind of orientalist othering. In the targeting of “the lady at home” to “spread the message of Ayurveda” or in Dr. Nambisan’s congratulatory words for Dr. Shiva for popularizing Ayurveda in rural areas, the discursive model in which *folkness* is produced makes the community’s ability to successfully integrate the “scientificity” of Ayurvedic knowledge indistinguishable from the perceived feminine virtues of “patience,” “nurture,” “healing” and readiness to “learn.” This has deep resonances in Ashis Nandy’s assertion that the parallel between primitivism and childhood was an important element in the legitimization of colonial rule (1983). The modern concept of childhood as it originated in seventeenth century Europe does not make the child a smaller version of the adult, but an inferior one that is “less productive and ethical, and badly contaminated by the playful, irresponsible and spontaneous aspects of human nature” (Nandy 1983; 15) The growth of this ideology and the theory of progress that undergird it legitimized modern colonialism for which the childlike Indian – innocent, ignorant but willing to learn – had to be reformed and educated.

The knowledge configuration around ‘quality’ also allows for the fashioning of an Ayurvedic elite that can apply a narrative of lack to folk medicine (not a lack of material resources but a lack of scientific knowledge of how to most effectively and sustainably use those resources, “systematically” and “hygienically”) while reserving a narrative of decline (not lack, but a civilizational decline from a science of antiquity; Langford 2002) for Ayurveda in its elite forms. The narrative of lack is so widespread that not only does it inform social policy for the ‘folk’ (the 2003 DST policy that ‘takes science’ to ‘society’ by designing training programs to improve weaker communities), but also results in new

scientific methodologies such as the IIA's own experiments with PRA (Participatory Rural Appraisal) in rural areas. 'Folk/community' in official IIA research program parlance is represented by the word "local" (the L of LHT, Local Health Traditions), that implicitly codes Ayurveda as not local, and as scholarly, codified, scientific. The conceptualization of the "local" is effectively reflected in PRA methodologies that include the use of innovative tools by IIA documenters of LHT who go into a village to conduct "walks with the community" (DALHT Trainer's Module #2, 2003; 18). Known literally as "transect walks," these "walks are undertaken in a systematic manner...where the documenter along with the community, walk around the village noting down the various resources and role players in the traditional health care of the village. This could include information on medicinal plants, houses of folk healers, houses of householders known for their expertise in home remedies and diet, temples, *darghas*, churches and other religious places which play an important role in health and healing" (*ibid.*). The module also cautions the trainer about the "possibility that during the course of the walk, the community might meander into seemingly irrelevant histories of the region. However, it is good idea to let them do that, since some very valuable information could come across in the process" (*ibid.*).

The spatialization of the "local" here is constructed in a very particular way. The DALHT training manual states that: "rural and tribal people possess medicinal knowledge about the flora and fauna in their farms, near their homes, water bodies, wastelands and forest in their regions. They are passed on from generation to generation orally in the form of stories, songs, and proverbs, and through demonstration" (DALHT Trainer's Module #1; 2002; 6), so that unlike Ayurvedic knowledge, local knowledge is not found within a text, but is rather dispersed and scattered across lands and farms and homes and temple grounds and songs and proverbs. Both landscape and its inhabitants are teeming with resources and practical knowledge, but lack a "systematic" order of and among things. In order to manage that knowledge systematically and scientifically, the IIA intervenes with its DALHT (Documentation and Assessment of Local Health Traditions) program in order to "revitalize" by following these:

- a. Identification of *important* local health traditions

- b. Community validation of these identified traditions along with multi-disciplinary validations for *encouraging the best and discouraging distorted practices*.
- c. *Promotion of the use of the validated health traditions at household and community level.*” (DALHT Trainer’s Module #2; 7; emphasis mine)

As a form of expertise, ‘scientific Ayurveda’ constructs the lasting otherness of the ‘folk,’ seemingly independent of cultural prejudices. Close attention to the contemporary discourse on “quality⁵⁹” however, points out how the disciplinary forms of Brahminical norms of hygiene, sanitation, respectability (and the indistinguishability of the health of the family/community from its moral welfare) predisposes Ayurveda to align itself easily with global, pharmaceutical and scientific concerns about “quality.” The relationship between Western medical notions of “unclean,” “infested,” and “unsystematic” and Brahminical norms of sanitation and bodily regulation is more intimate than appears at first glance. As Dr. Shiva suggested quite accurately at the end of his paper, the “enemy” of Ayurveda was not at all allopathy (or modern science), but one closer to home.

Let us turn now to some of the ways in which state scientific programs that regulate and teach “quality,” introduce the “right ways of being and doing” (Bourdieu 1986; 511).

“How to do.”

“We will teach you all the tests to be done,” Neeraja assured us on the opening day of the DST training program, as she introduced us to the importance of the processes of product preparation, product standardization and product testing for ensuring the quality of medicinal plants and substances collected from the wild. After two days of lectures and deliberations by experts, the workshop moved into the next phase consisting of lab experiments and demonstrations. “I am handing you over to your mentors now. Go

⁵⁹ In her intriguing analysis of class relations in contemporary Britain and the (negative) affective and cathectic aspects of class relations for middle-class identities, Stephanie Lawler discusses how expressions of disgust at white working-class existence confer uniqueness on middle-class identity and benefit the long-standing middle-class project of distinguishing itself. Although she focuses on expressions of disgust within the British media and other public fora, her questions resonate deeply with the ways in which certain classes of people can get constituted as “exotic” or sexually deviant or “simple” or “unhygienic” in their appearance, behavior and practices. These discursive and coding practices have serious implications for class relations. For the article, read “Disgusted subjects: the making of middle class identities” *The Sociological Review* 53(2): 429-446; August 2005.

ahead and enjoy!” said Neeraja, as she walked us all down to the biochemistry lab on day 3 of the workshop. Vijayashree was already waiting for us at the door with six lab coats in her hands, which she asked us to put on immediately, and ensured that we had our “quality handbooks” pens and everything, ready. The handbooks not only explained the difference between quality control, standardization and assurance (the question that we were asked on Day 1 of the workshop and failed to answer), they were also meant to be a sort of support document that enlisted all the catch words of ‘modern quality control’ to be frequently used in talks delivered by workshop experts. It also provided us with formats for the entry of lab quality test results, along with the protocols for performing these tests to test the plant for microbial, physico-chemical and organoleptic⁶⁰ quality. In addition, the handbook gave us several pages of scratch paper for doing our rough math calculations.

Our group consisted of six trainees other than me – community workers and representatives of grassroot NGOs, small-scale Ayurvedic pharmacies and manufacturing units. They were among the twenty workshop participants who completed a general two-day preparatory course in awareness about quality control of medicinal plants. The six participants were chosen to go on to do an advanced three-day “technical course” in Quality Control based on aptitude and interest. Three of the women participants from this group – Lalitha, Pramila and Soundarya, represented a rural developmental NGO better known for workshop purposes as a women’s SHG, with two of the women having acquired formal postgraduate training in Sociology, but no formal background in “science” or “medicine;” and Santosh, working for a rural NGO, with basic high school training in the Science track. They all had several years of experience in social work in rural health NGOs, and hailed from families of folk and local healers. Dr. Mallya, the fifth participant in the group, belonged to a small pharmacy in Karnataka, and had had basic science undergraduate training in his BAMS⁶¹ years. The sixth participant, Dr. Padhi, has traveled from North India, and is also a BAMS, now heading an alternative rural health NGO in Orissa. The final participant is the ethnographer, with a background

⁶⁰ Inspecting materials by using the senses. It involves visual examination, feeling, smelling and touching.

⁶¹ Bachelor of Ayurvedic Medicine and Surgery, the equivalent of an MBBS for biomedicine.

in neither Science nor medicine nor social work, nor any family affiliation with healing practices. Rather, as Vijayashree joked with another participant, this participant just “comes with the lab.”

We spent the next three days running between labs, jogging between equipment, frantically looking inside our manuals and shuffling around mentors to get hands-on experience on the “important instruments that you will use for your everyday analysis of quality.” We learned in the product development lab to “scientifically use our senses” to make good quality Ayurvedic formulations such as the *Aśwagandha Śatāvarī kalpa*⁶² and to “potentiate” formulations so that dosage may be reduced. The biochemistry lab sessions taught us how to use the Single Pan Balance in order to measure the weight of the dry *Aśwagandha* and *Śatāvarī* samples and to calibrate them and put them in the dehydrator till the moisture content reading was less than 10%;. We looked on as we were taught how to identify *Aśwagandha* by running TLC (Thin Layer Chromatography) tests in the biochemistry lab and HPLC (High Performance Liquid Chromatography) tests at the Instrumentation Center. When it was the chemistry lab’s turn, we were shown the value of Ash Value as a test to determine the purity of *Aśwagandha* and *Śatāvarī*. We were trained in the importance of working with botanists who would help us maintain the very critical SDS sheets (Sample Detail Sheets) – where all medicinal plant samples are assigned a UIN (Unique Identification Number) / Lab ID. Finally, and most importantly, we were trained on the significance of not letting microbes manipulate our *Aśwagandha* by doing, from time to time, microbial testing on our samples.

It is not that I could not understand that these sequential steps would result in “quality control,” rather it was the distribution of knowledge about quality that I could not grasp. I understood that these steps were meant to result in the “same objective standard” that could be applied regardless of community, lab, pharmacy, NGO or local context, but I could not comprehend why the emphasis on quality did not objectively apply as universal protocol to *all* members of the community such as the upper caste

⁶² A basic Ayurvedic formulation composed of two plant ingredients – *Aśwagandha* (*Withania somnifera*) and *Śatāvarī* (*Asparagus recemosus*), used as a rejuvenator and galactagogue in its granular form.

priests who were involved in the day to day spiritual and religious affairs of the IIA, and why this particular ordering of student-teacher-and-tools did not apply as a standard permutation in all of the lab's interactions with community. On the first day, Neeraja pointed out that "microbial quality testing is a must." "Nowadays," she noted, "pesticide residues, aflatoxins, radioactive rays and heavy metal contamination like mercury, lead, arsenic, all these things, is too much, and it is important to know the microbial tests." When we were led into the sterile microbiology lab by Cynthia (our microbiology mentor for the workshop) – to be alerted to "all the degradation that comes from the wild⁶³" and to all the germs and the microbes that possibly go into our food, food system, medicine, medical system, we were repulsed by all that fungi and bacterial growth on our formulation samples that would have gone undetected had we not exposed them specifically to a Petri dish with an agar medium that enabled the growth of microorganisms present. So surrounded by live cultures of bacteria and virus and fungi were we that we were almost a hundred per cent convinced by the end of it that we needed to be "smarter than the microorganisms" and that it would be irresponsible of us not to take "personal responsibility" for clean samples and a clean environment. This drastically simplified, formulaic and universal model to ensure "quality," "identity" and "purity" would have been less problematic if it were universally taught and imparted.

The *pujari* (head priest) of the IIA, as a rule, drinks water only from his own well. Neither he nor his family has ever drunk water from pipes or filters, I was told. I could not help but remember how, many months ago, Cynthia had, in the very same sterile lab, shown me a water sample from the *pujari's* well. The lab was, at the time, testing the strength of a copper device to kill microorganisms in water – a device that the lab had designed (and later patented). Cynthia was routinely looking for diverse water sources in the city of Bangalore to test out the device, and she had remarked that the *pujari's* sample of well water wouldn't let her down. It was the water that she knew as the most "unfit for drinking" among all the other water sources that she had tested, and a sample whose total microbial load was resistant even to boiling. Despite gaining the status of the "ideal

⁶³ Going back to Neeraja's introductory lecture on quality: "At the moment it is quite random, (done in) haphazard way, where a majority of them are women (who) go into the forest or degraded lands in the cities and collect the medicinal plants and give it to the traders – the middlemen. This has to change."

unclean” water sample for the lab that was so turbid that it did not even need to go through tests to be deemed contaminated, the lab was not conducting a training program in quality awareness for the *pujari* or *pujaris* in the city, who are driven by ‘purity’ but not ‘quality.’ Our first lesson on the first day of the program was that the “lack of quality consciousness is an attitude. It starts from us. We shouldn’t expect regulatory authorities to tell us that this is right, that is not right, it is *our* community, *our* people, *our* children, so I think the responsibility starts with us....there is no way that you can say no to quality control, you don’t have the right to do that.” Yet the *pujaris* at IIA did not constitute a “community” that “science” must reach and that the lab could “train.” While “experts” are not homogenous entities, there can be, and is, considerable shared understanding within what I am trying to point to as the Ayurvedic elite expertise (comprising scientific/religious/spiritual figures) about what and who constitutes “folk” or “community.” The exclusion of Brahmin priests from the “folk” that need training in assessment of “quality” suggests the term ‘quality’ hides a moral/civilizational economy within the sterile discourse of microbial and toxic status.

The lecture and demonstration hours of the training program were designed in a way that IIA’s own research projects to understand the logic of Ayurvedic basic principles with the help of modern science tools could be imparted to the trainee community. Whether it be their “intercultural studies” on the botanical identities of controversial medicinal species, or DNA marker assisted authentication of botanical species traded as “authentic” Ayurvedic species, or the use of classical and modern sensory science to test product quality, an underlying premise of being chosen as the site for the DST training program was to share IIA's own experiments in standardizing and making explicit in a step-by-step fashion the Science behind achieving “good quality” Ayurvedic formulations. We were offered a list (that was also available in fuller detail in the *Manual*), an enumeration, and a performance of “quality” that gained its authority from following a particular sequence of acts. In short, this performance consisted of knowledge and use of:

- Good Agricultural and Collection Practices (GAP and GCP)
- Good Manufacturing Practices (GMPs)
- Packaging

- Government and regulatory issues on quality
- Quality Control methods, including:
 - a. Morphological identification: Ascertaining the quality of a plant from its physical form and external structure and constructing equivalences with their mention in Ayurvedic texts using macroscopic tests. This includes also an introduction to botanical nomenclature, binomial names, synonyms, and “correct names.” (A Manual; 8)
 - b. Product preparation: Collecting product ingredients and preparing final products/formulations in accordance with the physical, chemical and biological quality standards enumerated in the Ayurvedic Pharmacopeia of India that define standards for herbal products and their individual ingredients.
 - c. Sensory analysis: the use of human senses such as sight, smell, aural, taste and touch to ascertain quality of a product and its ingredients, referred to at the IIA as “sensory tools.”
 - d. Physico-chemical analysis: tests for determining the identity and purity of raw drugs and products. The values of these tests are normally represented as Not More Than (NMT)% for undesirable parameters (like Moisture Content, FOM/FM and Ash Value) and as Not Less Than (NLT)% for desirable parameters (like extractives and content of active constituents). The tests include determination of foreign organic matter; determination of moisture; solvent extractive values; ash content; Thin Layer Chromatography (TLC) and fingerprinting of plants; and microscopy that gives full cell information about the raw drug.
 - e. Microbial analysis: tests to determine microbial load, or the total number of bacteria and fungi in a given quantity of water or soil or on the surface of plant material and finished Ayurvedic products.
- Documentation and record keeping: the process of systematically entering each of the above steps into a record keeping device – notebook, notepad, or computer – and maintaining records in a way that makes not only us aware of where to look for the file or record...but “transparent enough for any drug inspector to go to your place and pick out that specific file and pull it out within five minutes. That should be a system which we aim to have.” (part of Neeraja’s opening talk on Day 1)

The system that the trainees were being coached in not only constructed the “third party” (the government drug inspector, the botanist, the pharmaceutical company, the lab) as a form of expertise while increasing dependence on it, but also consolidated this expertise by confirming the irrationality and backwardness of the ‘community’ to whom the expert knowledges of Ayurveda and modern science must be ‘taken.’ Dr. Ganesh, as Head of Product Development at the Himalayan Drug Company, spoke from experience on the first day of the training program as he shared his views about quality with the women from the community SHGs and representatives from SSUs. Posing the question “is it true that we Indians are not much aware of quality?” he turned our attention to the

“great saying by Caraka – the most objective text of Ayurveda” to falsify the notion that “we Indians” don’t “know” quality. He emphasized that Caraka outlines “beautifully⁶⁴” the process of developing a drug profile or a drug monograph. There is first “the definition of *prakṛti* (properties, morphology, physico-chemical) *prabhāva* (specific activities), *deśa* (habitat), *ṛtu* (season of collection), method of collection, storage practices, *upaśkaranā* (processing techniques), *mātra* (the dosage), and today what is so important – pharmacodynamics, pharmacokinetics...it *all* was said in the traditional texts six hundred years ago first time on this earth.” If we understood this, then we would understand that “we need to absorb the value that quality brings about – good return, value in business which helps us to *shake hand* (emphasis his) with all the legal and liasoning offices and officers around the world. That is the ultimate approach (to quality), there is no second approach.” He clarified this with a slide that read:

Quintessence of an
Ultimate
Approach for
Legal/Liasoning
Issues of
Traditional herbal medicine to
Yield greater returns.

He urged us to keep in mind that “regulatory authorities have no idea about vernacular names. *Khus* (or anything rhyming with that in the vernacular name of a plant) is taboo to use. Why? Because Americans think it is opium.” He further informed us that “the Americans want not *your aśwagandha* but mine, that peak at 1.4, 2.1, etc.” (emphasis his). Therefore, it was essential that we learned to use the four Ms in controlling the quality of a herb: Materials, Machinery, Methods, Men.

At the end of the session, a very interesting discussion ensued between Neeraja and the audience pertaining to the four M list. Neeraja, who is always up for a good discussion and exhibits keen curiosity towards Other forms of knowledges, asks:

Neeraja: If somebody gives you an *aśwagandha* root, can you identify it?

Lalitha: Ya...(hesitantly)

⁶⁴ A word often invoked as a concept by scholars of Ayurveda and Sanskrit and practitioners of Ayurveda to refer to and understand the complexity of a passage or a text in classical thought.

N: You can? (turning to audience) So some people can. What's your good name?

L: Lalitha....

N: Lalitha, how do you identify?

L: (in Tamil⁶⁵) I'm not quite sure how to say it, but I think I know how to recognize *aśwagandha*. When you do this (rubs her index finger on her thumb) it should feel floury. It has this white -----N (interrupting): Off-white, creamish color--

---L: Yes...If you showed me different varieties of [*ashwagandha*] roots, it will be clear [to me] which one. And the smell, right? It is ---

---N (interrupting): The name! *Ash-wa-gan-dha*. Horse-like smell! It's got a characteristic smell. But in today's world, you can't use just that, meaning the smell alone, to identify it. Identification – morphological identification – *is* important. *But* it is not sufficient in today's time. Why because [switches to Tamil] adulteration industry is moving faster than the genuine industry. If you want saffron, you can get saffron looking plastic material which will melt in milk at the same temperature, and it will give the exact color as saffron. [Switches back to English] So the Ayurvedic way of determining whether it is saffron or not is No Longer Valid. Isn't it? Because the adulterant industry is supplying plastic material which is going to dissolve in milk just like saffron. And you are going to say that in Ayurveda texts they all say that when it dissolves in milk it gives a nice yellowish-orange color. [switches to Tamil] This is what is said in Ayurveda. So in today's world can we use just this to decide on the plant? You go according to that, you will be buying a packet of plastic material for saffron.

She continues,

N: So what *else* do you need? That's why you need *other* tests.

L: Technical tests are okay. But by the practice and experience, you can identify.

N: (interrupts nodding). That is what is at the current stage. But we have to raise it to the technical tests. That is why this whole program, this is why the [need for] awareness....Saffron is traded in shops and you will get different quality ranges just like *Aśoka*, which you will get from Rs. 14 a kilo to Rs 75 a kilo. So from the grading itself, from the pricing itself it is not the same. Then you will, you *should*, have a doubt. When you go and ask the market fellow I want saffron and he asks you back the hundred rupee one or the five hundred rupee one, then you should have a doubt. Why are they offering something for hundred rupees? Is it some other flowers? So you have to have a doubt all the time, up on your toes, be aware all the time whether I am getting genuine material or not.

The value of “doubt” or “suspicion” as a newly realized attitude of scientific expertise in contemporary Ayurvedic research is something that I develop fully in my next chapter, but the idea that “questioning” in practical life can be handed down as a scientific skill set to achieve ‘awareness’ or intellectual knowledge of something has been striking at this training program. The whole premise of the lab sessions on quality was that there are real, material processes and techniques for questioning that can be taught

⁶⁵ The official language of the Indian state of Tamil Nadu to which Neeraja belongs, and the predominant vernacular language in the room.

and imparted such that “quality” becomes a staging of “doubting,” (where such doubting is necessitated by the adulterating practices of “today”). The realization of “quality” in this way, however, makes necessary new relationships with the Ayurvedic “expert” (represented by the regulatory authority, the pharmaceutical company and the lab at this workshop) who, by their precise approach to materials, can help “control, assure, and standardize quality.” Dr. Padhi, a young Ayurvedic doctor from North India now heading an alternative rural health NGO in Orissa, extended the dialogue between Neeraja and Lalitha, and helped illuminate the specific practices adopted in the production of Ayurvedic expertise.

N (in continuation of the saffron-and-doubt conversation): You have to ask yourself, if this test cannot prove it, can I prove it using some other test. If *you* cannot do it, can some other lab do it and give you the result. So you cannot say that whatever is coming from the market I will see if it is giving *Aśwagandha* like smell and breaks like *Aśwagandha*, and looks like so and so...it is (this kind of quality testing using merely the senses of smell and touch) not good enough for today. It is good enough, [but] as a starting point. But you have to go to the next stage.

Padhi: (in Hindi) But say if I have *Vidari*⁶⁶, when I go to the market, some traders will have *Vidari* that remains white upon drying. Now mine turns black. I know that turning black is a characteristic of the real *Vidari*, I can identify authentic *Vidari* precisely by its color and touch but manufacturers don’t want to see that color. They think black means gone bad.

N: (In Hindi) Exactly. AYUSH has recognized testing facilities across India, different states. [switches to English] Many labs, like IIA, can certify the product, and there are several other than AYUSH owned testing labs.

P: No no, I am saying –

N: So you have to see what in your state is an approved testing laboratory.

P: I am asking [that] if I could identify [the plant] in the wild myself, then I could cultivate it. If I sent it outside Orissa there is risk of contamination. I am asking if I can myself identify –

N: Exactly. So you have to send that starting material to somebody like IIA, and people like Dr. Shashi Kumar will authenticate it.

P: (in Hindi) But I know from holding it that it is the correct species.

N: (in Hindi) That is what I am saying. You have to send it to an approved lab. Otherwise how will you know.

⁶⁶ The Sanskrit name for a plant whose roots are used to treat hyper neurosis and anxiety, and a species that has been taken up for extensive research by the IIA lab to determine quality characteristics of the ‘authentic’ versus its many adulterant forms in the market, a focus of study that I elaborate in the next chapter. The CPPP has also been heavily funded for experiments to test the plant for its effects as galactagogue.

In addition to demonstrating the creation of “the lab” as a cultural artifact, this exchange is remarkable in its symbolic value. It demonstrates how small resistances to “expert” knowledge are not only silenced, but also mis-heard and rendered in-audible and in-expert by the practices that organize and distribute expertise. It illuminates how the lab can emerge as “this space, this material/structural extension within which” other medical knowledges, persons, liabilities and exchanges could be organized and contained (Mitchell 2002; 90). It illustrates brilliantly how, to borrow James Scott’s words, “a hegemonic planning mentality,” a meta-logic of uniformity, standards and evaluation (self and third-party) excludes the necessary role of local, practical knowledge and know-how (Scott 1994; 6).

The “English problem”

Neeraja’s slides and lectures were designed to inculcate in the community/student a taste for “science,” “technology” and “quality.” When she got “technical,” that is, when she launched into the experiments that the group would be conducting themselves over the course of the program, there was palpable anxiety in the training hall over people’s abilities to fully appropriate all this new and essential knowledge about quality that was being disseminated in English and that they would be tested on at the end of the workshop. Participants looked around and at their neighbors for translation – of not just words – but of categories of “modern” scientific knowledge.

At several points in the talk, words and names of concepts would move laughter in Soundarya, not a postgraduate student as her colleague with whom she had traveled, but a valuable asset for the women’s SHG she was representing at this workshop. She comes from a family of Tamil “folk healers,” and her strength has been to assist her grandfather and now father in collecting plants for the preparation of medicines – a skill that she has now put to formal use at this SHG. Over tea later, her friend Lalitha, who did her higher studies in English as the medium of instruction, shared with me how through the length of the morning session that day Soundarya struggled to understand how “demo” could even be a serious word spoken by grown-ups. Every time the word was used in Neeraja’s introductory speech, she giggled, later also trying to understand

conceptually how “they” (the trainers/the lab) were planning to go about “doing demo” (demonstration) “after lecture,” or as separate from it. It is not insignificant that on the last day of the training program at the ‘industrial tour’ of a large Ayurvedic manufacturing facility in Bangalore, Soundarya was equally amused by the sound of the Sanskrit language that was as foreign to her as was English, when the tour guide said out loud the names of the three constituting plants of the Ayurvedic formulation *Triphala*, namely, *Amalaki*, *Bibhitaki*, *Haritaki*. She laughed pretty loudly in the middle of the tour and certainly the names had made an impression on her such that later she used the rhyme in it to play hopscotch. I was overjoyed to participate in what I registered as a subversion of Sanskrit, and we took turns to jump in the courtyard of the manufacturing facility while chanting in chorus “*Amala-KI!*, *Bibhita-KI!* *Harita-KI!* Of course, not everyone in the group was as eager to participate in this subversion or as resistant to the standardized discourse as Soundarya. For a lot of them, the language and discourse at the workshop was not altogether new or different from what they were taught at their undergraduate Ayurvedic medical schools, or the mode in which work reports were presented at their own development NGOs, but a number of the trainees were visibly restless, registering unease at not being able to keep up with the technical material in English presented on the slides.

“I will brief you on what you will do tomorrow, okay? You’ll do physical, chemical, tests.” The first entry on Neeraja’s slide explained the physico-chemical tests that were on the agenda for the next day, and Neeraja read out two-thirds of the word, prompting the audience to complete it. “Thin layer...?” Lalitha squints eyes and decodes slowly and tentatively, “chro-ma-to-graphy.” “Chromatography” says Dr. Muralidharan loudly and quickly. “Chromatography.” Nods Neeraja. “Okay? Here, Dr. Muralidharan will be your mentor.” While eyes and heads turn to Dr. Muralidharan, Neeraja feels the need to switch to Tamil for greater diffusion of a crucial concept in expertise building through such training programs. “Mentor, no? Someone who will oversee you, whatever problem, you ask them.” She points to the three junior scientists in her team, who, apart from being gifted researchers in their own work at the CPPP, proved to be outstanding and committed mentors through the very difficult training program week.

The dissemination of expertise about “quality” (in English) and of Ayurvedic terminologies critical to this training (in Sanskrit) gives rise to a specific kind of science imagination that is universal (quality “standards” are universal), yet national (signaled by the role that the history and lineage of Sanskrit plays in the history and lineage of India). This dissemination also gives rise to a medium of instruction in science pedagogy that may be seen as foreign, alienating, oppressive, or opaque to the “folk” student. I remember how on the first day of our lab sessions at the Product Development Lab, when we were informed by our Ayurvedic mentor that we were going to prepare *Aśwagandha Śatāvri kalpa* that day, Lalitha from our group indicated that she had no prior experience of the word *kalpa*. “Means? (meaning?)” she asked. “Means granular form,” said the mentor. “Means paste?” she confirmed again, not knowing what “granular” meant either. “No, not paste. Paste and granules are different. It is written in your manual under *kalpa*, just see, I will also tell you later” he said. The offer of an English word to clarify a word in Sanskrit and the use of a Sanskrit word to explain a word in English cannot be read as a simple replacement of one word with another. They can be used as synonyms and to stand in for each other in a ‘science and society’ training program precisely because they fulfill the twin (and different) needs of creating a science elite that speaks both the democratic language of universalism and technological modernity (global, pharmaceutical science expressed in the medium of English), as well as “classical,” textual, scholarly authority expressed through Sanskrit, which is, in Sawhney’s words, “the stamp of orthodoxy” (Sawhney 2009; 5). From my experience in participation and observation at this training program, both alienate, and neither empower.

Even though English, Sanskrit and Tamil were part of the world of the Brahmin in colonial Tamil Nadu, MSS Pandian, in his genealogical study of Brahmin and non-Brahmin identity formation in Tamil politics uses the term “bilingual” rather than “trilingual” to describe the language practices of the Brahmins. Tamil, he notes, remained by and large a language deserving contempt in Brahmin discourse – a language belonging to ‘Other’ Tamil speakers (Pandian 2007; 81) The Brahmin’s bilingualism was distinguished by its openly expressed enthusiasm for English and Sanskrit and

simultaneous contempt for Tamil – the language of the “common” people (*ibid.*77). The linguistic regime of the Brahmin, which was intimately linked to the dominant location of the Brahmin in the interlocked spiritual and material domains was constituted by the demands and new forms of knowledge brought in by colonialism. English education, the need to use English in public forums and offices, the easy access to printed Sanskrit texts, and Orientalist scholarship, all constituted a field of new possibilities wherein the new bilingualism became possible.

This does not automatically imply that the Vernacular was the democratic other of Sanskrit or English. Santosh Dash, in his book *English education and the question of Indian nationalism*⁶⁷ analyzes what he calls the problem of the “vernacular siege.” The long and exclusive nationalist focus on the English-vernacular divide, he contends, disables us to adequately understand the role of caste and differential access to education. His point is that Vernacularism, much like Orientalism and Anglicism, is part of a colonial legacy and a site that produces elite control and power over the cultural resources of the nation. The debate around the medium of instruction that the nationalists set up during India’s freedom struggle and the binary between the “English” and the “Vernacular” that this debate set up is a constructed one, and Seth shows us how both have worked in similar ways to cultivate elitism in India. Caste critiques of Hindu nationalism and the nationalist debate around medium of instruction have resulted in the demand by the “lower” castes for an education in English.

However, the language used by the ‘folk’ for folk medical knowledge is largely vernacular. Lalitha was telling me that whether plant names were presented to her in the Linnaeus structure of binomial nomenclature, or mentioned in Sanskrit within the polynomial structure of naming, she was processing both botany and *nāma gyāna* (Ayurvedic knowledge of naming plants) in Tamil, her first language. She was embarrassed to be evaluated on her knowledge about quality control at the end of the program based on what she had learned that week. She was not satisfied with her

⁶⁷ Santosh Dash 2009. *English education and the question of Indian nationalism: A perspective on the vernacular*. Delhi: Aakar Books.

performance, and the mentors were too nice to let people ‘fail’ on the final evaluations, so they almost did all of their TLC Rf (Retention Factor) values and solvents calculations in order to help them. When I took a look at the ‘Trainee Assessment Report,’ Lalitha had “improved” only 12.50%, while Dr. Mallya had improved 15.79%. Santosh registered a 6.67% improvement from his “pre-training” tests, and Soundarya’s percentage improvement was 10%. The overall “improvement” of the group was 8.91%, something that was marked by awards and certification on the last day. It is on the day of the certificate hand-out that Dr. Ram Shastri, senior Organic Chemist at the lab who was also summarizing the training program for the Director of the IIA spoke the epigraph: “We gave them hands-on experience in microbiology and other things which would be useful to them. And very surprisingly, they were not comfortable with this value and that and all this in the beginning but they did very well and I hope they have enjoyed it.....some more improvements naturally they need, let’s hope next time they will improve.” Neeraja stepped in to report the language barrier to the Director, admitting that in their next trainings, they would require more careful groupings of the community based on language. Dr. Ram Shastry however, noted that it was an achievement of the training program that it made them “practice English” in a way that they could not have done at home. He reiterated, “none of them would have spoken English as much at home as they did in these five days....you are almost compelled to speak English. That is one good thing that you got some more confidence in English.”⁶⁸

What I have tried to bring out in this chapter is not the scientific skills that are imparted through a State science pedagogy program conducted at an Ayurvedic lab, but an understanding of the political meaning of the pedagogical itself. The methodologies that are imparted as “training” are not just goods or skills in themselves that are objectively imparted to just anybody, but are seen to have educative value, depending on who the student is. Sanjay Seth, in his study on the western education of colonial India

⁶⁸ The enthusiasm is uncannily and disturbingly reminiscent of a mid nineteenth century newspaper quote following the decision to institutionally introduce “English education” within the “western education” of India. Sanjay Seth records: “The English education of India! It is one of the most momentous events the world has ever seen and most difficult problems the human brain has ever faced. How to transport the learning, method, and spirit of Western Europe to Middle Eastern Asia, among a subject race....and make it grow as native of the soil....It is a more difficult achievement than the annihilation of time and space by modern science.” Noted by Sanjay Seth 2007. *Subject lessons: The Western education of India*. Duke University Press, Pg3.

notes that the Penal Code, public works, railways, irrigation and civil works, schools, the post office and telegraph, the free press, were all forces working to “educate India.” The ascription of pedagogic effects and benefits to almost all the practices and institutions of colonial rule became so pervasive and part of the wider pedagogic mission of colonial rule that even the provision of public sanitation and urine accommodations were touted by government commission inquiry reports as having “a distinctly educative value” (Seth 2007; 2).

Further, since English, modern science, Ayurveda and Sanskrit form the procedure by which this science pedagogy is realized, this science merit is conferred, and this “capacity building” is certified, pedagogic programs such as the one discussed not only reinforce the continual treatment of English in post-independent India as the bearer of “modernity” (Dash, 2009), but also additionally situate Ayurveda as an expertise that works in tandem with English to confer merit and efficiency to ‘society.’ Ayurvedic science pedagogy itself frames “folk practices” as a careless and deficient system of collection of plant and plant materials and a limited understanding of quality that must be overcome by the systematic methods of Ayurvedic science and techno-science. In this process, the “laboratory” emerges not only as a cultural object, but also as a reading practice, as I discuss in the next chapter.

Making ‘sense’ inside the lab: Ayurvedic experiments with *acintya* (the unthinkable) and *acintita* (the unthought)

There is an intricate concept in *Dravyagūṇa Vijñāna* (special knowledge of drugs/materials, their properties and actions, or, Ayurvedic pharmacology) known as *prabhāva*. It stands for the special property of a *dravya* (matter/substance/drug) that makes it behave in a certain way that cannot be explained in terms of the pharmacological logic that can be attributed to the other properties of that *dravya*. This is to say that while every drug (whether they be used by means of *āhāra* – food, or *auśadha* – medicine) has five properties by which it acts, namely: its *rasa* (taste), *gūṇa* (properties), *vīrya* (potency), *vipāka* (post-metabolic effect) and *prabhāva* (specific effect), the *prabhāva* of certain drugs will be that specific and unique property of the drug that produces actions different from and contrary to, those ascribed to the individual and combined effects of its *other* four properties, ie. its *rasa*, *gūṇa*, *vīrya* and *vipāka*. As such, the theory of *pañcamahābhūta* (the five elements of *ākāśa* = space, *vāyu* = air, *agni* = fire, *āp* = water and *prthvī* (earth) that provide the material basis for all matter, animate or inanimate) and the theory of *tridoṣa* (the set of three pathogenic factors in the body – *vāta*, *pitta*, *kapha*) offers a procedural logic and a way to explain all drug composition, their properties and their effects on the body. However, there are certain drugs, whose actions escape this procedural logic. This means that while the fundamental principles underlying Ayurvedic pharmacology can explain the effects of *dravyas* in terms of their composition and properties, there do exist certain drugs that have inherent special properties (*prabhāva*) that escape the known logic of pharmacological actions. For example, the two drugs *citraka* (*Plumbago zeylenica*) and *danti* (*Croton polyandrum*) have similar *rasa* (they are both *katu*=pungent), similar *gūṇa* (*laghu*=light), similar *vīrya* (*uṣṇa*=hot), and similar *vipāka* (*katu*=pungent), yet the physiological effect of the two are dissimilar – while *citraka* promotes digestion, *danti* is a powerful purgative. This inherent peculiarity of *danti* that makes it a purgative against and contrary to its logically inferred action is its *prabhāva* – its specific action. *Dugdha* (milk) and *ghṛta* (clarified butter), to take another example, are exactly alike in *rasa* and *vīrya*, but *ghṛta*'s *prabhāva* makes it a *dīpana* (that which stimulates the digestive fire), while milk does not achieve any such

effect in the body. Several other drugs and food substances that have identical properties but entirely different actions, and different properties but similar functions, are explained in Ayurvedic pharmacology as doing so because of their *prabhāva* – specific action⁶⁹.

As a concept, like many other concepts in the Ayurvedic body of thought, *prabhāva* has triggered disagreements and debates not only among more recent commentators and interpreters/practitioners of Ayurvedic medicine, but between the first known Ayurvedic schools of thought. While *acāryas* (teachers) of the Ātreya school of thought (Caraka, Vāgbhata) “accepted that *prabhāva* is *dravya svabhāva*⁷⁰” (Lucas 2006, 233; emphasis mine), the *acāryas* of the Dhanvantari school of Ayurvedic thought (Suśruta, Nāgārjuna) do not regard it as a separate entity or property. Rather they consider it along with the *vīrya* (potency) of the drug, where the rules governing this potency may be *cintya* (cognizable, thinkable) or they may be *acintya* (unthinkable). While the first type – the *cintya śakti* (power to make it thinkable, cognizable) – is understood by *kārya kāranabhāva* (effect and cause) and perceived by *buddhi* (intellect), the second type – *acintya* – can be understood only by the effect, but cannot be explained or perceived according to the causal principles of action that otherwise apply (Sharma 1995; 54). The *prabhāva* of a substance is likened to this *acintya vīrya*, which, in Suśruta’s words, is an *amīmāmsya*⁷¹ (not capable of being put to critical investigation or reflection).

⁶⁹ ‘*Rasavīryavipākanām sāmānyam yatra laksyate*

Viśesah karmanām camva prabhāvastasya sa smrtah’ (Ca. Sū 26.67)

As a concept in Ayurvedic pharmacology, *prabhāva* has a special place. Special, because unlike the four other pharmacological properties of materials (mentioned in the text above) that Ayurvedic physicians, scientists and scholars have tried to co-relate with modern pharmacological concepts such as isolation of ‘active ingredients’ of medicines in attempts to “explain” in modern terms how Ayurvedic drugs might work, *prabhāva* has always been the inexplicable – too autonomous and special to subject to the biomedically inspired methods of understanding substances. An active ingredient in biomedical understanding is a chemical compound that is responsible for, and that can explain, the main, predominant pharmaceutical value of the drug. While there has been no consensus on how to equate / co-relate / translate the *rasa*, *guna*, *vīrya* and *vipaka* properties of an Ayurvedic drug in terms of active ingredients, Ayurvedic medicines, even at the IIA lab, often go through this co-relation exercise. The *prabhāva* of a drug on the other hand, has been less amenable to modern pharmacological methods of explaining drug action. It is widely accepted by scientists, physicians and scholars to be *unexplainable*. In this chapter, however, I am describing the research practices and conceptualizations of scientists and Ayurvedic pharmacologists who think that *prabhāva* has held the privileged status of the *unexplainable* for so long because the instruments, tools and methods that are required in order to “understand” it are simply “not there.” In this sense, these scientists conceptualize *prabhāva* in the mode of what Chakrabarty has critiqued as the universalizing ‘stageist’ narrative of the transition of time. Dipesh Chakrabarty 2000, *Provincializing Europe*.

⁷⁰ *Dravya* – substance; *svabhāva* – its own behavior/ nature, inherent, specific and independent property of the substance.

⁷¹ ‘*Amīmāmsyānyacintyāni prasiddhani svabhāvatah*.’ (Su. Sū. 40.19-21)

What is so captivating to me about this concept is not the substances that do or do not exhibit *prabhāva*, but that its use as a heuristic can singularly capture the terrain of new critical pharmacological research on the fundamental principles of Ayurveda today. Contemporary experiments and research studies in *dravyaguṇa śāstra* that do not merely “accept,” to re-emphasize Dr. Lucas’ words – classical principles as *āptopadeśa* (statements made by *acāryas*) attempt to make sense of “*why* they said what they said,” a question that Neeraja often asks. It is not enough for researchers in Ayurveda who consider themselves to be “serious” researchers to know their classical texts well, it rather becomes important for them to know and show how the *acintya* - the unthinkable – of the classical texts is only but an *acintita* - the (hitherto) un-thought of modern research. As Professor PV Sharma writes, “it never means that *prabhāva* can’t be explained. Constant efforts were being made to rationalize this aspect....but while assessing the achievements made by the Indian authors, one must keep in mind their limitations in terms of modern sophisticated instruments and laboratories” (Sharma 1995; v)

The laboratory study that I will be discussing in this chapter is not an experiment in rationalizing *prabhāva*. But it is a search for ways to “demonstrate Ayurveda’s own principles” and distinctly articulate the “logical reasoning” (Internal Lab Report, 2006; 1) behind basic Ayurvedic pharmacological concepts. I introduce this chapter’s problematic with the help of the concept of *prabhāva* because I am using *prabhāva* as a motif that represents contemporary scientific Ayurvedic research initiatives premised on Professor PV Sharma’s call of “substituting properly” the word “unthinkable” with the word “unthought,” so that “the path of rational thinking is always open to dedicated scientists” (*ibid*). Read together with Dr. Dhyani’s work as teacher and researcher in *dravyaguṇa śāstra* who has motivated not only students across the country to pursue “scientific inquiry” into Ayurvedic principles of drug action but also the team of researchers at the IIA to do “creative” *dravyaguṇa* research, these research efforts that explain with the help of laboratory tools how Ayurvedic principles work, elucidate not the *unknowable* of Ayurvedic knowledge, but the hitherto *unknown* of modern laboratory-driven Ayurvedic knowledge. They elucidate “the limits of our own knowledge about the rational explanation of drug action” (Dhyani 2003; 123). This chapter is about the laboratory

practices and narratives that effect that shift, that displacement, that variation, in classical concepts that places what the texts have called *amīmāmsya*⁷² for critical investigation in the laboratory. It is about the scientists who suspect that it is only a matter of time and method before *prabhāva* as a concept becomes redundant to *Dravyaguna Vijñāna*. Further, this chapter will illuminate the desires, ambiguities and contradictions inherent in the bringing together of the epistemologies of ‘science’ and ‘*śāstra*’ in IIA pedagogical and research programs in an effort to unpack the implications of the lab’s double gesture of demonstrating the ‘contemporary relevance’ of ‘traditional’ knowledge. This knowledge, as we have seen in the preceding chapters, draws on and reinstates the larger Hindu philosophical framework as one that produces ‘valid’ knowledge that can align itself with the “logical reasoning” of Science.

“I know it, but I cannot describe it, cannot explain it....cannot say to you exactly that it is because of this, this, this, this.”

The policies of the colonial, and later, the developmental Indian state, worked to foster a ‘scientific culture’ and distribute science as a form of cultural authority (Abraham 1998; Gupta 1999; Prakash 1999; Arnold 1993; Kumar 2000). One of the chief ways in which the cultural force of science’s authority gained ground was by - to use Prakash’s phrase - bringing “the hidden out in the open” and by functioning as an aid for repositioning and re-claiming an already-present indigenous rationality (Prakash, 1999; 49). The modernization of the Indian systems of medicine (Ayurveda, Unani, Yoga, Siddha) through national programs and discourses of science led not only to new knowledges and technologies, but to new ways of organizing and transferring traditional medical knowledge (Adams 2002, Langford 2002, Farquhar 1994, 2002, Bode 2002, Banerjee 2009). Laboratory research in/on Ayurvedic medicine in postcolonial India has received the abundant support of the State, the Ayurvedic medicine manufacturing companies and non-governmental organizations to demonstrate the efficacy of Ayurveda to a global public. This has led to diverse (but really quite uniform) strands in Ayurvedic drug, literary and clinical research in the last sixty years or so. Examples of recent studies

⁷² Suśruta uses the word *amīmāmsya* to understand *prabhāva* as *achintya vīrya* (a potency that can only be observed as an effect, not explained by tools of thought), as something that cannot be put to critical reflection.

range from those that value Ayurvedic pharmacology as a ready pharmacopeial repertoire that documents multiple uses of “natural products as medicine” (Mukherjee, 2009; preface) in hopes for a “less risk-prone route to drug development” (Valiathan 2006, 1); to those that translate and co-relate Ayurvedic illness categories with modern medical disease categories; to establishing equivalences between the Ayurvedic body and the anatomical body to “find” the possible genomic basis of *prakṛti* (a person’s body type, constitution)⁷³. These research initiatives can be said to conform to what Banerjee has termed a “pharmaceutic episteme” – an episteme that is focused on retaining Ayurveda’s usefulness as a supplier of new pharmaceuticals, but one that dismisses its worldview on the body, health and disease (Banerjee 2002; 1136). They excerpt a piece of traditional medical knowledge (information about medicinal plants, therapeutic cures, diet prescriptions and proscriptions and so on, documented in the scholarly, textual Ayurvedic tradition as well as ‘folk’ knowledge in use by communities) and evaluate it with the help of modern biochemical, phytochemical, pharmacological and biomedical clinical testing methods (such as Thin Layer Chromatography, High Performance Layer

⁷³ In what is regarded as one of the most promising and landmark studies in modern Ayurvedic scientific research, the CSIR (Council of Scientific and Industrial Research, GOI)-led study known as ‘Ayurgenomics’ has chosen the clinical research expertise of the IIA (Institute of Integrative Ayurveda, the fieldsite of this ethnography) as one of its main think-tanks. A good example of ‘trans-disciplinary research’ and the elite Ayurveda that I have spoken about in the previous chapters, this study is undertaken by a team of Ayurveda doctors, molecular biologists, biochemists, bioinformaticians and statisticians. It was triggered by the results of the CSIR-led Indian Genome Variation Consortium Project that set out to map the “first genetic landscape of India” (PIB Press Release, 2008) as part of the wider global interest in human genome sequencing. 55 distinct “populations types” were picked on the basis of linguistic lineage and ethnicity from different geographical zones of the country, and were found to cluster into five major groups of genetic “relatedness.” But “despite greater genetic similarity, there was high inter-individual variability within each cluster” (*ibid*). This variability, which was to become the premise of the Ayurgenomic study, was understood to confer individual susceptibility to common diseases like diabetes, asthma, cardiovascular disease and differential drug responsiveness. It was agreed that the team should look at the Ayurvedic knowledge base and one of its foundational principles of *prakṛti* as the “next logical step” to identify groups within these clusters that would be similarly predisposed to certain diseases and that might respond in different ways to drugs based on differential *prakṛti*. As noted by Langford (2002), *prakṛti* is usually translated as the constitution of a person, where it refers to the predominant *doṣa* manifest in the person’s body type and behavior, affinities and aversions, but many practitioners will tell you that a person’s *prakṛti* is not an inherent characteristic of the patient, and that it can change over time due to external influences of the environment such as climate, food, and even medicine. About 1,000 individuals from northern India were screened for contrasting *prakṛti* types, and 120 individuals were selected on the basis of their predominant *kapha*, *vata*, *pitta doṣa*. On the basis of blood samplings, DNA, RNA and serum isolations, and the whole array of biochemical testing along 33 parameters for genome expression profiling, the study concluded that the three *prakṛti* types did exhibit differences at biochemical profiles such as liver function tests and lipid profiles, and that there was significant “differential gene expression” related to metabolism, immune system and regulation of blood coagulation across these three *prakṛti* groups. The scientists and funders involved in the study have regarded the results of the small-scale study undertaken in North India as promising. The premise and hypothesis of “Ayurgenomics” – the co-relatability of “this ancient and documented system of *prakṛti* analysis and modern biology” (*ibid*) – has led to the designing of several studies along similar lines that propose to use fundamental Ayurvedic principles to provide models for predictive and personalized medicine as such. This has strengthened and amplified the attitude of post-independent ‘modern’ Ayurvedic research that the usefulness of Ayurveda can be revived, revitalized or repositioned (Banerjee 2002) by being of use to solving some of modern medicine’s own mysteries.

Chromatography, Gas Chromatography, bioassays and Randomized Controlled Trials) to demonstrate and legitimize its efficacy. Few research studies are conducted to “standardize the methods” of evidence-generation within traditional medical knowledge, and even fewer are undertaken to unpack “the logic” – the why – of the foundational principles of Ayurvedic knowledge.

“Why are there only five *pañcamahābhūtas* (five physical elements)? Why not seven? Why not four? Why not eight? Why are there only six tastes?” These were Dr. Ramya’s first questions when she and Dr. Neeraja conceptualized the sensory analysis study for the lab in 2002, and her first questions to me when asked to share the ‘what’ of the sensory analysis study. “Our science (Ayurvedic science) is based on observation-based logic.....it is not like the modern experiment based logic which keeps on changing based on more and more experiments.” The all-embracing system of medical teachings that fall under the rubric ‘Ayurveda’, Ramya suggests, revolve around a constellation of concepts that will never change. “But does that mean that we fold up our books and say that *Dravyaguna* (Ayurvedic pharmacology) is dead?” Neeraja asks on a different day, in a distinctive way. For her, as the head of the lab that is locally and nationally known for its bold and “original” stances on research, it is about probing “*how* they (sages/writers/redactors of the classical Ayurvedic treatises) knew what they knew and *why* they said what they said.” For these scientists, Ayurveda deals with health at three integrated levels: *tattva* – the conceptual level (level of basic principles, logic), *śāstra* – the scientific (procedural) level, and *vyavahār* – the practical level. While research into the practice (*vyavahār*) of Ayurveda has been given its due importance by physicians both at home and in the world and by the Ayurvedic industry both nationally and globally, the “science and the logic of it” has been under-researched and therefore remained under-understood. “My PhD is in Biochemistry,” states Neeraja, the Head of the IIA lab, “but I have started thinking more and more like them (Ayurvedic physicians in the lab). I can predict the *doṣa* of a particular thing, the *guṇa* of a particular thing, but I am not able to pen down *why* I can predict it. I have sort of imbibed the unwritten thing from my environment, so much so that I am also not able to communicate, just like they have not been able to put it down in words.” She points to a coffee mug on the desk and continues,

“because they have explained to me and I have learnt (by working closely with them) what is *pañcamahābhūta*, I can probably predict the *pañcamahābhūta* constitution of this, but I cannot say to you exactly that this is because of this, this, this, this.” She pauses, and then adds, “Yet.”

The Ayurvedic experiment titled ‘Sensory analysis’ that I open up for analysis in this chapter is aimed at formulating – out of the classical Ayurvedic classificatory scheme of understanding matter (*dravya*) – a “method” to know and understand materials and medicines. It acknowledges that the recommendations and parameters for evaluating “efficacy of medicines vary from one medical system to another” (Internal Report 2006; 1) and notes that unlike the prevalent and common recourse to the method of chemical analysis of drugs and plant materials in order to understand their properties and actions, “there has been no method developed based on the traditional parameters for quality assessment of medicines” (ibid.) One of the lead conceptualizers of this experiment, herself a biochemist, writes in a peer-reviewed journal that phytochemical (chemical compounds in drugs), anatomical and molecular standards have been used to screen and test Ayurvedic medicines, but that these tests do not truly reflect the safety or efficacy of drugs since plant materials are complex systems that cannot be grasped by any one or a combination of instruments that modern science and technology have been able to offer (Venkatasubramaniam, 2007). Human sensory evaluation of a material on the other hand, as laid out in Ayurveda, she argues, uses the human body and perception to study the properties (*guṇa*) and actions (*karma*) of drugs (*dravya*), and generates knowledge about the full potential of the drug and its context and purpose of use. Knowledge about a particular drug and its five properties (*rasa*=taste, *guṇa*=properties, *vīrya*=potency, *vipāka*=post-metabolic effect and *prabhāva*=specific effect) is derived from its taste, color, texture, sound, and smell. The *rasa* of a drug – its taste – is in particular, an indicator of the composition, properties, and probable action of the drug (Sharma 1995). The practice of evaluating drugs sensorially to identify raw drugs and to prepare formulations has been in use by the Ayurvedic drug industry and certainly among independent Ayurvedic physicians, but the “protocols are not documented,” the “*exact* science or protocol to test these are not readily available nor understood,” and therefore

the “Ayurvedic ways of drug discovery appear subjective” (*ibid*; emphasis mine). As a way of dealing with this appearance of subjectivity, the trans-disciplinary team at this lab, led by two Ayurvedic physicians, has initiated studies on “reviving traditional ways of drug discovery by using the human body and senses as the instrument.” (*ibid.*)

What exactly is “*exact science*?” What does it mean to conceive of the sensory experiences of “the human body” as raw material for experimental science? How is the *representability* of the elaborate science of physical materials that co-constitute the animal body, plant and mineral kingdoms, the physical universe and all of matter (*Dravyaguna Vijñāna*), imagined in a way that would satisfy the conditions of “exact science”, and how is it rendered “readily available” in a way that isn’t currently available? How is this quest for exactness, clarity and explicitness (used interchangeably with the “modern” in modern science) negotiated by Ayurvedic and modern scientists, and what questions do these imagined (re)negotiations and (re)formulations raise about “modern” Ayurveda that provides first, the conditions of difference/estrangement/distance from a “traditional” science, and then necessitates a project of *re-presenting* it (making present again) – only this time, as readily available?

Inspired by the extensive use of sensory evaluation in the food and beverage industry as a quality control technology, the lab experiment asks why advances in modern sensory science, with their leads in sensory testing laboratories and standardized sensory evaluation facilities and training cannot be used to develop “indigenous solutions to drug discovery,” given the elaborate Ayurvedic conceptual exposition on the intimate relationship of materials with the five sense faculties of the body. The 2008-2009 project report of the experiment defines sensory analysis as “the scientific discipline used to evoke, measure, analyze and interpret the reactions to characteristics of materials as they are perceived by the senses of sight, smell, taste, touch and hearing (Project Report 2009; 44). It goes on to list these senses also as the “tools” of sensory analysis and suggests that by a deeper understanding of the theoretical parameters and “medium of developing evidence” in traditional/Ayurvedic knowledge and by integrating the techniques of modern sensory analysis into this knowledge, it is possible to develop a scientific

methodology to analyze drugs and formulations (*ibid.*) and predict the probable action of a drug from its *rasa* (taste) by fine tuning the body's sense of taste.

The sensorium.

In 'making sense' of this Ayurvedic sensory experiment, I am also speaking to the literature in anthropology and cultural studies where sense has emerged / is emerging as a focus / frame of analysis. Through decades of interest in the senses and sensuality leading up to the sensual turn of the late 1980s and early 1990s, the career of the "sensorium" in understanding social realities and modernities has grown, shifting and expanding the meaning of 'sense' itself (Howes, 2003).

As an object of anthropological investigation and a condition of reflexive anthropology, 'sense' has developed from being *something* that was measured in the bodies of "primitive peoples" and recorded through instruments (the 1898 Torres Strait expedition; see Kuklick 1991) to a method of cross-cultural study within anthropology. As Howes notes, from being disfavored as a focus of analysis because of its former use in the racial classification of peoples, anthropologists became less and less fascinated with documenting the physical and sensory characteristics of the non-European populations they studied, advancing more and more a theory about how a study of the senses could reveal similarities and differences in cultural patterns and explanations (Malinowski 1922; Mead 1935; Turner 1967; Lévi-Strauss 1969; Carpenter 1973; Feld 1982; Guerts 2002; Desjarlais 2003) and serve as a model for an approach to anthropological observation, interpreting, reading and writing that re-interrupted the body (Geertz 1973; Bourdieu 1977; Jackson 1983; Corbin 1986; Clifford 1988; Taussig 1993). This latter cluster of cultural analyses called for a shift away from ethnography as necessarily sensing patterns and participant observations to textual modes of "reading" (Geertz 1973) and "writing cultures" (Clifford 1988). Even within this group, the shift in the meaning of the anthropological enterprise as something that interpreted, to something that dialogued, meant, in sensual terms, a shift from a visual and verbal emphasis (stemming from the

ocularcentric and verbocentric character of reading and writing; see Howes 2003) to evoking a spirit of orality and aurality by “listening” to “voices.”

The way that these shifts in anthropological scholarship have articulated the senses and have been articulated by the senses, add a new and exciting dimension to an ethnography of the current Ayurvedic lab study. The “sensual turn” in scholarship that I referred to earlier was brought about in part by reactions against the “incorporeality of the academic writing” of the nineteenth and early-mid twentieth centuries⁷⁴ (Howes 2003; xii). Since then, anthropologists of the senses have been so aggravated by the hegemony of vision in western culture and its association with both scientific rationalism and capitalist display, that in critiquing it, they literally went “looking” for the role that other under-represented and under-theorized senses played in the cultural life of societies. This trend has been strengthened (and represented) by the sway of Foucault’s motif⁷⁵ of the “gaze” in American anthropology and the political economy of power that the motif of the panoptic gaze (Song 2006) enables us to *see*. I would question the adequacy of this critique of the visual field (and the image of sight as the medium of a monolithic, rationalistic worldview) to inquiries within non-western contexts. I would argue that these critiques take for granted and promote the understanding, imagination and articulability of the senses as discrete, individual and separate categories. I suggest that both the anthropological critiques as well as the researchers involved in the Ayurvedic sensory lab study that I have picked for analysis succumb to what Kuriyama has termed the “spell of anatomy” (Kuriyama 2006; 50). Let me explain.

A careful examination of the Ayurvedic understanding of the body and pharmacology will show us that not only are there the five sense organs of the eyes, ears,

⁷⁴ Howes here is referring to the long, “dry” period in which the senses and sensuality were bypassed by most academics as antithetical to intellectual investigation. He refers to Charles Baudelaire as the “symbolist champion of multisensoriality” who inveighed against the “modern professors” who had “forgotten the color of the sky, the form of plants, the movement and odor of animals.” Howes marks this as an antecedent to the sensual turn in scholarship where academics begin to rediscover how colors, movements and odors may themselves be crucial vehicles for cultural meaning and not merely picturesque trappings. (Howes 2003; xii)

⁷⁵ See Hoon Song’s “Seeing oneself seeing oneself: White nihilism in ethnography and theory” for a stimulating discussion on the currency of Foucault’s motif of “the gaze” in American anthropology and the reflexive turn of the 1980s.

nostrils, tongue and the skin, but also five sense faculties, five *objects* of sense faculties, five sense perceptions, and five underlying material constituents of these sense organs. The five objects of sense faculties - as I will discuss later in the chapter - *śabda* (audition), *sparsā* (touch), *rūpa* (vision), *rasa* (taste), *gandha* (smell) are inferred, rather than directly perceived (CS.Sū.21.14) Further, these sense objects exist in a subtle and inseparable relationship with one or more of the *pañcamahābhūta* (five physical elements) of *ākāśa* (space), *vāyu* (air), *agni* (fire), *āp* (water) and *pṛthvī* (earth), and are sequentially ordered in this way according to their decreasing degree of subtlety. Each of the five elements are present in each of the five sense faculties of the auditory, tactile, visual, gustatory and olfactory, but individually dominate only one of these, and produce a sense perception only as the result of the combination of the sense faculty, its object, the mind, and the soul (Sharma and Dash 2008; 167). The material constituent or the physical element that is predominantly responsible for the creation of a sense faculty is known as the *indriya dravya* (*indriya* = sense; *dravya* = material), and human sense perception is a result of the relationship between this material (*dravya*) and its associated quality/property (*guṇa*).

We will talk more about these relationships in the pages to come, but it is important for us to begin by noting that the very idea of “sense” in an anthropology of the senses and in the Ayurvedic “sensory experiment” is an outcome of a Euro-American history and experience of sensing, within a particular and a different tradition of understanding the body, consciousness, the mind, and individuality. But what should we do with this difference? Should we merely note that the sensorium in the Ayurvedic worldview is “different” or more “holistic” than in modern sensory science and western thinking? This is something that BS, Founder of the IIA, will often tell you. That the Ayurvedic worldview is “different” because it is effected/affected by flows and interconnections that cannot be reduced to a simplified understanding of its parts, but then attempt nevertheless, through concrete research projects, to “integrate” the two (as done in the experiment I will discuss) or read one *through* the stable other (as done in the anxious works of the anthropologists of the senses). Both these options enrich and sustain the distinction between the Western and that which is Not – the Nonwestern – and both,

even when they emphasize difference and challenge hierarchies and hegemonies of senses and experiences, reinforce them. ‘Difference,’ like Derrida’s *différance*, is itself a movement that resists opposition of any kind (1982; 5). To the extent that only those things that can be *present, manifest*, and shown to *be present* can be exposed, any attempt to *show this difference* runs the risk of “disappearing.” Can there be a way of thinking difference in sensory cultures that does not assume two stable entities of *visuality/aurality, modern/Ayurvedic, western/nonwestern*? I am proposing that the only way of dealing with this difference is to open it up to the recognition that these differences are also always in movement, that they are themselves unstable, and that their relationship is a product of place and of history, and of the purposes with which research studies and analyses are made. In what follows, I draw upon the specific practices, iterations and conceptualizations of an ‘integrative’ research laboratory that aims to “communicate” Ayurveda to the “world” at a particular juncture in the history of “revitalizing the Indian medical heritage.” I look specifically at how *rasa* is sculpted to mean *taste* and how an object of sense faculty comes to be negotiated as a ‘sense.’

“Unintentional adulterations”

Dr. Ajay, an Ayurvedic physician, former college lecturer and MD in *Dravyagūṇa Vijnāna* (Ayurvedic pharmacology) is planning, designing, implementing and leading the current phase of the sensory experiments in the lab. He reminded us on our third training day that we were not going to test Ayurvedic formulations or raw drugs just yet. We were still only in the ‘general training’ phase of the year long panel training program where we were continuing to learn to recognize colors of food materials, their brightness/dullness, darkness/lightness, glossy-ness/mat-ness; nature of odors – their sharpness, sweetness, pungency; their tastes – sweet, salty, spicy, pungent, bitter, astringent; and their textures – smooth/rough, soft/hard, tough/brittle, moist/dry. Along these parameters of color, odor, taste and texture, we would be “profiling” basic food materials such as juice and biscuits for their finer attributes of brightness, pungency, bitterness, roughness, and so on. The procedure for profiling involved examining the material for the presence of each of the visual, smell, touch and taste attributes of the product enumerated on the panel training

sheets, indicating the intensity of each of these perceived attributes on a fifteen-point grade scale provided on the sheets and noting down any other qualitative attributes that we noticed about the products that were not included on the training sheets prepared by Ajay. It was absolutely vital for a “fully trained” panel, Ajay had explained to me in an interview, to detect even minute modifications in the taste of a material. Unlike a “semi-trained” panel that would be qualified enough only to test finished Ayurvedic formulations and raw drugs for the presence or absence of each of the visual, auditory, gustatory, olfactory and tactile attributes of a quality drug, a fully trained panel would be the tool that generated, from within *Dravyaguna*’s criteria of identification of drugs, a standard and universal list of these attributes in the first place.

Ajay explained what this might mean with the help of the example of *cyavanaprāśa* – an important drug in Ayurvedic therapeutics within the *rasāyana* (rejuvenation / promotive and preventive) category of therapeutics⁷⁶. The drug itself has an important place in the story of Ayurvedic pharmacology’s encounter with new forms of consumption and commodification, some facets of which have been documented by Banerjee (2009). As described in the chapter on *Rasāyana* in the *Caraka Samhitā*, the formulation *cyavanaprāśa* is a *lehya* (paste) composed of specific plant parts of about 41 crude drugs, and is an effective drug that promotes overall health rather than alleviate specific diseases. This character of *rasāyana* drugs in general, and of *cyavanaprāśa* in particular, that prevents and promotes, revitalizes and rejuvenates, rather than treat or alleviate any specific condition, boosts the idea (along with the immune system) of

⁷⁶ *Cikitsāsthāna*, translated as the ‘section on therapeutics’ in the *Caraka Samhitā* begins with the chapters on *Rasāyana* (promotive treatment) and *Vājikaraṇa* (administration of aphrodisiacs). The *Caraka Samhitā* is predominantly a text on therapeutics, representing the school of medicine (as opposed to Susruta’s compendium on surgery and surgical procedures), and it is important to note that out of the thirty chapters in the section on therapeutics, the chronological priority of the chapters on rejuvenation and longevity indicates the primacy of prevention over treatment, of drugs that rejuvenate and promote health, rather than treat it. The writers and redactors of this text apply this logic of precedence throughout the text. For example, the *Kalpsthāna* (section describing identification, preparation, storage, recipes and the administering of medicinal plants, approximately translated as ‘pharmaceutics’) is placed in the text *before* the *Siddhisthāna* (section discussing the successful management and administration of elimination therapies). The rationale of this is one that is forwarded by the writers themselves, namely, that the *Kalpsthāna* describes the methods of acquisition of the emetic and purgative drugs that form an important part of the *basti* (medicated enema therapy) and elimination therapies discussed in the chapters on the *Siddhisthāna*. Again, the narrative organization of the eight classificatory sections of the *Caraka Samhitā* itself follows a similar logic. For example, in *Kalpsthāna*, the logic of the chapters follow the logic of the complexity of the composition of emetic and purgative drugs - the section begins with the drugs that are least complex in their composition and least likely to lead to complicated effects when administered, followed by those that can be placed in an ascending order of complexity.

Ayurvedic drugs as effective food supplements. Dabur – a major player in the Ayurvedic pharmaceutical industry in India – has, through its smart product positioning strategies, managed to make *cyavanaprāśa* one of the largest selling classical⁷⁷ Ayurvedic products in the Indian market. The formulation has become almost synonymous with the Dabur product - Dabur Chyawanprash, and has been aggressively marketed as an immunity building health tonic. It has been an important classical drug that marks new patterns of health problem-solving among urban and semi-urban Indians (Nichter 1996; Banerjee 2009) and whose popularity addresses rising concerns about adulteration and environmental deterioration (Nichter, 1996; 273). Sociologists and anthropologists of traditional medicines in India have pointed out that low levels of nourishment and high levels of adulteration in everyday food products and vegetables contribute to the casting of Ayurvedic medicines such as *cyavanaprāśa* as nutraceuticals for the highly health conscious urban consumer – mainly upper class professionals (Banerjee 2009). The researchers in this drug research lab are, paradoxically, moved by another facet of adulteration. They suspect that what is sold as *cyavanaprāśa* is itself adulterated.

Ajay pointed out that some of the main ingredients used in the preparation of *cyavanaprāśa* were often replaced by the industry with other low cost substitutes and adulterants. Researchers at the R&D unit of the Himalaya Drug Company define adulteration as the intentional substitution with another plant species or intentional addition of a foreign substance to increase the weight or potency of the product or to decrease its cost (Mitra and Kannan, 2007). The purpose of the article, however, is to make a case for adulterations in Ayurvedic medicines that aren't always intended, something they call “unintentional adulterations” arising from any or all of the following factors: (a) confusion in vernacular names between indigenous systems of medicine and local dialects; (b) lack of knowledge about the authentic plant; (c) non-availability of the authentic plant; (d) similarity in morphology and / or aroma; (e) careless collection and other reasons “unknown even to the scientific community” exist in herbal raw material

⁷⁷ Products and formulations that follow the recipe, preparation procedures and ingredient break-down as described in the classical texts are known as classical Ayurvedic products by the Ayurvedic manufacturing industry. These products are required to carry as product information the name of the text/treatise that they were borrowed from. These are different from proprietary medicines that take clues from classically described recipes and compounds, but change up the ingredients based on availability, innovation, and purpose of manufacture.

trade (ibid; 11). Interestingly, the IIA lab has touched upon each of these concerns⁷⁸ of the industry in its many years of research (reiterating the point raised in the previous chapter about “scientific problems” in State-civil society partnerships where Ayurveda assumes a key role. These “scientific” problems are invariably problems for which global pharmaceutical science needs solutions). Ajay’s reflection on the issue of adulteration reminded me of my interview with Dr. Asha Sundaram, Director of a small but respected

⁷⁸ The Ayurvedic pharmaceutical industry refers to such studies collectively as “authentication” studies, while the IIA lab and other research departments within the IIA call them specifically “intercultural” studies in keeping with their larger goal of trans-disciplinary research. These studies are performed on “controversial” raw drugs used in preparing common Ayurvedic formulations. They are controversial because although sometimes they are claimed to be the materials / plants mentioned in the classical texts of Ayurveda, Siddha and Unani for use in formulations or by themselves, they are sold under the textual name, bearing only a very rough resemblance in overall appearance to the classical plant. Research studies on these drugs are undertaken to “authenticate” or match the various species of plant traded by the name of say, *Vidari* or *Vidanga* or *Nagakesar* (Sanskrit names for three important drugs in Ayurveda) with the botanical description and identification criteria mentioned for *Vidari*, *Vidanga* and *Nagakesar* in *Dravyaguna* (Ayurvedic pharmacology) texts. Out of the four or the five traded species for the same plant *Vidanga*, modern pharmacognosy tools such as microscopy will show typically that only one of these species will satisfy the conditions for the textual description of the plant. The remaining species are termed “substitutes” or “adulterants.” To take an example, the Ministry of Environment & Forests, Government of India, funded the lab for a five-year long study to respond to the controversy around the botanical identity of the Ayurvedic plant *Vidanga* (Sanskrit name). The problem arose when it was found and published by the IIA’s medicinal plant database that the annual volume of the plant traded (600 tons per annum) in the Indian raw drug market was simply too large to account for the restricted area growth of the plant. The plant occurs only in certain parts of the Western Ghats, Eastern Himalayas and some parts of Northeast India. Then what was it that was being traded as *Vidanga*? The lab team joined hands with the Herbarium and the *Dravyaguna* team to probe this question and commenced a line of drug research that began with compiling a list of all possible synonyms of *Vidanga* across the various texts and chapters where it finds a mention. Etymological analyses are undertaken and layered on to information about the geographical distribution and occurrence of the described plants. This is often the biggest challenge for an “intercultural” team that sets out to correlate “*Vidanga*” and its many synonyms in Sanskrit (not to say the many more synonyms in use in the vernacular languages that are in use in ‘folk’ medicine). Ayurvedic pharmacology follows a polynomial system of naming where each drug is denoted by many names – each name describing an aspect of the drug, either morphological or medicinal. Put together like a jigsaw puzzle, the names enable one composite picture of the drug. Still, the inclusion of most of these drugs in the API (Ayurvedic Pharmacopeia of India – the official multi-volume work published by the Government of India containing pharmacognostic, chemical and “Ayurvedic standards” for plants used in Ayurveda) means that research that is conducted to further investigate aspects of these drugs have a starting point. The starting point for *Vidanga* is the Latin name and taxonomical nomenclature of the botanical species already correlated with it – *Embelia ribes* Burm. F. (Myrsinaceae). The research team’s task is to then explore why “even though *Vidanga* has been correlated with *Embelia ribes* Burm. F., the species most traded in the market as *Vaividang* was *E. tsjeriam cottam* A. DC, along with other species such as *Maesa indica* and *Myrsine africana*” that were also found to be in use (traded by the industry) depending upon the region (Annual Report 2005-06; 26). Lab studies including microscopy and tests to demonstrate molecular differences and differences in anatomy and DNA fingerprint profiles between the four species were carried out to conclude that significant differences do exist between the species. The lab study found that the fruits of *E. tsjeriam cottam*, for example, contain oil glands that are entirely missing from *Embelia ribes*. The fruit texture of *Embelia ribes* is characteristically warty or irregularly wrinkled while that of the other three are smooth. Other chemical and DNA tests performed too indicate that there are differences at the species level that suggest that not all candidates can be legitimately used as *Vidanga*. Extensive pharmacognostic tests including microscopy, TLC, HPLC, molecular biology led the team to conclude that even though only *Embelia ribes* Burm. F. has been shown (and known) to best fit the Ayurvedic description of *Vidanga* with regard to seed size, seed feature, habitat, seed shape, seed design and habit, the other traded *E. tsjeriam cottam* A. DC could also be botanically related to the Ayurvedic description of *Vidanga*, and therefore, was Not a substitute or adulterant. The other two, however, cannot be authenticated as *Vidanga*, and are therefore adulterant species in the raw drug market. The lab’s research on *Vidanga* and several other controversial drugs has been recognized for its contribution in what the industry calls “lack of knowledge about authentic plant” (Mitra and Kannan, 2007; 14), as well as in developing a protocol that may be used by any research lab of any manufacturing unit in the “authentication of a material” (Annual Report 2005-06; 26).

Ayurvedic clinic cum pharmacy in South Delhi. Speaking about her “authentic” medicines, Dr. Sundaram had admitted that even the Director of DRF (Dabur Research Foundation, maker of Dabur Chyawanprash) bought his annual supply of *cyavanaprāśa* from her (her manufacturing unit in Kerala). We both laughed when she said that, and I clarified if she wasn’t using that as a metonymical figure to convey the general authenticity of her products. She confirmed that both intentional and unintentional adulteration was common malpractice within an industry where several of the raw drugs that went into formulations such as the *cyavanaprāśa* had become scarce in relation to the demand for it, and were therefore expensive and routinely substituted with other similar tasting ingredients. Changing the “original” ingredients have the ability to alter the *rasa*, *guna*, *vīrya* and *vipāka* of the final formulation in a way that its very pharmacological effect may be distorted, she admitted.

Ajay observed that the industry can and does get away with substituting the classically (textually) recommended ingredients with other less expensive ones or, sometimes, more palatable ones, that do not alter the overall taste and look of the final formulation significantly. Honey – a key *cyavanaprāśa* ingredient – is typically replaced with jaggery for being less expensive and generally sweet in taste. But jaggery is wholly different from honey in texture, and something that would be easily detectable even in a compound formulation consisting of some 40 ingredients if the “standards” for evaluating the stickiness or jam-like consistency of *cyavanaprāśa* were in place. *Āmla* (Indian gooseberry; Latin name as authenticated by the API⁷⁹: *Emblica officinalis*) or *āmalaki* (Sanskrit name) is the highest consumed botanical raw drug by the domestic herbal industry (Ved and Goraya, 2007). Although an easy to grow tropical plant, it is in very high demand, and its adulterant in Ayurvedic formulations such as the *cyavanaprāśa* and *triphalā cūrna* (powder formulation from three fruits) is usually any fruit that is predominantly sour in taste. In extreme cases, even pumpkin has been used to replace *āmla* in *cyavanaprāśa*. Ajay reiterated that his intention with the sensory analysis experiments was to be able to, first and foremost, enumerate all the attributes of *cyavanaprāśa* on a sample of an “ideal formulation” prepared by him and the lab on the

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basis of information about product preparation gleaned from the *Dravyaguna* literature, and compare with market samples of the same product. The attributes of *cyavanaprāśa* here refer to the characteristics of *cyavanaprāśa* as a drug, that is, its abilities to be identified by sensory inspection such as visual inspection (its color, form), odor inspection (distinctive smells), tactile inspection (texture, stickiness), and inspection by taste (what taste, mouthfeel, etc). Sound, in this sense, is not an attribute of a product that has the consistency of a paste or jam, since nothing about the product provides a stimulus to the sense of hearing. In other words, it is not a sensory stimulus, and therefore not an *attribute* of *cyavanaprāśa*. Further, a breakdown of the attribute of taste is required, indexed by the word “sub-attributes,” which does not imply a general taste like ‘spicy/sweet/sour’ as typically defined by the industry, but the primary taste, or tastes (combination of primary tastes), its secondary tastes, tertiary tastes and its lingering tastes. “Anyone can tell it has four tastes. But quantification is our challenge,” Ajay reminded. How much sweetness? In how many units? And then how much more is the sweetness in terms of the sourness? His intention was to develop a list of such attributes, their sub-attributes, their quantities wherever possible, and then standardize these into what the lab calls a protocol. Once there exists a protocol developed by a fully trained panel for a specific Ayurvedic formulation, evaluating the authenticity of the drug by a semi-trained panel could become a common evaluation practice and goal in an industry where adulteration was so rampant.

“What is the contribution of Ayurveda now you will ask,” Ajay preempted. “In Ayurveda we believe in six tastes.” Astringent and pungent are not considered “tastes” by modern sensory science, and taste is limited to sweet, sour, salty and bitter. “But in our protocols, six tastes are considered,” Ajay continued, referring to *madhura* for ‘sweet’, *āmla* for ‘sour’, *lavana* for ‘salty’ and *tikta* for ‘bitter,’ plus the two additional tastes of *katu* for ‘pungent’ and *kashāya* for ‘astringent.’ The last two are considered smells, at best sensations, by modern sensory science but are properly *rasa* (the object of the gustatory sense faculty), and not *gandha* (the object of the olfactory sense faculty) for Ayurveda. We see here already the beginnings of a discourse that presents *rasa* as taste by critiquing the ostensible exclusion of the two *rasas* – *katu* and *kashāya* – from the list

of tastes in modern sensory science and by arguing for their inclusion as an Ayurvedic “contribution.” The sensory panel sheets that are derived from this kind of an interpretive framework look like the ones in the attached annexures 1a and 1b, where the “six basic tastes” are listed as *madhura*, *āmla*, *lavana*, *katu*, *tikta*, *kashāya*, with their accompanying translations as sweet, sour, salty, pungent, bitter, astringent, in parenthesis. The part played by parenthesis on such test sheets needs to be taken seriously. For often, they create conditions and desires for translations that are not simply inter-lingual (Niranjana 1992), but cultural, involving translative practices and challenges, some of which we will read about in the final sections of this chapter.

The point I wish to emphasize here is that while the specific inclusion of *katu* and *kashāya* by the experimentalists are meant to read against prevalent (and allegedly, for many Ayurvedic scientists, “limited”) modern understandings of ‘taste’ (with only four tastes as opposed to the possible Ayurvedic six), their (re)translations *as* tastes allow for *rasa* to be discursively engaged in ways of seeing, techniques of translation, and modes of representation that seek to simplify complex knowledge (Scott 1998; Mitchell 2002). By this I do not mean to argue whether and how *rasa* is the stable “original” that is somehow more “holistic” than *taste*. I am, rather, interested in noting first, that re-presenting the (already represented in classical Ayurvedic pharmacology) concept of *rasa* in and through lab experiments involving training human volunteers allows for its rearticulation as something that belongs to the anatomical body and that can be investigated by observing the effects of certain (food or drug) stimuli on the body; and second, that even within the (self-reflexive, elite) Ayurvedic community that is determining to a large degree the course and discourse of contemporary Ayurvedic research, the impetuses of scientists to translate and re-present *rasa* are not homogenous. The annexures and sensory experiment sheets given to us (see in particular, attached Annexure 1b) demonstrate how the crystallization of *rasa-as-taste* is premised on the anatomical assumption of ‘taste’ as being a “transduction that is initiated when a stimulus interacts with a specific receptor entity of a taste receptor cell of the tongue” (Brand 1997; 1). The layout of the experiment sheets (as well as the experiments themselves), including the spaces provided for the panelist’s observations and descriptions mold a

particular way of recording (and therefore, seeing) *rasa*. What is understood to be a detailed, practical, “exact,” “protocol” that is aimed at making information about the *rasa* of a material “readily available” can only be derived from a specific way of seeing the body as something that responds to a stimulus, rather than apprehending the body as something that co-constitutes the material and non-material universe. In the latter way of knowing the body, within which *rasa* exists as an object and a process as we will learn later, there is no room for “controlling the (sensory) environment” – one of the most important preparatory steps in lab-led sensory studies. Environment is vital according to the classical medical teachings of Ayurveda, but then, as Farquhar notes for traditional Chinese medicine (2007), the body is itself a sign of it, shaped by it, experiencing *rasa* of objects that are themselves shaped by the special qualities pertaining to each of the seasons.

Ajay continued to explain that once we (the panel) were able to “differentiate and able to give *precise* attributes and sub-attributes, if possible numerically – sweetness 4 units, sourness 2 units, astringency 6 units – then it is a *fixed* criteria, fixed quality standard for that particular product” (emphasis Ajay’s, and now mine). Therefore, whether or not the sub-attribute of astringency in *cyavanaprāśa* was greater than the sweetness in it, and if so, by how much, became the question for the sensory panel to address. When asked to articulate how these quality standards were different from those given in the classical literature for *cyavanaprāśa*, he observed that “even though in Ayurveda or our Indian systems of traditional medical systems” [a familiar discursive way of securing the place of Ayurveda as *Ayurveda*, as well as something that represented “our,” “Indian,” “traditional”] most standards (instructions/steps) that exist for identifying, collecting, storing and preparing medicines are sensory, we are not given “*proper* set of standards for every formulation.” For example, we are told that a good quality *lehya* (drug in the form of a paste) should be of a consistency such that when pressed between the thumb and the index finger it should leave a neat and clear impression of the furrows of the finger; when rolled between the thumb and the index finger it should easily form a wick; at what (visual, tactile, olfactory and gustatory) stage the other ingredients are to be added to the jaggery or sugar-based paste so that when

immersed in boiling water the paste dips rather than spreads (this being only one of the several *pāka lakshaṇā* (*pāka* = decoction, boiling, fermentation; *lakshaṇā* = characteristic features, criteria, sign); criteria to determine how the final formulation gains textures, smells, tastes, and appearances of the individual ingredients that go into its making; and, in many cases, the connections between the names of the formulations and its properties (of taste, smell, feel, sound and appearance) from where the names are derived. “But that’s all,” Ajay observed. “These references that are available in the classics are not very vast.” They don’t tell us the individual attributes for specific sets of *lehyas*, they don’t give us any quality attributes specifically for *cyavanaprāśa*, or the *kushmāndavaleha* (another formulation in paste form) or the *citraka haritaki avaleha* (also formulation in paste form). “They (the classical literature on materia medica) give only a few, *general* instructions, and it stops there. It is *our* duty to develop further.”

Developing further. Or, training to hear, touch, smell, see, taste.

To return to our discussion of the third day of the panel training with which I began the last section, Ajay was, by now, introducing us to the merits of numbering attributes of a *dravya*. Our panel, known as the sensory panel, was composed of ten “human instruments” – six female and four male – and we were selected on the basis of a set of criteria of inclusion and exclusion. The inclusion criteria were: (a) Generally feel healthy, (b) Ready to attend at least two sessions per week; while exclusion criteria included: (a) Constant medication; (b) Health problems/defect by birth; (c) Pregnancy or planning pregnancy, (d) Addiction to habits like smoking, tobacco, etc. For Dr. Ramya, who does not work at this lab or at this institute anymore, and from whom Ajay has inherited the study itself and some of its experiment formats, “interestedness” was an important inclusion criterion as well. Being coerced or coopted into the study against one’s choice would impact sensory responses to a material significantly, she argues. The panel for this year’s study is a diverse mix of people as far as educational backgrounds and qualifications go, but with the substantial project grants that the organization has been receiving from the government and the industry lately, panel commitment has become one of the most scarce resources in this study, and panel availability – the most

important inclusion criterion. There were five panelists who were trained Ayurvedic doctors (that is, with BAMS – Bachelor in Medicine and Surgery degrees – and some with MDs in specialized branches of Ayurvedic medicine as well. They are currently working in the lab, the clinic, and the informatics department at the IIA); two young Sanskrit scholars (currently employed in the literary research unit of the IIA); one Yoga practitioner and teacher (PhD in applied Yogic science from the Bihar School of Yoga and currently employed at the IIA clinic as a therapist); one organic chemist (MSc. Biochemistry, employed as a research fellow in the lab), and one anthropologist (working on her PhD in Anthropology, permitted to participate in the life of the lab).

Ajay briefed us about the fifteen-point grade scale, where identifying and naming visual attributes such as color, form and appearance; aroma attributes such as lemon, cardamom; mouth-feel such as thick/thin, heavy/light; and taste attributes such as sweet, sour, bitter and salty, would enable us to compare different liquid samples and fix the overall quality of products. We were going to use the result sheets shown in Annexures 2a and 2b to quantitatively record the intensity of our visual, aroma, mouthfeel and taste experiences of the two food products that were picked for the day's training.

Today's purpose was for us and the PI and CO-PI to get an overall sense of the panel's (divergent and/or similar) response(s) to sensory stimuli by comparing notes at the end of the testing session. The tests and procedures for conducting the tests are derived and inspired by sensory training programs that the PIs had themselves attended. Like the Leatherheads School of Food Research, UK, where Dr. Ramya (who had first conceptualized these experiments in the year 2003) and Dr. Neeraja had their first interactions with modern sensory analysts and the "systematic things to be observed during sensory analysis," these initial sessions were to get the panel started on the same (sensory) page. Neeraja spoke to me about this day at the Leatherheads as an "ice breaker," when they were all given blinded samples of apple juice in a cup and asked to identify. All panelists present at the training facility concluded, based on the *taste* of the liquid sample, that the testing sample was a grape juice sample, with the exception of Neeraja, who detected that it was actually a sample of (pink) apple juice. The trainers

were impressed to see that Neeraja saw through the red artificial coloring agent added to the apple juice to give it the visual appearance of grape juice (some others even recorded the product as wine), and this was used instead as an introductory example to demonstrate to the panelists in training (a) how eyes may deceive the tongue into believing the sensory perceptions that it (the eyes) notes; and (b) the invariably mixed sensory composition of the panel itself and its diversity in sensorially responding to the same sensory stimuli.

Our training in fine-tuning our own senses of tasting, seeing and smelling followed the formats presented in Annexures 3a, 3b and 3c. Not only was this the first time that the panel was being imparted the methods of recording on paper their taste, their gaze and their nose, we were also learning to assign numbers to them. This meant, first and foremost, that we were learning to isolate our sensory perceptions. It meant that we were learning the importance of segregating our own sensory experiences of taste, touch, smell, hearing and sight from each other, even as we struggled to desegregate, unite and “normalize” our sensory experiences with that of the panel others. Since there were in place rules for experiencing the senses, there were also rights and wrongs. As Ajay writes a year later in the final project report submitted to the Tata Trust, “panel members have to experience each attribute listed in the training manual, otherwise chances of error are very high” (Tata Report; 2008-09; 52). He writes:

“Ideally all the standard attributes should at least be perceivable by each panel member in each test. It is quite possible that because of various reasons, panel members may not be able to perceive it consistently in quality or quantity. This leads to errors in the result. There are basically two types of errors: Type I: [Where] some of the attributes actually do not exist but the panel members perceive them. This...appears if they were not properly trained, were not feeling healthy, were not in sound mood, were not interested, prejudice or predilection, etc. Type II: In this, some of the attributes actually exist, but the panel members are not able to perceive them. It appears if panel members have not been trained properly to perceive those attributes, are not sensitive enough to those attributes...opted for not marking the presence of those attribute/s thinking that it would be wrong though they did perceive, etc.” (ibid. 53)

The table on annexure 3c shows in particular the paradox that results from a table that asks an individual to remember (from cultural, individual, linguistic, lingual memory) an “associative word” that best identifies for her the smell of the sensory sample at hand, being placed alongside a table that states the “correct identification” of the smell, that is, one “revealed by the conductor.” Further, what sets apart this paradox from other scientific tools and methods in the lab that seek to create “un-biased” and “objective” conditions of knowledge out of the “subjective” perspectives and experiences of scientists is the desire to “standardize” both individual experiences of sensing as well as the errors themselves. The final project report notes that “since sensory evaluation is a highly subjective test and human members are the tools of this test, there is always a chance of either Type I or Type II errors creeping in. Therefore, it is important to ‘standardize’ the panel as a collective tool for sensory evaluation” (ibid.). This standardization is meant to be achieved by “repeated group discussions” following the sensory experiments so that “incorrect” observations may be debated, and paradoxically, *through* more “associative words,” language, subjective experiences, interpretations and identifications, the “degree of variation in panel observations” may be checked and abated.

Ajay was, by now, using the chalkboard to graphically explain to us the importance of “methods of quantitative representation of qualitative data.” The method is known as ‘QDA, or Quantitative Descriptive Analysis, and it is used to grade the intensity of our experience of attributes (see Annexures 4a and 4b). The profiling looked simple (see Annexure 2a and 2b again) – examining the product for the given attributes of ‘color and appearance,’ ‘texture,’ ‘aroma,’ ‘taste’ and ‘overall quality,’ and recording these sensory experiences on the 1-15 grade scale provided under each of these attributes. I seemed to be on board with the group until we were required to record on the grade scale. We were given four single blind samples of yellow juice in different color and aroma intensities in four test tubes (with some of the test tubes looking considerably darker and heavier in concentration than the others), and two single blind samples of biscuits – both popular market brands, but one sample being slightly older than the other. When I thought I had finished rating biscuit sample A for taste, texture, odor, and

appearance, I moved on to biscuit sample B, except that I found it impossible to “move on” and rate B without comparing it with A. My tendency was to constantly revert to A to provide me a standard *against which* to rate B. For example, when I broke off a part of biscuit B and graded it for texture in terms of the texture attribute ‘fracturability,’ I rated it ‘medium,’ that is, 8, on a scale of 1 to 15, where 1=low fracturability (a goal that reflects the freshness of biscuits) and 15=high fracturability (not desired). I struggled in my head, however, with the question “medium in comparison to *what?*” If it was in comparison to A (which it had to be, it seemed to me, for the “high” and the “medium” and the “low” to have a context within which they were high or medium or low), then it only made sense to sample them back to back, or together. It is also true that I revised (erased and re-circled) many of my scores on the grading scale when I sampled the two together, back to back. But since Ajay’s preliminary instructions to the panel on the first day of the tests were to sample one, rate it for all attributes, neutralize tastes (by rinsing mouth with water), and then “move on” to the other, I interrupted the experiment to clarify. Ajay confirmed that that was precisely the purpose of the training and part of what the training would accomplish for us as a panel that was going to generate standard sensory protocols for Ayurvedic formulations in the future. We needed to learn to *think* like a panel – a single panel – that recognizes attributes of materials and records intensities to sensory stimuli *as a single body*. In this particular case, where we were all given a standard stimulus, we were required to recognize and record attributes of sample B by *memory* of sample A. The more we did these tests together as a panel and discussed our individual roadblocks, such as mine, the less variable and more standardized we would become in our responses to a material.

I brought this up with Dr. Ram Shastry – the Organic Chemist on our panel and senior-most researcher in the lab who had remarkable sensory sensitivity, according to other study participants. I interviewed him as both anthropologist and fellow sensory panelist, and he advised me to remember to do “fast scans.” The more I pondered and mused over biscuits, the more confirmation and validation I would require from myself to be sure of what I was feeling. He took the example of Shankar, the lab technician, who has not been able to get any taste “right.” It was the designers of the experiment, in his

view, who should be in a position to identify individuals with the ability to identify (materials). If I did not think so much about my sensory feelings, I would be more accurate. And besides, such exercises are “pleasurable to all people who are capable.” In my discussion with Dr. Srinivasan right outside the training hall, however, we discovered that we both had similar questions about comparing attributes (taste, smell, odor, sound and texture) of a material. It turned out that he had done exactly the same thing that I did – tasted the two solutions of liquid juice and compared them side by side in order to note the different concentration levels of sweetness in them. He was interrupted by Ajay as well, who encouraged him to observe and evaluate one product carefully, note its characteristics, and then move on to the next. “You need a second object for comparison,” Srinivasan noted, and we both found comfort in agreeing, that if the second object was not drawn from the materials before us in the training hall, then we would be searching for our individual experiences of it, with it, in our own life memories. In which case, “we can rate it anything. It is better that all of us compare with the same second sample than compare with the sample in our minds...instead of all of us having our own standards, it is better that we had the same external standard” he proposed. Through the course of the experiment, Dr. Srinivasan and I got along wonderfully, sharing and hitting upon exciting new ideas and voicing methodological reservations to the PI and Co-PI and the rest of the group. As the sterile language of official project reports go, not much of that excitement found a place in the final report that Ajay submitted to the funders at the end of the project year. Writing about this phase of the panel training, Ajay writes, “simple tests were given for identification of color, taste, aroma etc. Their thresholds to sensory stimuli were also tested. Panels who passed in these levels were taken up for further training and Sensory Analysis tests...Re-training is done if any of the panel members have not understood or needs more experience to appreciate certain attributes. One has to monitor the performances (while training) of each panel member to check [for] variability. Re-training is designed on the nature of variability encountered” (Tata Report; 2009, 51).

It was clear to Ajay and Meenakshi and me that I was a candidate for “re-training.” In fact, several months later, when I was studying the lab register/notebook,

where Ajay would routinely document the plans and progress of the sensory project, the section titled ‘Process and Results’ had two ‘wrongs’ next to my name. I had marked biscuit sample A saltier than B and B sweeter than A, and that was “incorrect.” The re-training seemed even more urgent in hindsight. I underwent special and extra training sessions to catch up, along with one other panel member who had missed the previously held training sessions. She was an Ayurvedic doctor, and I was concerned that she would “know” more about tastes in general and differentiating the six tastes in particular, but we had still not “entered the world of Ayurvedic medicines” according to Ajay, and so there was a possibility that we were at the same starting line as far as the general training was concerned. The sessions for the general training that we had missed were the ‘Triangle tests’ and the ‘Intensity tests’ (Annexure 5), both meant for developing ‘differentiation’ skills. These skills would enable us as individual sensory panelists to tell subtle differences in taste and appearance of materials, in addition to noting these differences *as a single panel* - discussing individual differences in observations and doing the tests over and over again to obliterate these differences and “arrive at a standardized qualitative and quantitative response to a material” (Tata Report, 2009; 51).

Admittedly, many of the challenges experienced by us as panel and by Ajay, Neeraja and Ramya as the pioneers of this kind of modern sensory evaluation exercise for pharmaceuticals arose from the fact that the “scientific” sensory tests and methods that we were going to use to understand Ayurvedic drugs were developed by international sensory labs with food research in mind. Ajay’s key guidebooks through the length and breadth of the sensory project have been the ‘Consumer sensory testing for product development,⁸⁰’ the ‘Sensory analysis and consumer science approach towards consumer preference⁸¹,’ and ‘Sensory evaluation technique.’ The exercises that we were doing today and had used for training earlier during the ‘general training phase’ of the experiments have been standard panel training procedures designed and recognized internationally for food science. Therefore, even though we were not training on the ‘hedonicity tests’ seen in annexure 5 (since these were tests that were in use by the global

⁸⁰ VAR, Anna 1998. *Consumer sensory testing for product development*. Maryland: Aspen Publishers.

⁸¹ Published by the Central Food Technology Research Institute, Mysore, India, where Ajay was sponsored by the IIA for professional training in sensory analysis.

food and beverage industry “to determine the acceptance of a food” [AVA 1998; 21] and “acceptance” or preference did not seem to the experimentalists to be valid criteria for medicine or food as medicine), we were nevertheless, borrowing “scientific” methods of sensory testing from a food industry context that privileges the goal of maximizing product acceptance.

“The world of Ayurvedic medicines” and a “qualitative analysis of *rasa*⁸²” within it.

In a 2007 paper⁸³ titled ‘Traditional phytochemistry: Identification of drug by “taste,”’ the authors⁸⁴ propose a “possible scientific approach” to the study of *rasa* – a concept, they admit, roughly corresponding to taste. They cite recent studies in modern phytochemistry to talk about the links between the pharmacological properties of materials and their tastes. Premised on an article published in the science journal *Nature* that relates the pharmacological activities of ibuprofen and oleocanthal to a similarity in their tastes, the paper urges for new and scientific investigations into the Ayurvedic means of drug identification outlined in *Dravyaguna Vijñāna*. The paper is introduced by its authors with an innovative use of parenthesis – they insert the word ‘hypo’ between ‘Ayurvedic’ and ‘thesis.’

“This paper discusses a possible scientific approach to understanding the Ayurvedic (hypo)thesis in terms of the stereochemical basis of both pharmaco-activity and taste, and the numbers of possible pharmaco-active compounds that ‘Rasa’ may be able to distinguish” (Joshi et al, 2007: 145).

The ‘hypo’ insertion may be read in any or all of the following ways: One, that *rasa* as a concept is at best a (hypo)thesis until explained in phytochemical terms; two, that the thesis of the stereochemical basis of the link between pharmaco-activity and taste is an Ayurvedic one - but is a ‘hypo’ that remains to be proven right or wrong; and three, that the Ayurvedic thesis of *rasa can* be understood in terms of the (hypothetical) relationship of the stereochemistry of a material to its pharmaco-activity and taste. Further into the

⁸² See annexure 1b.

⁸³ Joshi, Kalpana, Alex Hankey, Bhushan Patwardhan 2007 “Traditional phytochemistry: Identification of drug by taste.” *Evidence based Complementary and Alternative Medicine*. June; 4(2): 145–148.

⁸⁴ Kalpna Joshi, Alex Hankey and Bhushan Patwardhan, of whom two are intimately connected with the affairs of the IIA. Alex is now Editor of IIA’s peer-reviewed journal, and Dr. Bhushan Patwardhan, at the time of authoring the article was Director of the Interdisciplinary School of Health Sciences, University of Pune, and is now Director of the IIA.

commentary, the authors formulate a broader definition of *rasa* where they note that “the Sanskrit word ‘Rasa’ is usually rendered into English as ‘taste’ for want of a better word, but it possesses a deeper and more subtle meaning” (ibid. 146). But they return, in the very next statement, to the urge to speak about *rasa* again from the special authority of western anatomical science by claiming that “*rasa* refers to the total subjective experience arising from putting the substance in the mouth, including not only the six primary tastes recognized by Ayurveda (sweet, sour, salty, bitter, pungent and astringent), but also the ‘flavours’ experienced by means of retronasal olfaction (nasal smell receptor stimulation by food warmed in the mouth), the more acrid, chemesthesis irritation sense referred to above, and even more subtle associations available to rare individuals such as the ancient rishis of the Vedic civilization” (ibid). So much so, that they add that “Ayurveda’s claim that ‘Rasa’ provides an effective means of identification, though seemingly simplistic, merits deeper scientific analysis, to see what substance there may be to it. It is apparently supported by the comparison of Oleocanthal and Ibuprofen” (ibid.) They conclude this with an observation about the overarching theoretical, philosophical and methodological tenet of the *pancamahābhutas* (theory of matter, the five physical elements explained earlier on in the chapter) as a mere deflection – “at a simple level, the six Rasas are said to respond in a precise way to particular qualities, or ‘panchamahabhuttas’ [sp], of plant material tasted.” The real challenge, however, they continue, is one that requires “a far greater sensitivity” – that of the identification of pharmacactivity. Over the past five millennia or more, they write, oriental traditions of medicine such as Ayurveda and Traditional Chinese Medicine have identified and prepared many effective therapeutic preparations, as modern scientific evaluations of their efficacy amply demonstrate. “But *how* they were able to do so is not at all understood” (ibid). It is important to understand these Ayurvedic claims as they “might well assist in future identification of potential sources of drugs.”

To be sure, the classification of the six main types of *rasa* (*madhura*=sweet; *āmla*=sour; *lavaṇa*=salty; *katu*=pungent; *tikta*=bitter; *kashaya*=astringent) and sixty-three combinations of derived *rasa* in Ayurvedic theory and the five types of flavors in Chinese medical theory and the classificatory rubrics of drugs derived from their flavors,

warmth, directionality and speed (Farquhar 2007), are not operating “at a simple level.” The edifice of the Ayurvedic theory of drugs stands on the foundation of *mahābhūta* (space, air, fire, water and earth: the five types of matter) and *tridoṣa*. Drugs have an effect on the body because there is an inseparable relationship (*samāvaya*) between, and similarity in, the constitution of the body and the constitution of matter. *Rasa*, as an object of a *jñānendriya* (organ of cognition, translated commonly as sense organ), is a quality of one of the five types of matter/*dravya*. This means that while there are five types of sentient matter and four kinds of insentient matter/*dravya* (the soul, mind, time and space) that sustain the universe by their combination, for *rasa* to be manifest, there needs to be a medium, a substratum as it were, in and through which it will be experienced. That medium is primarily water and secondarily earth, experienced by us through a particular organ of cognition – the tongue. The composition of the *rasas* (sweet = earth and water; sour = earth and fire; salty = water and fire; pungent = air and fire; bitter = air and space; and astringent = air and earth) has been determined and described by observing and inferring the effect of the five constituents of matter on the body (Sharma 1995). Whether we “understand” it or not, it is part of a single story anchored in a single system of the classification of matter. Further, to understand that any change in the location (*dīk*) and the time (*kāla*) and the specific quality of a drug (*prabhāva*) can bring about a change in the probable action of the drug in the body is to talk about a specific type of human body and its interaction with tastes of drugs. For example, in his commentary on the medical treatise *Caraka Samhita*, Chakrapānidatta elaborates on ‘location’ in the chapter on tastes and diet, and states that grapes and pomegranates growing in the Himalayas are sweet in taste, whereas those growing elsewhere are sour. Similarly, an unripe mango fruit that starts out being astringent in taste, goes on to become sour, and eventually turns sweet when ripe, will have wholly different effects and interactions with the body depending on its age, and *by virtue* of its three distinct tastes. In this logic that connects *rasa* to the powers of medicines, “there is room for the sensed responses of the lived body,” as put beautifully by Farquhar (2007; 294). The body experiences a changed *rasa* differently in terms of a bodily change observed at the level of the drug/food’s potency and digestive and post-metabolic effects.

To read the Ayurvedic concept of *rasa* and its role in determining the *guṇa* (qualities) *vīrya* (potency) and *vipāka* (post-metabolic effect) of a drug or diet as “Ayurveda’s *claim* that *rasa* provides an effective means of identification” reflects, more than anything else, a distinct urge, a special desire. It does not reflect a right or a wrong reading of Ayurvedic concepts as much as it exposes a certain way of seeing, a motivation derived from a difference in objective, a difference in what one seeks to see (Kuriyama 1999), The very impetus to “identify” *rasa* as a drug discovery tool represents a desire for knowledge to be applied in a certain kind of way. But this question of application necessitates an affiliated development of a method. Let us now return to the lab to look at negotiations with method. The lab is not attempting to “relate a molecule’s ‘Rasa’ to its biochemical structure and to its pharmacological properties” as the authors of this (hypo)thetical piece are doing. Then what is the lab attempting?

The lab had picked two commonly prescribed Ayurvedic formulations for developing sensory protocols for the sensory project year: the *Niśāmalaki cūrṇa* and the *Aśwagandha Śatāvarī kalpa*. The first is a commonly recommended anti-diabetic formulation prescribed in classical Ayurvedic literature in the *cūrṇa* (powder) form, while the second is a *kalpa* (granular form), which is a compound formulation indicated for general debility and for promoting lactation, among other therapeutic uses. The reason that these formulations are chosen for the sensory experiments is not because they are commonly prescribed, but because, as medicinal formulations, they serve as model preparations that contain a basic combination of two constituting ingredients and a complex method of preparation. As scientific “objects,” these formulations (that are basic ingredient-wise, but complex preparation, process-wise) function as ideal study material for generating and fine-tuning a “method” of sensorially analyzing Ayurvedic compound formulations. An earlier sensory study drug candidate *Kushmāndavaleha* (an *avaleha* like *cyavanaprāsa*: in paste form) had at least nine raw drug ingredients. Neeraja’s reservations with a complex formulation like that was known to all, and even though we had conducted training sessions on its three ingredient drugs – *pippali* (Latin name: Piper longum, long pepper), *twak* (cinnamon) and *jeeraka* (cumin seeds), we abandoned the drug some weeks into the training and switched to profiling for the *Aśwagandha Śatāvarī*

kalpa, with *Aśwagandha* (Latin name: *Withania somnifera*) and *Śatāvarī* (*Asparagus racemosus*) as its only two ingredients. I want to underscore here the divergence of Ajay and Neeraja's motivation for conducting the sensory study on Ayurvedic medicines, and note that the significance of this difference for any anthropological analysis of the experiment itself is not minor.

Let us recapitulate a bit. Ajay's ultimate goal with this study, as we were familiarized with in the last section, is to be able to come up with an extensive and complete list of all the defining and distinguishing characteristics of raw drug/finished drugs in use by the industry and commonly prescribed by practitioners. In order to achieve this, he wants to stay as close as possible to the Ayurvedic ways of acquiring knowledge of a material through the use of the five senses. He writes in the Introduction of the final project report:

“Ayurveda describes two major medium of developing evidence: *pratyakṣa* and *anumāna pramāṇa*⁸⁵ (means of knowledge). *Pratyakṣa* is direct cognition through the sense organs ie. *Rūpendriya* (eye), *Ghrāṇendriya* (nose), *Rasanendriya* (tongue), *Shrotrendriya* (ear) and *Sparśanendriya* (skin). The characters that are perceived directly through these sense organs are *Pratyakṣa*. This is experience. Indirect perception of the characters based on experience is *Anumāna* (eg: assuming fire after seeing smoke). *Upamāna* (comparison with well known objects) and *Yukti* (predicting the past, present and future based on same/similar experience ie. indirectly perceived through the sense organs) are the other *pramāṇas* used in Ayurveda. Based on the traditional and modern understanding of Sensory Analysis, we have developed methodology and guidelines to assess the typical characters of elected Ayurvedic products” (Report 2008-09; 48).

For Neeraja, the big question that this study might help ask (and hopefully address) remains “what is the logic behind that [any] formulation? Why in the proportion of 1:1? And why only these herbs? What is it about the taste of the drug that makes it interact with the body in this way or that? So many questions come to mind which is [that are] not

⁸⁵ *Pratyakṣa* is a compound word from *prati* + *akṣa*, meaning ‘in front of the eyes.’ *Anumāna* is a compound word from *anu*= afterwards/later; and *māna* = knowledge/understanding, and *pramāṇa* stands for ‘means of knowledge,’ having *pramā* as its root word, meaning ‘valid knowledge.’ It is hard for the word *pramāṇa* to be thought of as ‘evidence’ or even methodology. As a means of knowledge derived by direct cognition through the senses the concept of ‘*pramāṇa*,’ in a very Derridian sense, is not autonomous. It emerges as a signified only in relation to other signifieds such as *pramā* - valid knowledge, *prameya* – object to be known, and *pramata* – the individual seeking knowledge. Further, the concept of *pramāṇa* is used in Ayurveda in ways very different from the philosophical body of work that the concept is derived from – the six schools of Hindu philosophy (*ṣaṭ darśana*, literally, ‘the six views,’ the six insights) that are themselves born out of the *Upaniṣads*, which are, in turn, part of the *Vedas*.

written down and cannot be explained by these [Ayurvedic] physicians....” We will return to Neeraja’s questions in the last section, but it is important to remind ourselves and keep in mind that the objective of these experiments for Neeraja is not to sensorially evaluate individual drugs as ends in themselves (with the purpose of evaluating individual formulations), but to develop a method that can evaluate the quality of contemporary Ayurvedic drugs *so that* the link between the *rasa* (taste), *guṇa* (properties), *vīrya* (potency), *vipāka* (post-metabolic effect) and *prabhāva* (specific/unique effect) of drugs and their pharmacological use may be explained. The divergence in the two scientific positions of Ajay and Neeraja are not always visible in the lab, to the extent that they cannot even be called positions that are vocalized as points of debate either in monthly lab meetings or inside the sensory training hall. They manifest every now and then in the short term goals of this experiment and others, and are often arbitrated and unified in seemingly neutral project grant titles such as ‘TQS, or Traditional Quality Standards’ (the larger project of which the sensory study is a part). For a lot of us in the lab, it reflects the hierarchical arrangement of the scientists in the lab and the goals of western anatomical and pharmaceutical science and international drug research. Perhaps Ajay’s practical approach to the materiality of Ayurvedic medicines has as much to do with his MD in *Dravyaguṇa* and not a PhD degree in biochemistry; in his being a research associate in a lab, not its Director or the Joint Director of the IIA and in his spending only one year in the lab as opposed to establishing it, as with his style of interrogating in/with Ayurvedic science. Neeraja’s style of interrogating “why,” “the logic,” the “there-must-be-a-reason” does not drive Ajay. As Dr. Ravi, Ajay’s classmate in BAMS and an MD in *bhaisajya kalpanā* (Ayurvedic pharmacy) said in an interview, “It [Ayurveda] is not for everyone.... unknown things might be doing so many unknown things....you can’t take an Ayurvedic concept and start asking modern questions.” Let us hold this thought for now and take a closer look at the questions that Dr. Ravi *is* asking in the sensory trainings and discussions.

Discussions following the experiments, as I have mentioned earlier, formed an important component of the sensory project in this round. Ajay was sent by the IIA to train at the CFTRI, Mysore (Central Food Technological Research Institute) - not the

Leatherhead Food Research, UK, that had trained Neeraja and Ramya. The sensory project has itself grown and expanded since Ramya conceived it back in 2003-04, and Ajay has learned through his training, reading and conversations with Neeraja and *Dravyaguṇa* experts at the IIA that there is no substitute for discussing the sensory observations of the panel with the panel. Soon after we moved from profiling food products in our training phase to discerning attributes of raw drugs, we started meeting after the experiments to discuss our “findings.” I found myself more at home in these sessions than at the experiments themselves since I was convinced that out of all the participating sensory volunteers, I was the one least predisposed to handling those materials. Despite Dr. Srinivasan, Ravi, Geetha and other co-panelists assuring me that my background had little to do with how well or not I did at the sensory sessions or how I approached the “samples” given, I would go to the training hall each week with less knowledge of sensory technique than my co-panelists, with a smaller vocabulary of sensory terms, and with scantier experience of the material itself. Even though Ajay, as the designer of this set of experiments, had translated and integrated into a tabular format the ‘traditional methods to identify the Rasa (Taste) of [a] given sample’ (see figure 2.3) for the benefit of a single-blinded panel, some “traditional methods” would always slip through the cracks. For example, when we were profiling for *Aśwagandha* (Latin name: *Withania somnifera*, also known as Indian Ginseng), I saw Poonam, an Ayurvedic doctor, taking the root of the raw drug and breaking it close to her ear. I looked back at the sheets provided to the panel where we were recording our observations on the attributes of the drug, and could only find columns for ‘Attributes for visual inspection,’ ‘attributes for odor inspection,’ ‘attributes for tactile inspection’ and ‘attributes for taste.’ There was no ‘attributes for auditory inspection’ column. A heavy omission in and of itself where there was no room for *śabda* (the object of the sense of hearing) on the sensory panel observation sheet, Poonam said that she relied on the sound of the breaking of the root to make an assessment of its tactile strength, and on the sound of *any* material to evaluate its freshness, coarseness, roughness and toughness. When we did try to break a piece of *happala* (Kannada for thin, crisp wafers of dried lentil, eaten with a meal) together at lunch one day using that technique, I could see how connected the tactile and the auditory

were. Poonam said that these things “come naturally” to any student of Ayurveda, given their mandatory second year syllabus on *Dravyaguna Vijñāna*.

The student of anthropology was happy to speak at the discussions. Several of my doubts about the study were heard and debated at these discussion sessions, and many of the IIA researchers would use these gatherings to propose radically new ideas, critique new research studies in Ayurveda, express their enthusiasms and reservations about the methodology of the sensory study and so on. There was one particular discussion meeting that was considered a breakthrough in the sensory project that year. We had profiled the attributes of *pippali* (long pepper) the week before, and were meeting this time to arrive consensually at a list of standard attributes (derived by visual, odor, tactile and taste inspection) that every raw mature fruit of *pippali* must possess. Here are very brief selections of the 1.5 hour-long discussion where we discuss *gandha*, *sparśa* and *rasa* (the objects of the faculties of the faculties).

Ajay: Anything to add to visual? Then shall we go to odor? I’ll read out. [Reads from our result sheets] Pungent, spicy on breaking, spicy, pungent, causes sneezing on snuffing, pungent smell, hot---

Ravi: [interrupts] But that is not related to smell, sneezing and all is not related to smell.

Geetha: That will be irritation. Sneezing is irritation.

A: Yes, that is personal. [reads on] Strong and spicy, pungent, resembles *shikakai* (hair shampoo, a medicinal plant whose fruit is used to make hair products)

[Small bouts of laughter at this point blowing up into loud laughs in the hall since *shikakai* – itself a product – was an odd choice of descriptive language for a product], [continues] smells like *hingwāshatak churna* (again, another product - an Ayurvedic drug in powder form, with pippali as one of its nine ingredients). [continues] Agreeable, smell of pepper, felt like sneezing. See? Two people who find that it may cause sneezing. Smells like old fruit, not fresh one, causes tingling.

G: But everybody accepts spicy and strong?

A: [continues] Tingling.

Ritika: But sir, again, there is a difference between when you smell it as a whole and when you break it.

A: Break it, yes yes yes yes. [Continues reading] Pungent, irritation in the nasal passage, increased pungency upon breaking.

Rit: Right.

Ravi: The smell is Ayurvedic pharmacy smell, when you enter.

Ajay: Pleasant and non-agreeable, nauseating.

Ravi: Its not nauseating! In fact it subsides nausea.

Kavitha: Sir I found it nauseating.

A: Okay.

Ravi: I think we can say spicy and pungent.

A: Okay so here I think there is not much confusion. Pungent, spicy, and what? Irritation? Smell now and see? [we all inspect our own discussion reference pepper sample for its smell] Who all found it irritates? Rekha you, and...[points to another panelist]...you.

Ravi: But Rekha you are a bit allergic in general, no?

G: How close are you holding it? Are you pressing it also? Only when you put some pressure will the smell be more and that might be irritating you.

Rit: But sir also depends on what term you are using. If you are using pungent it comes from modern sensory science and the word there *means* irritation. To some sense. But if we are using *katu* then it is different, right?

A: That is true, your opinion is true, but—

Ravi: -- but you have to use universal term.

A: Pungent...

Rit: Haan (yes), so why don't we use pungent in addition to spicy, then we won't need to use a third term like irritation.

A: Yes, then it will be included in that. But I was thinking why don't we use it as an explanation? Irritation?

Ravi: Even garlic smell they (modern sensory science) say is pungent. But this pungent is totally different from that. Garlic they call pungent odor. Then how will you call this pungent? How will you grade pungent?

A: It is not possible, these things are not possible, but it is part of the sensory analysis, so even if it contributes only ten percent...

Ravi: Then pungent is the right word.

A: Pungent is the right word, no?

Ravi: Actually these are called aromas, not smells.

A: So as explanation (for qualitative sub-attributes) can I write irritating? Frankly, it is not irritating for me.

Ravi: I feel that spicy aromatic is the right word.

A: Spicy ar-o-matic [writes the word down]. Okay. Nobody has spelt out aromatic (in their observations). But I believe it is aromatic. Once again here, science opines aroma, what is aroma? Aroma is smell. The true meaning of aroma. But generally how we use it in the sensory analysis dictionary, aroma is agreeable (that is, modern sensory science uses aroma in a positive way, to always mean "agreeable"). Okay, anything else? Now about tactile...hmm...hard, granular..

Ravi: Its not granular!

A: What is your opinion, what *is* granular? [asks Ravi]

Ravi: Granular means it should not be powder, it should not be hard. Granules. Should be separable.

Rit: But this is separable, here! [applies pressure on the fruit until it separates]

Ravi: Now this is granular, but when you roll it, is not (the technique for evaluating granular is not by crushing, but by gently rolling between fingers).

A: See I think it looks granular—

Ravi: ---(interrupts) *looks* granular, we are doing tactile now.

A: See when we make *halva* (sweet confection made from flour, clarified butter and butter) and you let it cool, after a few hours, a top layer forms—

G: *Ravey ravey* (a word in Kannada, and a cultural sensory descriptor that I could not understand until Ravi explained)

A: Exactly! Like *ravey ravey*.

R: But it varies according to sample, not all can be broken and separated to look like granules. I think good ones should not separate.

Rit: Ya, if its dry, it shouldn't separate.

A: Ya, everybody has written like that only. With slight pressure, not easily breakable or separable. We have to see how much pressure is to be applied to break it into granules. Let us do that with another sample next time. I bring a fresher sample.

A: Okay now, attributes of taste. Burning sensation, after two or three minutes, burns very much. So primarily *katu*, secondary *tikta*. Salivation in mouth, hot sensation. Yes, that is a good finding that she has written. Causes 'salivation.' Is it true? Tingling is okay, but salivation? [he asks the room]

Rit: I think it coats the tongue.

Ravi: It is a kind of burning sensation only, but not *exactly* burning.

G: Tingling. I think it is tingling.

Rit: Ya, tingling. Or burning. No?

Ravi: Burning, see when you eat red chilly you get burning. That is burning. Unbearable. This is bearable. You have how much ever (however much) it will not burn. See take a real chilly, you have to drink water. That is burning.

A: Yes yes yes. See the difference is here...even I am only now able to differentiate between the pungent sensation and tingling of *pippali*.

G: Only front part of the tongue burns.

Rit: The tip, yes.

A: It is not uniform sensation it is causing. It is like *jum jum jum jum* (an onomatopoeic word in Kannada to express a vibrating sensation)

Rit: And you know I also discovered that no matter where you put the *pippali* on your tongue, it is always the tip that tingles!

A: Yes, yes yes yes. And my observation is that this type of tingling causes slightly *amla* (sour) taste. Is it true? [asks all of us]

Meenakshi: Same thing here. Like *Aakarakara*.

Rit: What is *aakarakara*?

Ravi: It is a local plant used as an anesthetic. It causes this type of acidic feeling in the mouth, it is used because it causes numbness.

A: Salty taste. Ritika, you have written salty. I personally observed that it is a combination of sour and salt. To some extent. That too when I touch my tongue to the lips. It is not primary salty taste. Did anyone feel that? Salty?

Rit: Actually sir you when it tasted salty to me? Not on the tongue, but when I touched my tongue to the gums, that contact gave some salty taste.

A: Yes that is what I am talking about also. But I didn't find it salty.

M: It is not salty, it is sour.

A: Someone has written unpleasant. Do you think it is unpleasant?

Rit: Unpleasant can be a criterion for food, not medicine. What do we mean unpleasant?

G: Sir we can say disagreeable. Maybe for smell you can give pleasant or unpleasant. But not for taste.

Ravi: You find it unpleasant? [Asks Swati directly, who had made the disagreeable observation]

A: Whatever it may be, she doesn't want to taste it further [we laugh].

Ravi: Ya, it depends...these things are personal preferences....

Rit: But sir, does agreeable or not even matter to medicine?

Ravi: See, for quality control aspect, agreeable non-agreeable is immaterial. You take *pippali*, the agreeable non-agreeable question doesn't count. (For) food it counts.

A: Yes, I am not saying that. For some things, the material should be disagreeable....good quality if *pippali* is unpleasant....see Kavitha says she has too much tingling with this.

Ravi: That means she taken more, she must have swallowed it! We should define the quantity (that we are supposed to take in order to inspect these materials).

G: But even if you get that sensation, it is nice for the throat! I cannot even say it is tingling, my throat always feels like *pippali* will help.

Ravi: Yes, and that is the aim of giving it in so many medications. It makes you cough, it is an expectorant.

Rit: For me, it soothes the throat much more than irritating it. Because my throat is always dry and disturbed.

A: Now I am even getting doubt if we should even write pungency.

Ravi: Ya, because pungent is a smell, right?

A: No no, *katu, katu*. (referring to the translation of the Ayurvedic *rasa – katu –* as pungent, and by derivation, pungent as taste)

Ravi: But that is *katu!*

M: Pungent odor and pungent taste both are there.

R: They (referring to modern sensory science) have pungent as taste?

A: No, in modern, there is no pungent taste. Any irritation to tongue is pungency. But for our sensory analysis, pungency we are considering here. And what is pungency? Red chillies, pepper, they are pungent. They are the standards for pungent.

Rit: But if it (pungent) is not a taste, only a smell—

Ravi: --In modern, taste depends only on the taste buds. For us, if something is *katu* and you touch it anywhere, it will burn. Hands, lips, eyes, any (part of) skin...

A: That is true Ravi [name changed], that is true, but the type of sensation it is causing—

Ravi: --[interrupts] You can call it as 'pungent' (implying that if you called it 'taste,' it would mean *katu*, since there is no 'pungent' that is a taste in modern sensory science, so just call it pungent) Pungent is more of smell as far as that word is concerned.

Rit: That's what I am saying. But to call it a taste would be to confuse *katu* with pungency. It should not be translated as *katu* I feel.

Ravi: Pungent you are not supposed to put under the heading of taste.

A: But see what happens--

Ravi: --[interrupts] *Rasa* is totally different. Don't translate.

A: But see modern sensory analysts are now also ready to accept pungency as taste. It is not really taste but now if they are ready to *accept* under the heading of 'taste' then...

Ravi: Taste as far as the drug is concerned. For this, [*pippali*] it is a *rasa*. That's what. Exact word is *rasa*. But not taste. Take pungency more as a smell rather than a taste.

A: See as far as our work is concerned, especially for taste, we are depending on Ayurvedic description and Ayurvedic classification.

Ravi: Write *katu rasa* then!

A: It is *katu* only. For the purpose of understanding, I have translated as pungent.

Ravi: Haan (yes) in translating you will lose everything.

Rit: That's what. Then we should just write *katu rasa*.

Ravi: *Katu rasa* can become a technical term for them! Now they have accepted 'guru' and all, so give them *katu*.

A: Very good, very good [agreeing].

Ravi: Pungent they have given and we have accepted. It is not like that. We can give our own terms, we can coin our own terms.

A: What do you feel [asks Rekha] See, it is a very small forum but many interesting things are coming up. Otherwise if you are sitting alone however much you think, how much ever you write, these points will not come out. But see, it is very ideal what they [Ravi and Ritika] are saying, and very good also. Because there is no proper translation or correlation between *katu* and pungency. In fact they are different. It is not taste.

Ravi: For example, hydrogen sulfide they call pungent. It is *totally* different. Can you call that *katu*? Pungent is only related to odor.

A: Yes, okay, we will try to propagate the *katu rasa*. We will keep the same word as it is.

Ravi: Yes then give a glossary. What all is *katu rasa*.

Ravi and I had a much longer discussion at an interview later that week. We continued to discuss the inadequacies in the English language to grasp the realities of the six tastes. If '*madhura*' was really 'sweet' then every time you had a *vāta* problem, you should go take sugar and you shall be fine! Ravi claimed. He was not opposed to statistics per se, and would not mind participating in any 'integrative' study if it helped "them" (modern scientists) make better sense of Ayurveda than they can make now. "But that (statistics) is not required for our science. If you use it, just be sure that whatever you do, you don't sacrifice the concept." As an MD in Ayurvedic pharmacy, Ajay takes Ravi and his opinions and his work seriously. I have not followed up on the fate of the *katu rasa* in the story of the sensory project, but the total effect of discussions such as these and many

others point to the diversity of perspectives and the relativity of perspectives in developing a scientific protocol, depending on whom you are speaking to. Dr. Ram Shastry works in the lab in an overall advisory capacity, guiding researchers on a breadth of chemistry topics. His heightened sensory sensitivity impressed us all, but he doesn't "like to rely on these things" (human sensory tools) alone. He supports instrumentation in sensory science such as the development of the 'electronic nose' because he has realized in the course of the sensory experiments that your results will vary not only from one another but from your own, depending on your disposition and mood on the day of the tests. Dr. Srinivasan, the Sanskrit human encyclopedia at the IIA and translator of a 16th century text of Ayurveda into English does research on subjects that lie in the province of traditional literary texts. He reflected hard on my question to him about whether or not statistics could also be seen to belong to a culture, whether they were also 'cultural.' Dr. Srinivasan admitted that statistics were indeed cultural – they belonged to a culture that gave importance to parts. They were useful for "us" (the Ayurvedic community) to drive home the point that they were not, indeed, useful for us.

The transcription of the meeting that I have provided above illustrates, more than any other thing, the impossible ideal of a "standardized panel" that, in Neeraja's words, "thinks alike, says alike, analyzes alike." It also elucidates not only two divergent scientific languages, but the intimate relationship of words and their meanings to "science." The particular scientific protocol that I discussed earlier on in the chapter namely, the Quantitative Descriptive Analysis (QDA) envisioned by Ajay, leaves a lot of room for description. Neeraja and Ajay's optimism of a standardized panel was premised on the idea that articulating and verbalizing our individual sensory descriptions as a collective sensory panel would ensure a "normalizing" of these descriptors, an eventual discussion session when we – "the instrument called panel" – could "calibrate our senses" (and each other) and speak in one voice. As we saw in the discussion selection above, descriptive terminology used for explaining the sub-attributes of a material are indicative of not only shared palates and experiences of linguistic groups but also of the different characteristics perceived by them. There were, of course, the instances when the panel responded differently to the same sensory stimuli (as seen in the back and forth

arguments about tingling, sneezing, burning), but more importantly, there were the dependences on specifically local referents (*shikakai*, *aakarakara*), local metaphorical usages (*jum jum jum jum* and *ravey ravey*) and Ayurvedic correspondences (smells like *hingwāshatak churna*). Neeraja, with whom I later chatted about my reservations with the assumptions of the sensory study, was confident that with more and more open and elaborate discussion sessions, we would understand each other's words so that agreeing on a set of attributes would come naturally, and representing sensory stimuli, more homogenized.

A critique of the lab's aims and methods were perhaps most succinctly summed up by Dr. Bhagwan Dash - translator, commentator, interpreter and scholar of innumerable books and tomes of classical Ayurvedic literature. Once the Deputy Director of the Central Council of Indian Medicine, who voluntarily resigned from his research/administrative post in the government owing to severe disagreements over the course that post independent Ayurvedic teaching and research policy in India must take, sitting in his Delhi home and library, he heard me out in full descriptive detail as I explained to him the sensory experiment. After a very long pause, the frail but strong and still practicing *vaidya* leaned over the arm rest of his couch to position his mouth on the spittoon that lay on the side table. With one vigorous and perfectly aimed spit out into the spittoon bowl, he flattened his right palm in the air and got ready to say, "*Karey jo bhi karna hai, isme Ayurved ka kya bhalaa* (They may do whatever they please, what's in it for Ayurveda)?"

Whys and hows.

In a report submitted to the National Geographic Society in the year 2003 on 'The documentation of Indian traditional methods of collection and processing of medicinal plants,' Ramya and Neeraja – the PI and Co-PI on that project – write, "practical knowledge regarding processing and purification of toxic plants exists even today...but it was realized that even though the 'how' of medicinal plant preparation was alive today, the 'why' was not clear to the people (traditional physicians, collectors of medicinal plants, store managers of Ayurvedic drug manufacturing companies)" (Interim Report

2003; 7). For the director of this lab, as for several other prominent people influencing the course of discourse on Ayurvedic research today, “science” must have a deliberate character. If Ayurvedic knowledge has been shown to be “effective” for generations, then how is it that its practitioners can cure us, but not tell us the “logic” in the cure that cured us? To explain this question, Neeraja offers an understanding of Ayurvedic knowledge that has three tiers to it: *tattva* (essence, logic, principles), *śāstra* (body of knowledge, rules of knowledge, commonly used translated as ‘science’) and *vyavahār* (use, practice). There was a time when all three were thoroughly integrated. The people who would practice the Ayurvedic system of therapy were also its pedagogues and the manufacturers of its medicines. With the three tiers now getting increasingly disconnected from one another, only the practice has remained, with no clear understanding of why it is working anymore. “They (contemporary Ayurvedic researchers) have to not stop until they have asked all the questions,” Neeraja believes, confirming that this is the only way that we can stop approaching a living body of knowledge (*Dravyaguṇa Vijñāna*) as if it were dead.

What, in particular, is meant by “all the questions?” Are “why” questions “all the questions?” What is the significance of invoking a language of crisis by stating that “even though the ‘how’... was (is) alive today, the ‘why’...was (is) not clear?” Judith Farquhar and Jun Wang have recently published and presented a fascinating reverse articulation of a related dilemma in contemporary Chinese medicine. They explore the associated meanings and connotations of commonly used proverbs in the Chinese medical field. In particular, they look at the inversion by Chinese medical experts of the commonly spoken Chinese proverb - “knowing the how but not the why” – a proverb that is invoked in everyday Chinese speech to refer to knowledge that is superficial, knowledge that denotes mere technique without insight (Wang and Farquhar 2009). The Chinese medicine doctors they interviewed seem to invert the terms of this proverb to critique the privileged global-scientific way of evaluating, modernizing and developing Chinese medicine, so that “knowing the why but not the how” becomes their way of critiquing the dilemma in Chinese medicine brought about by decades of modern scientific interpretations and scientific assessment of Chinese medicine. The “why” in this

expression refers to modern scientific knowledge (Neeraja's "śāstra"), and the 'how' refers to the styles of practice of Chinese medicine, for example, clinical traditions and textual sources (Neeraja's "vyavahār"). The proverb, in its contemporary Chinese medical professional articulation, is prominently reversed to articulate the decline in the "quality" of Chinese medical skills with regard to their clinical practice and "in-depth knowledge of traditional medicine" (*ibid*).

"Practice," for Neeraja, is direct application of the basic principles and logic of the Ayurvedic knowledge system. It is something that is historically and practically contingent, so practically contingent that it may even be determined by the terms set by the Ayurvedic manufacturing industry and by the constraints of the availability of plant resources and materials. "Tattva" and "śāstra," on the other hand, are the threads that can and will ensure the continuity of "the knowledge system, the consistent framework within which materials are supposed to behave in a certain way." The scientific contribution of the lab, for Neeraja, will be in asking these "much deeper questions" that mere Ayurvedic practice – the 'how' of Ayurvedic knowledge – cannot possibly answer. Probing the "clear cut logic" that exists but is not spelt out in the canonical texts is the theoretical contribution that Ayurvedic pharmacology needs in order to "carry on" (referring to the "growth" of the science of Ayurvedic pharmacology). But does interrogating the "why" of things itself not assume a universal reality that things *can* be explained in a way that is *articulatable* in a common language of "science?" The "why" question cannot be formed outside the interrogative model of inquiry that has as its goal the ideal of accuracy, repeatability, reproducibility and simplicity of technique. I have tried to show in this chapter how, with its close scrutiny of units of measurement, clarity of procedure and of the steps involved in the procedure, the particular discourses that arise out of the technical expertise involved in asking the "why" question in *Dravyaguṇa Vijñāna* seek to scientifically validate a basic conceptual and methodological tenet of Ayurvedic pharmacology with the help of "modern" scientific techniques of measurement and explanation, even as they purport to be interrogating within the larger epistemic "logic of Ayurveda." That logic is not *standardizable*, therefore one must borrow it (the logic of standardization) from an epistemology that can view human bodies and senses as tools

that can be used to standardize. When I pointed out to Neeraja the problems of calculability in relation to the lab sensory study and the constraints introduced in the wake of understanding *indriya* as “sense” and *rasa* as “taste,” she replied that if I could supply a better word for “sense” or a better translation of “*rasa*”, she would take it. “The point is to understand it. We are only trying to understand Ayurveda with the help of modern science. If it can be understood Ayurvedically, without the help of modern science, let’s do it...but there is a particular *reason* behind what they have said...and I want to understand it in any which way it can be understood.”

Isabelle Stengers, in her engaging historical analysis of *where* modern science comes from, notes its emergence as an “event” (Stengers 2000; 71). She calls it an event because calling science an event gives it a contingency that goes against the claims made for science as revealing the deep truth of the universe and as promising to provide a ‘theory of everything.’ She shows us, through close readings of Galileo’s scientific work and discourses that Galileo, in the way that he appeals to ‘facts,’ to experiments, in order to back up his arguments, introduces us to a new mode and method of discerning truth into our culture. But, and more importantly, she says that it is not enough to speak of contingencies. To note merely the contingent advent of a paradigm is to “follow it” (*ibid.* 72), as if nothing has taken place, as if all its constructed significations and engendered problems are valid because they are all relative to their context. Against this, she proposes a way of reading the experimental sciences that *invents* a “new mode of astonishment” (*ibid.*), that identifies a “motif” that singularizes the sciences and make it capable of becoming a subject of history. It would not be an exaggeration to state that the Ayurvedic scientists whose work I have discussed in this chapter, and the Ayurvedic elite that I engage in the dissertation, are themselves invested in constantly inventing new modes of astonishment. These modes, as we know from recent studies of colonial and postcolonial Ayurveda are profoundly political (Langford 2002; Sivaramakrishnan 2006; Banerjee 2009). Far from appealing to demythologizations or secularizations, Ayurvedic scientists re-invent their science and theorizations of that science by appealing to a politics constitutive *of* that science.

This dissertation analyzes the political implications of a *use* of reason central to the functioning of ‘open-minded’ and ‘trans-disciplinary’ Ayurvedic science. Towards that end, the central contribution of this chapter has been to show specifically how the justification for a politics constitutive of ‘open-minded’ science is consolidated in and through laboratory work. This laboratory work, mediated by the sensory study’s reliance on the Hindu philosophical framework of developing “evidence” simultaneously harnesses the power of modern science even as it critiques it. Let us return to the opening article that outlined most clearly IIA’s goals of ‘inter-cultural,’ ‘trans-disciplinary work’:

“Ayurveda shastra, the *main* THS (Traditional Health Science) of India (emphasis mine) has developed in a cultural milieu, through a methodology that is based on a subjective approach to standardization....In the last few centuries, the objective and analytical use of reason has developed well. Unfortunately, the development has been one-sided, and there has been a corresponding neglect of subjective reasoning. The neglect has gone so far that the word ‘subjective’ is routinely assumed to mean just ‘personal’, and a subjective use of reason is thus put outside the essential and proper functioning of science....Modern science is based on the observer-observed dualism and on the Cartesian worldview. The philosophical foundation of Ayurveda is derived from sad-darsanas (the six philosophical traditions of Hindu thought)...” (Shankar, Unnikrishnan, Venkatasubramanian 2007; 1500).

Here we find a theorization of a subjective use of reason that is shown to be central to Ayurveda’s functioning *as a śāstra*, as “Indian,” and as an open-minded science that is different from modern science. By locating an Indian difference in “subjective reasoning” and, more importantly, in the very ability to bring subjective and objective reasoning, *pramāṇa* and evidence, within the same experimental frame – inter-cultural science, and this sensory experiment in particular – invokes (and in the process, consolidates) the authority of the open-minded scientist to move fluently between different uses of reason. Further, I have tried to draw on my ethnographic experience of this experiment to demonstrate that a trans-disciplinary study, in fixing the meanings of its core concepts in the lexical system provided by the epistemological framework of Cartesian and post-Enlightenment rational thought, gives in to it even as it critiques it.

Annexure 1a

Annexure-1

TRAINING OF PANEL IN IDENTIFICATION OF RASAS (TASTES)

NAME:

DATE:

OBJECTIVE: Identification of six basic tastes

PROCEDURE:

1. Rinse your mouth with water
2. Taste any sample given to you and hold the solution in mouth for about 15-20 seconds
3. Write the name of taste if identified
4. Six basic tastes are:
 - 1) Madhura (sweet)
 - 2) Amla (sour)
 - 3) Lavana (salty)
 - 4) Katu (pungent)
 - 5) Tikta (bitter)
 - 6) Kashaya (astringent)
5. Rinse mouth with water, test the next sample
6. Note down the correct names of tastes, confirm by tasting again
7. Now test the samples of series -II

SAMPLE SERIES- I			SAMPLE SERIES-II		
SAMPLE NO.	TASTE	CORRECT TASTE (REVEALED BY THE CONDUCTOR)	SAMPLE NO.	TASTE	CORRECT TASTE (REVEALED BY THE CONDUCTOR)

RESULT:

CORRECT IDENTIFICATION

SAMPLE SERIES- I

SAMPLE SERIES- II

Annexure 1b

Observation	Characters	√
Soon after swallowing		

Increases salivation	
Tingling sensation in teeth	
Burning sensation/irritation in mouth	
Burning sensation/irritation in mouth and tongue	
Burning sensation/irritation in throat	
Pricking sensation in tongue or mouth	
Pricking sensation in throat	
Watering from eyes	
Watering from nose	
Dries mouth	
Feeling of stiffness in tongue	
Dries up throat	
Discomfort in chest region	
Removes unctuousness in mouth	
Adhers inside the mouth	
Coats inside the mouth	
Sticky feeling in the mouth	
Sliminess in the mouth	
Smooth feeling in the mouth	

Till 2 - 3 minutes after
swallowing

Increases salivation	
Tingling sensation in teeth	
Burning sensation/irritation in mouth and tongue	
Burning sensation/irritation in throat	
Pricking sensation in tongue or mouth	
Pricking sensation in throat	
Watering from eyes	
Watering from nose	
Dries tongue	
Dries the whole mouth	
Feeling of stiffness in tongue	
Dries up throat	
Discomfort in chest region	
Removes unctuousness in mouth	
Adhers inside the mouth	
Coats inside the mouth	
Sticky feeling in the mouth	
Sliminess in the mouth	
Smooth feeling in the mouth	

Rasa Analysis

Procedure: Observe for the presence of listed characters in the given sample and note down

Observation	Characters	
		√

Consume the sample

**Immediately after putting
in mouth**

Mouth	Dissolves quickly	
	Increases salivation	

**While retaining in mouth
for few seconds**

Mouth	Dissolves quickly	
	Increases salivation	

First bite

Mouth

Squeezing of eyes/eye brows		
Increases salivation		
Horripilation		
Tingling sensation in teeth		

While mastigating

Squeezing of eyes/eye brows		
Increases salivation		
Horripilation		
Burning sensation/irritation in tongue or mouth		
Pricking sensation in tongue or mouth		
Watering from eyes		
Watering from nose		
Tingling sensation in teeth		
Dries mouth		
Feeling of stiffness in tongue		
Removes unctuousness in mouth		
Adhers inside the mouth		
Sticky feeling in the mouth		
Sliminess in the mouth		

While swallowing

Increases salivation		
Burning sensation in throat		
Dries mouth		
Feeling of stiffness in tongue		
Burning sensation/irritation in tongue or mouth		
Pricking sensation in tongue or mouth		
Watering from eyes		
Watering from nose		

Annexure 2a

SENSORY ANALYSIS

PROFILE OF BISCUIT

PANEL TRAINING

Name of the panel member:

Procedure:

- Edible samples are given to you in sets.
- Examine for the presence of each of the attributes listed below.
- Indicate intensity of the perceived attributes by marking at appropriate place and write the code number
- Note down any other attributes if you find

COLOUR AND APPEARANCE

Brown
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Light | Dark

TEXTURE

Firm
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Low | High
Fracturability
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Low | High
Brittle/Snappy
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Low | High
Crispness
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Low | High
Chewiness
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Low | High

AROMA

Baked cereal
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Low | High
Vanilla
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Low | High

TASTE

Sweet
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Low | High
Salty
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Low | High

OVERALL QUALITY

-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
Very Poor | Fair | Very Good

Any other attributes

-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

FRLHT

C P P

PROFILE OF JUICE

Name of the panel member:

Procedure:

- Examine for the presence of each of the attributes listed below.
- Indicate intensity of the perceived attributes by marking at appropriate place and write the code number
- Note down any other attributes if you find

COLOUR AND APPEARANCE

Yellow

 Light |-----| Dark

Clarity

 Light |-----| Dark

AROMA

Lemon aroma

 Low |-----| High

Cardamom aroma

 Low |-----| High

MOUTHFEEL

Body

 Thin |-----| Thick

TASTE

Sweet

 Low |-----| High

Sour

 Low |-----| High

Salty

 Low |-----| High

Bitter

 Low |-----| High

Astringent

 Low |-----| High

OVERALL QUALITY

 Very Poor |-----| Fair |-----| Very Good

Any other attributes

Annexure 3a (GENERAL TRAINING: the sense of Tasting)

Annexure-1

TRAINING OF PANEL IN TASTE THRESHOLD TEST

NAME:

DATE:

OBJECTIVE: Determination of taste threshold for taste _____

PROCEDURE:

1. Taste the solution in the given order
2. By using the intensity scale given below, describe the stimulus of each sample
3. Rinse mouth with water between testing two samples

INTENSITY SCALE

None / blank solution	0
Different from blank (doubtful)	?
Threshold value (just perceptible)	X
Weak	1
Medium	2
Strong	3
Very strong	4

SAMPLE SERIES- I		SAMPLE SERIES- II	
Sample No.	Score	Sample No.	Score

Annexure 3b (GENERAL TRAINING: the sense of Seeing)

Traditional Knowledge Guided Quality Standards 2008-09

Annexure-1

TARINING IN IDENTIFICATION AND SENSITIVITY TEST- COLOUR

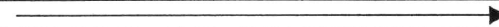
Name:

Date:

Objective: Discrimination of colour intensity differences

Procedure:

- You will be given 6 test tubes containing colour solution
- Arrange them in the increasing order of colour intensity and enter the 3 digit code number at appropriate place
- Repeat the test for all colour series

Colour	Increasing order 					
	I	II	III	IV	V	VI
1.						
Correct order						
2.						
Correct order						
3.						
Correct order						
4.						
Correct order						

- Once again compare the correct order of colour arrangement with samples

Annexure 3c (GENERAL TRAINING: the sense of Smelling)

Traditional Knowledge Guided Quality Standards 2008-09

Annexure-1

TRAINING IN RECOGNITION OF ODOURS

NAME:

DATE:

OBJECTIVE: Recognition of odour components

PROCEDURE:

1. Gently smell the sample given to you by bringing the sample near to nostrils
2. Describe the odour note identified by name or by an associative word (compare with a well known smell)
3. Breathe in fresh air and proceed to next sample

Sample No.	Identification/ associative word	Correct Identification (Revealed by the conductor)

RESULT: CORRECT IDENTIFICATIONS- /

(AFTER GETTING THE CORRECT IDENTIFICATION, SMELL AND CONFIRM THE IDENTIFICATION OF SAMPLE SMELL)

Annexure 4a

Traditional Knowledge Guided Quality Standards 2008-09

Annexure-3

QDA sheet for the profiling of raw drug/ product _____

Name of the panel member:

Date:

Procedure:

- Edible samples are given to you in sets.
- Examine for the presence of each of the attributes listed below.
- Indicate intensity of the perceived attributes by marking at appropriate place and write the code number in 1-15 grade scale

COLOUR AND APPEARANCE

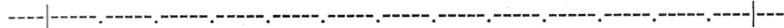
Attribute1



Light

Dark

Attribute2

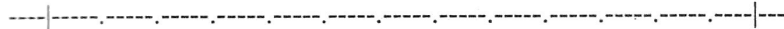


Light

Dark

TEXTURE

Attribute1

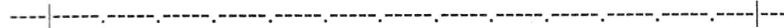


Low

High

AROMA

Attribute1

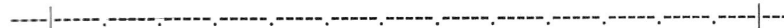


Low

High

TASTE

Attribute1



Low

High

Any other attributes



Annexure 4b

Traditional Knowledge Guided Quality Standards 2008-09

Annexure 5

TESTING OF RAW DRUGS/FORMULATIONS

Name of the panel member: _____

Date: _____

- Examine sample for the presence of different sensory attributes & sub attributes
- Try to explain the sensory attribute you perceived in a phrase or sentence
- Indicate the intensity of the perceived attribute based on fifteen grade QDA scale
- Try to explain the raw drug given to you in terms of sensory attributes and sub attributes

Drug (code number): _____

Sl.no	Attributes	Sub attributes	Explanation	Grade (1-15)
Attributes for Visual Inspection				
Attributes for Odour Inspection				
Attributes for Tactile inspection				
Attributes for Taste				

Annexure 5 (Threshold tests)

Traditional Knowledge Guided Quality Standards 2008-09

Annexure-2

TRIANGLE TEST

Name:

Date:

Procedure:

- Taste the given samples one by one (rinse mouth with water in between tasting two samples). Two are identical and one is different. Identify the odd one.

Code nos.	Odd sample	Result

INTENSITY TESTS

Objective: Determination of differences in taste intensities

Procedure:

- Examine the samples for intensity of sweetness, sourness and colour intensity
- Rank them in order of sweetness and sourness, rank them in order of increasing intensity (rinse mouth between testing two samples).

Rank order	High			Low	
	I	II	III	IV	V
Sweetness					
Sourness					
Colour					

HEDONICITY (LIKE/DISLIKE)

Objective: To test hedonicity of given product

Procedure:

- Observe overall taste, smell and mouth feel of given products and rate them as per your like/ dislike

Degree of liking	Code number
Like very much	
Like slightly	
Neither like nor dislike	
Dislike slightly	
Dislike very much	

Conclusion

At a lecture event organized as part of a discussion series at the IIA called *Science and Śāstra*, a senior *Dravyaguna* (Ayurvedic pharmacology) professor introduced Neeraja as she walked in, as the “bold⁸⁶,” brave, “risk-taking one amongst us, always pushing us and asking questions.” The large gathering that morning had a few minutes before the program for the day began, and in the brief, informal conversation that ensued, the professor reiterated that that “boldness” is what gave the IIA’s work its edge. What I have tried to demonstrate in this dissertation is that in defending the importance of being bold, creative and “open-minded,” and designating themselves as ‘Trans-disciplinary,’ the Ayurvedic elite and their ideological discourse authorize themselves to control a space for Ayurvedic knowledge production that ostensibly precludes any political ideology, disciplinary technique, scientific method, or knowledge tradition from claiming transcendent authority.

This dissertation critically examines the burden of the specific political ideologies, disciplinary techniques, scientific methods, and knowledge traditions issuing from the practice of Trans-disciplinary science. Central to my argument are the political uses to which “demonstrating the contemporary relevance of Ayurveda” can be applied. Langford has noted in her study of contemporary Ayurvedic knowledge practices that the nineteenth and twentieth century discourse on the revival of Ayurveda had the effect of delineating it as the exclusive domain of a group of high-caste, Sanskrit literate pundits (2002). Revivalist ideology, she suggests, has associated Ayurvedic knowledge with the authority of ancient texts, with the effect of detaching it from immediate, practical contexts and locating it within remote texts (*ibid.* 86). The loss, decay, and contamination of ancient Ayurveda invoked in the revivalist ideology is able to function as a sign of the contamination of authentic Indian culture by distinguishing an “authentic” cultural object from its corrupted version – a mere copy. In this way, and through this tension, Ayurveda is able to participate in a national-cultural rhetoric, framed as both national medicine and spiritual culture. Charles Leslie, in his studies on the modernization of Ayurveda has

⁸⁶ This and several other ways of articulating their work as new, relevant, critical and creative that have been observed in the chapters, themselves resonate deeply with the Cartesian rationality register of ‘dare to know.’

argued that the logic of a revivalist ideology *required* a theory of decline from a golden age of medical learning in order to serve as the ideological ground for professionalizing reforms (1973; 1998). He notes that the Ayurvedic revivalists – middle-class urban entrepreneurs and members of Brahmin and other high castes – professionalized indigenous medicine and shaped careers for themselves, and created within the pluralistic Indian medical system a dual structure of professional medical institutions (Leslie 1998; 364).

In its ideological attachment to “relevance,” the *revitalization* ideology that I have tried to outline in this dissertation attaches itself to the legacy of the revivalist discourse, and reshapes and resituates it by laying a political claim to the “contemporary.” This discourse gains its strength and authenticity not so much from the recovery of an original unity and purity of a homogenous, mythic past (Anderson 1983), but from an evocation of a temporality that allows it to invade every contemporary context. This form of temporality is not evoked as a “homogenous, empty time” (Anderson 1983; 30-31) that links together people and their actions simply by synchronicity and by being temporally coincident. Rather, by relying on the force of the prefixes *trans*, *inter*, *multi*, this form of temporality allows Ayurveda to be shaped in the image of an “open,” syncretic knowledge bank, while at the same time, enforcing a restricted Hinduness.

In a special issue of *Configurations*, Sandra Harding’s article on science and culture galvanized debates around concerns that lie at the heart of the project of postcolonial science. I will use Harding’s article and the conversations around it to locate my own project within the broader area of science studies, and to facilitate a summing up. Harding reflects on the question ‘Is science multicultural?’ in an article by the same name⁸⁷. She attempts to problematize “universal science,” and formulates a view of science that recognizes that science does not travel freely and evenly around the globe, spreading benefits where it goes. She proposes to articulate this view and provide a critique of the claims of universal science by introducing the benefits of multicultural perspectives. She writes:

⁸⁷ Sandra Harding 1994 “Is Science Multicultural? Challenges, Resources, Opportunities, Uncertainties” *Configurations* 2.2: 301-330.

“Multicultural perspectives are providing more comprehensive and less distorted understandings of history, literature, the arts, and the social sciences....Do the challenges raised by multicultural perspectives in other fields have no consequences for the natural sciences?” (Harding 1994; 301).

Harding proposes to accommodate this absence of multicultural perspectives in our conventional understandings of science by demonstrating that modern science, just like “other, culturally distinctive sciences” also bear “cultural fingerprints” (301; 304; 308; 319). She suggests that as Third World postcolonial critics, anthropologists and historians of science, we challenge the conventionally held universal science view – that modern sciences are uniquely successful because they have eliminated cultural fingerprints from their results of research. Harding wonders if these assumptions are “probably false,” and/or “have not been supported by evidence” (304). As a result, “for anyone who wishes to explore this issue,” and for postcolonial science studies “authored by scientists and engineers, a few anthropologists, and historians of science, who are of both European and Third World descent,” she identifies three questions for research (301):

- a. “Does modern science have non-western origins?” (305)
- b. “Have there been or could there be other, culturally distinctive sciences that ‘work’?” (308; emphasis Harding’s)
- c. “Is modern science culturally ‘western’?” (314)

Here Harding is articulating cogently the stated aims and goals of the Trans-disciplinary scientists in my project. As a philosopher of science and critic of postcolonial science and technology, however, Harding’s framing of questions and, consequentially, the discussions around them reinforce the very problems with conventional understandings of science that she has set out to critique. She submits that “third world cultures are immensely diverse and that they are internally heterogeneous by class, gender, ethnicity, religion, politics and other features,” and that ignoring these would amount to Eurocentric tendencies to homogenize (303). Yet there is no engagement with this difference. Not in

the group of “postcolonial authors” that she has cited; not in the assumptions made about how sciences in “third world cultures” may differ from each other; not in claiming that “it is useful to think of them all as sciences” even though “there clearly are obvious and large differences between modern sciences and the traditions of seeking systematic knowledge of the natural world to be found in other cultures” (310); and not in using the language of “evidence” and “fingerprints” to en/counter Eurocentrism.

As an anthropologist who has been consistently studying traditional medicine in China, Judith Farquhar points out that Harding’s insistent phrase “the laws of gravity and antibiotics” makes one wonder why readers of this critical journal must accept the Newtonian “law of nature” as emblematic of basic science or an instrumental “magic bullet” as summative of late twentieth century medicine (Farquhar 1994; 331). Advancing a similar criticism, Kuriyama notes that the effort to elevate alternative ways of knowing by calling them sciences inadvertently reconfirms Western science as the gold standard to which these alternatives must measure up (Kuriyama 1994). Lawrence Cohen correctly points out that the question “Is science multicultural?” may not be a central dilemma for many of the postcolonial critics Harding cites. For the generation of scholars compelled to rethink questions of practice, rationality and corporeality post-Bhopal, the “frame of reference” and the bodies that matter have shifted (Cohen 1994; 344).

The sense that we can no longer tell science or the history of science as a single story, from a single stable point of view or from a single perspective, has been a major contribution of science studies. The idea that “culturally distinctive sciences” (Harding 1994; 308) exist or “work,” or that “scientific borrowing” (*ibid.* 306) from the knowledge traditions of many different non-European cultures has resulted in the modern sciences’ (multi)culturality / cultural specificity, are important in destabilizing and disrupting the single science story. However, as critics of postcolonial science, it is necessary for us to see the ways in which the very categories by which one articulates and problematizes “culturally distinctive” practices and “different” knowledge traditions originate in the particular experiences of the western world and in western rationality. Foucault tells us in

The Order of Things that ways of seeing are predicated on ways of knowing (Foucault 1970). It is important to want to understand difference, but it is also important for us to see that it is only within an ordered perception that seeing cultures, sciences or knowledges in terms of ‘similarity’ or ‘difference’ can make sense. In this regard, Warwick Anderson’s call for a “postcolonial disruption, disfigurement even, of science and technology studies” (Anderson 2002; 645) needs to be taken as seriously as possible.

What I have presented in this dissertation is an ethnographic exploration of the contact zones of some of these concerns. The force and power of trans-disciplinary discourse comes not from articulating itself as the “Indian” or the “local” Other of modern science, but as the “open,” “relevant,” “creative” and “critical” other of Ayurvedic science, folk knowledge as well as modern knowledge systems. “Inter” and “Trans” and “multi” – the motifs of this discourse – are not given/s, but chosen/s, and this language of oppositional criticism is chosen and used strategically in order to blur the boundaries between medical knowledge, religious practice, community pedagogy, professional goals, Ayurvedic methodologies, conceptual tenets of “valid” knowledge contained in the *śāstras*, and so on. Therefore, instead of asking how science works (Biagioli 1999; xii) or demonstrating that scientific and social phenomena have blurred boundaries and that science and law and politics are mixed up (Latour 1993, Latour and Woolgar 1979) I have wanted to understand rather, how science is made to work by scientists and why the “mixing up” becomes for them, not a bi-product or a condition of producing scientific knowledge, but an end in itself. The practices and discourses of the contemporary Ayurvedic elite that I have tried to bring out suggest that these blurring of boundaries can no longer be seen as just attributes of science making, but as a carrier of exclusions.

In following debates among scientists that outline the claims and effects that support the logic of this mixing up, I have relied deeply on Isabelle Stengers’ analytical strategy of inquiring into the modern science affirmation “This is scientific” (Stengers 2000; 79). She uses this assertion as a way of getting inside the politics and the fiction of modern science (and the politics and fiction that *is* modern science) in order to lay bare

the foundations upon which legitimacy in science may stand. The emphasis on creative autonomy and creativity rather than authenticity for the scientists in my project is a very specific strategic maneuver that generates not only specific kinds of discourses as legitimate knowledge, but discourses through which the meanings of the cultural and political authority of science can be negotiated by its practitioners. Further, the specificities of developing a discourse on Trans-disciplinary Ayurvedic knowledge produces its own trajectories of political alignments and claims. Rooted in the politics of their everyday lives, open-minded scientists produce ‘knowledge’ and practices that no longer make it tenable for us to think about Ayurveda and modern Science in an oppositional relationship with each other where ‘Ayurveda’ becomes modern science’s democratic Other, but understand it, quite unambiguously, as a site that itself confers privilege and produces power.

Works Cited

- Adams, Vincanne 2001. "The sacred in the scientific: Ambiguous practices of science in Tibetan medicine." *Cultural Anthropology*. 16 (4): 542-575.
- 2002, "Randomized Controlled Crime: Postcolonial Sciences in Alternative Medicine Research." *Social Studies of Science* [Oct. - Dec. 2002] 32 (5/6): 659-690.
- Ananthamurthy, U.R. 1965, *Samskara*. Translated by A.K. Ramanujan. London: Oxford University Press.
- Anderson 1983, *Imagined Communities: Reflections on the Origin and Spread of Nationalism* London.
- Anderson, Warwick 2002, "Introduction: Postcolonial TechnoScience", *Social Studies of Science*: 32(5/6), Oct-Dec 2002: 643-658.
- Anderson, Warwick 2008, *The Collector of Lost Souls: Turning Kuru scientists into White Men*. Baltimore: The Johns Hopkins University Press.
- Apter, Emily 1995. "Ethnographic Travesties: Colonial Realism, French Feminism, and the Case of Elissa Rhais". In: *After Colonialism: Imperial Histories and Postcolonial Displacements* Gyan Prakash (ed.), Princeton: Princeton University Press.
- Arnold, David 1993, *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth Century India*. Oxford: Oxford University Press.
- Asad, Talal 1993, *Genealogies of Religion: Discipline and Reasons of Power in Christianity and Islam*. Baltimore: The Johns Hopkins University Press.
- Resurreccion, Anna V.A. 1998, *Consumer Sensory Testing for Product Development*, Gaithersburg: Aspen Publishers.
- Banerjee, Madhulika 2002. "Public policy and Ayurveda: Modernizing a great tradition." *EPW*, March 23: 1136-46.
- 2004. "Local knowledge for World Market: Globalizing Ayurveda" *Economic and Political Weekly*, Jan 2004: 89-93
- 2009. *Power, knowledge, medicine: Ayurvedic pharmaceuticals at home and in the world*. Hyderabad: Orient Blackswan.

- Barry, Christine Ann 2006, "The role of evidence in alternative medicine: Contrasting biomedical and anthropological approaches" *Social Science and Medicine*, 62: 2646-2657.
- Barthes, Roland 1989, *The Rustle of Language*, trans' R. Howard. Berkeley: University of California Press.
- Bell, Diane 1992. *Ritual theory, ritual practice*. New York: OUP.
- Bhabha, Homi (ed.) 1990. *Nation and Narration*. London: Routledge.
- 1994. *The Location of Culture*. London: Routledge.
- Biagioli, Mario (ed.) 1999 *The Science Studies Reader*. London: Routledge.
- Bode, Maarten 2002. *Taking Traditional Knowledge to the Market: The Modern Image of the Ayurvedic and Unani Industry 1980-2000*. Orient Blackswan.
- Bourdieu, Pierre 1977, *Outline of a Theory of Practice*, Translated by Richard Nice. Cambridge: Cambridge University Press.
- 1986, *Distinction*. Translated by R. Nice. London: Routledge and Kegan Paul.
- Brand, Joseph G 1997. "Biophysics of taste." In Gary K Beauchamp and Linda Bartoshuk (eds) *Tasting and Smelling*. California: Academic Press: 1-24.
- Brass, Paul 1972. "The Politics of Ayurvedic Education: A Case Study of Revivalism and Modernization in India". In Suzanne H Rudolph and Lloyd I. Rudolph (eds.), *Education and Politics in India: Studies in Organization, Society and Policy*: 342-371, Cambridge, MA Harvard University Press.
- Carpenter, Edward 1973. *Eskimo Realities*. Holt, Rinehart, Winston.
- Chakrabarty, Dipesh, 1989 *Rethinking working-class history: Bengal 1890-1940*. Princeton: Princeton University Press.
- 2000 *Provincializing Europe: Postcolonial thought and Historical Difference*. Princeton University Press, Princeton.
- 2002 *Habitations of modernity: Essays in the wake of subaltern studies*. Chicago: University of Chicago Press.
- Clarke et al 2010, *Biomedicalization: Technoscience, Health, and illness in the US*. Duke University Press.

Clifford, James 1988 *The Predicament of Culture: Twentieth-Century Ethnography, Literature, and Art*. Cambridge: Harvard University Press.

Clifford, James and George E Marcus 2010, *Writing Culture: The Poetics and Politics of Ethnography*. 25th Anniversary Edition. University of California Press.

Cohen, Lawrence 1994. "Whodunit? Violence and the Myth of Fingerprints: Comment on Harding" *Configurations*. 2(2): 343-347.

Edwin L Cooper, 2005. "CAM, eCAM, Bioprospecting: The 21st Century Pyramid" *eCAM* 2 (2): 125-127.

Corbin, Alain 1986. *The Foul and the Fragrant: Odor and the French Social Imagination*. [Trans. By Miriam Kochan, Roy Porter and Christopher Prendergast]. Cambridge: Harvard University Press.

Dash, Santosh 2009. *English education and the question of Indian nationalism: A perspective on the vernacular*. Delhi: Aakar Books.

de Grazia, Margreta 2007. "The Modern Divide: From Either Side", *Journal of Medieval and Early Modern Studies*, 57(3): 453-467.

Deleuze, Gilles 1977 "Intellectuals and Power: A conversation between Michel Foucault and Gilles Deleuze." In Donald F. Bouchard (ed.) *Language, Counter-Memory, Practice: Selected Essays and Interviews*. Ithaca: Cornell University Press.

Derrida, Jacques 1976. *Of Grammatology* [Trans by Gayatri Chakravorty Spivak] The Johns Hopkins University Press, Baltimore.

-----1982. *Margins of Philosophy*. [Trans. By Alan Bass]. Chicago: University of Chicago Press.

Desjarlais, Robert 2003. *Sensory biographies: lives and deaths among Nepal's Yolmo Buddhists*. University of California Press.

Dhyani S.C. 2003. *Rasa Panchaka: Ayurvedic Principles of Drug Action*. Varanasi: Chowkhamba Krishnadas Academy.

Easthope, Gary 1986. *Healers and Alternative Medicine: A Sociological Examination*. Brookfield, VT: Gower Publishing Company.

Elias, Norbert 1978 *The Civilizing Process, Vol 1: The History of Manners*. [Trans by Edmund Jephcott] New York: Urizen Books.

Farquhar, Judith 1994 *Knowing practice: The Clinical Encounter of Chinese Medicine*. Boulder, CO: Westview Press.

-----1994b. "Multiplicity, point of view and responsibility in traditional Chinese healing." In Angela Zito and Tani E. Barlow (eds.) *Body, subject and power in China*. Chicago: University of Chicago Press: 78-103.

-----1994c. "Political Economies of Knowledge: Comment on Harding". *Configurations*, 2(2): pp. 331-335.

-----2002. *Appetites: food and sex in post-colonial China*. Durham: Duke University Press.

-----2007 (ed. w/ M. Lock) *Beyond the Body Proper: Reading the Anthropology of Material Life*. Durham: Duke University Press.

Feld, Steven 1982. *Sound and Sentiment: Birds, Weeping, Poetics and Song in Kaluli Expression*. Philadelphia: University of Pennsylvania Press.

Foucault, Michel 1970. *The order of things: An archaeology of the human sciences*. London: Routledge.

-----1977 "Nietzsche, Genealogy, History". In Bouchard and Simon (eds) *Language, Counter-Memory, Practice: Selected Essays and Interviews by Michel Foucault*. Ithaca: Cornell University Press: 351-370.

-----1978. *The History of Sexuality: An Introduction Vol. 1*. [Trans. By Robert Hurley] Hammondsworth: Penguin.

-----1980. *Power/Knowledge: Selected Interviews and Other Writings 1972-1977*. Colin Gordon (ed.) Hertfordshire: Harvester Press.

-----1987. "The Order of Discourse." In Robert Young (ed.) *Untying the Text: A lost-structuralist Reader*. London: Routledge and Kegan Paul.

Fujimura, Joan 1987. "Constructing 'Do-able' problems in Cancer research: Articulating alignment." *Social Studies of Science*. 17: 257-293.

Gandhi, Leela 1998. *Postcolonial Theory: A Critical Introduction*. New Delhi: Oxford University Press.

Ganeshaiyah, KN, Vasudeva, R. and Uma Shanker 2009. "In Search of *Sanjeevani*". *Current Science* 97(4): pp. 484-489.

Geertz, Clifford 1973. *The Interpretation of Cultures*. New York: Basic Books.

Geurts, Kathryn Linn 2002. "On Rocks, Walks, and Talks in West Africa: Cultural Categories and an Anthropology of the Senses" *Ethos* 30(1): 178-198.

Good and Good 1993 "‘Learning Medicine’: The Constructing of Medical Knowledge at Harvard Medical School." In Shirley Lindenbaum and Margaret Lock (eds.) *Knowledge, Power, and Practice: The Anthropology of Medicine and Everyday Life*. Berkeley, University of California Press: 81-107.

Haraway, Donna 1999. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective" In *Simians, Cyborgs, and Women: The Reinvention of Nature*. New York: Routledge

Harding, Sandra 1994. "Is Science Multicultural? Challenges, Resources, Opportunities, Uncertainties." *Configurations*. (2) 2: 301-330.

Howes, David 1991 (ed.) *The varieties of sensory experience: A sourcebook in the anthropology of the senses*. Toronto: University of Toronto Press.

-----2003. *Sensual relations: Engaging the senses in cultural and social theory*. Ann Arbor: The University of Michigan Press.

Hubert and Mauss 1981. *Sacrifice: Its Nature and Functions*. Chicago: University Of Chicago Press.

ICTM 2006. "International Conclave on Traditional Medicine." Proceedings.16-17 November 2006, New Delhi: India.

Interim Report 2003. "Interim Report on NGS Grant for the period between January 2003-December 2003." Dec 2003. Bangalore: FRLHT.

Internal Lab Report 2006. "Application of Sensory Evaluation Techniques in Quality Control of *Trikatu Churna* – A report" 2005-2006. Bangalore: FRLHT.

Jackson, Michael. 1983. "Thinking through the Body: An Essay on Understanding Metaphor." *Social Analysis*. 14:127-48.

Jameson, F. 1991, *Postmodernism or, the Cultural Logic of Late Capitalism*, Duke University Press, Durham.

Jasanoff, Sheila. 2004. *States of Knowledge: The Co-Production of Science and the Social Order*. Routledge, New York.

Joshi, Kalpana, Alex Hankey, Bhushan Patwardhan 2007 "Traditional phytochemistry: Identification of drug by taste." *Evidence based Complementary and Alternative Medicine*. June; 4(2): 145–148.

Kaur, Raminder 2003, *Performative Politics and the Cultures of Hinduism: Public uses of Religion in Western India*. UK: Anthem Press.

Kim, Jongyoung 2007. "Alternative medicine's encounter with laboratory science: The scientific construction of Korean Medicine in a global age." *Social Studies of Science*. 37: 855-880.

Kim, J.D., S.M. Kang, M.Y. Park, T.Y. Jung, H.Y. Choi and S.K. Ku, 2007. "Ameliorative anti-diabetic activity of dangnyosoko, a Chinese herbal medicine, in diabetic rats" *Biosci. Biotechnol. Biochem.* 71: 1527-1534.

Kleinman, Arthur 1981. *Patients and Healers in the Context of Culture: An Exploration of the Borderland Between Anthropology, Medicine, and Psychiatry*. University of California Press.

Knorr-Cetina, Karin 1981. *The manufacture of knowledge: An essay on the Constructivist and Contextual nature of Science*. New York: Pergamon Press.

Kuklick, Henrika 1991. *The savage within: the social history of British anthropology 1885-1945*. Cambridge: Cambridge University Press.

Kuriyama, Shigehisa 1994. "On Knowledge and the Diversity of Cultures: Comment on Harding." *Configurations*. 2 (2): 337-342.

-----2006. *The expressiveness of the body and the divergence in Greek and Chinese medicine*. NY: Zone books.

Lab DST Report 2008. "Quality Control of Herbal Medicines." Bangalore: FRLHT.

Langford, Jean 2002. *Fluent Bodies: Ayurvedic Remedies for Postcolonial Imbalance*. Durham: Duke University Press.

Latour, Bruno and Woolgar, Steve 1979. *Laboratory Life: The Construction of Scientific Facts*. Princeton: Princeton University Press.

Latour Bruno 1987. *Science in Action: How to follow scientists and engineers through society*. Cambridge, MA: Harvard University Press.

-----1993. *We Have Never Been Modern*, Translated by Catherine Porter. Cambridge, MA: Harvard University Press.

-----2000 "When things strike back: a possible contribution of 'science studies' to the social sciences. *British Journal of Sociology* 51 (1): 107-23.

-----2005 *Reassembling the social: An introduction to actor-network theory*. Oxford: Oxford University Press.

-----2011 “Waiting for Gaia: Composing the common world through art and politics.” (Lecture at the French Institute, London) November 2011. (www.bruno-latour.fr/sites/.../124-GAIA-LONDON-SPEAP_0.pdf)

Lawler, S. Disgusted subjects: the making of middle class identities” *The Sociological Review*. August 2005, 53(2): 429-446.

Leslie, Charles 1973. “The Professionalizing Ideology of Medical Revivalism”. In Milton Singer (ed.) *Entrepreneurship and Modernization of Occupational Cultures in South Asia*. Durham: Duke University Press.

-----1998. *Asian Medical Systems: A Comparative Study*. New Delhi: Motilal Banarsidass Publishers.

Lévi-Strauss, Claude 1969. *The Elementary Structures of Kinship*. [Trans. James Harle Bell and John Richard von Sturmer] Boston: Beacon Press.

Lucas, D.S. 2006. *Dravyaguna Vijnana, Vol. I: Basic Principles*. New Delhi: Chaukhamba Krishnadas Academy.

Lynch, Michael 1985. *Art and artifact in laboratory science*. London: Routledge and Kegan Paul.

----- 1988. “Sacrifice and the transformation of the animal body into a scientific object: Laboratory culture and ritual practice in the Neurosciences.” *Social Studies of Science*. 18: 265-289.

Mahapatra 2008 “‘Ram himself destroyed Setu.’ Govt tells SC,” http://articles.timesofindia.indiatimes.com/2008-07-23/india/27940951_1_ram-setu-lord-rama-ram-sethu

Malinowski, B 1922. *Argonauts of the Western Pacific: An Account of Native Enterprise and Adventure in the Archipelagoes of Melanesian New Guinea*. London: Routledge.

Mallavadhani, UV 2006. “Standardization and Quality Control of Multiherbal Formulations.” In ICTM 2006. “International Conclave on Traditional Medicine.” Proceedings. 16-17 November 2006, New Delhi: India.

Mashelkar, RA April 3, 2008 “Second World Ayurveda Congress: (Theme: Ayurveda for the future) – Inaugural Address: Part I” *eCAM* 5 (2): 129-131.

Mauss 2000 *The Gift: The Form and Reason for Exchange in Archaic Societies*. [Trans. WD Halls]. NY: WW Norton and Company Inc

Mead, Margaret 1935. *Sex and Temperament in Three Primitive Societies*. Perennial: An Imprint of HarperCollins publishers.

Mitchell, Timothy 1988. *Colonizing Egypt*. Cambridge University Press, Cambridge.

-----2002. *Rule of Experts: Egypt, Techno-Politics, Modernity*. University of California Press, Berkeley.

Mitra SK and R Kannan 2007. "A note on unintentional adulterations in Ayurvedic herbs." *Ethnobotanical Leaflets* (11): 11-15.

Mukherjee, Pulok 2009 "Herbal medicine: evaluation of quality, efficacy and safety." In Preface, 'Abstract Book,' International Herbal Conference 2009, Feb 26-28. Bangalore, India.

Nanda, Meera 2003. *Prophets facing backward: Postmodern critiques of science and Hindu nationalism in India*. New Jersey: Rutgers University Press.

----- 2005. "Postmodernism, Hindu nationalism and 'Vedic Science.'" In Noretta Koertge (ed.) *Scientific values and civic virtues*: 221-236. Oxford Scholarship Online: <http://www.oxfordscholarship.com/view/10.1093/0195172256.001.0001/acprof-9780195172256-chapter-15>

----- 2009. *The God Market: How Globalization Is Making India More Hindu*. New York: Monthly Review Press.

Nandy, Ashis 1983. *The Intimate Enemy: Loss and Recovery of Self Under Colonialism*. Oxford University Press, New Delhi.

----- (ed.) 1989. *Science, Hegemony and Violence: A Requiem for Modernity*. Oxford: Oxford University Press.

Narasimhacharyulu, KVL 2007. *Padārtha Vijñāna*. Varanasi: Chowkhamba Krishnadas Academy.

Nichter, Mark 1996. "Pharmaceuticals, health commodifications and social relations: Ramifications for primary health care. In Mark Nichter *Anthropology and International Health: South Asian Case Studies*. Psychology Press.

Niranjana, Tejaswini 1992. *Siting translation: history, post-structuralism, and the colonial context*. Berkeley: University of California Press.

Pandian, M.S.S. 2007. *Brahmin & Non-Brahmin: Genealogies of the Tamil Present*. Ranikhet: Permanent Black.

Patwardhan, Bhushan, Ashok D. B. Vaidya, Mukund Chorghade 2004, "Ayurveda and natural products drug discovery." *Current Science*. 86 (6) 25 march 2004.

-----2007 *Drug Discovery and Development: Traditional Medicine and Ethnopharmacology* New Delhi: New India Publishing Agency

PIB, Press release, Sept 19 2008 <http://pib.nic.in/newsite/erelease.aspx?relid=43008> (visited on July 26th 2011). Ministry of Science and Technology, Government of India.

Prakash, Gyan 1997. "The Modern Nation's return in the Archaic." *Critical Inquiry*. 23 (3) Frontlines/Border Posts (Spring 1997): 536-556.

-----1999. *Another reason: Science and the imagination of modern India*. Princeton: Princeton University Press.

Project Report, June 2009. "Traditional knowledge guided quality standardization of traditional medicine." April 2008-March 2009. Bangalore: FRLHT.

Rajan 1997, "The Third World Academic in Other Places; Or, the Postcolonial Intellectual Revisited." *Critical Inquiry*. 23 (3) Front Lines/Border Posts (Spring, 1997): 596-616.

Ramanujan, AK 1991 "Three Hundred *Rāmāyaṇas*: Five Examples and Three Thoughts on Translation." In Paula Richman (ed) *Many Rāmāyaṇas: The Diversity of a Narrative Tradition in South Asia* (Berkeley: University of California Press): 22-49.

Rao, Anupama 2010. *The Caste Question: Dalits and the Politics of Modern India*. Ranikhet: Permanent Black.

Roberts, Elizabeth 2010. "Ritual Humility in Modern Laboratories: Or, Why Ecuadorean IVF Practitioners Pray." In *The Problem of Ritual Efficacy*, Sax et al (eds.). London: Oxford University Press.

Sawhney, Simona 2009. *The Modernity of Sanskrit*. Minneapolis: University of Minnesota Press.

Sax, WS, J. Quack, J. Weinholt 2010. *The Problem of Ritual Efficacy*. London: Oxford University Press.

Scott, James 1998. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. Andover, MA: Yale University Press.

Sanjay Seth 2007. *Subject lessons: The Western education of India*. Durham: Duke University Press.

Shankar D, PM Unnikrishnan 2004. *Challenging the Indian Medical Heritage*. Center for Environment Education. Cambridge University Press India Pvt. Ltd.

Shankar D, PM Unnikrishnan, Padma Venkatasubramanian 2007 “Need to develop intercultural standards for quality, safety and efficacy of traditional Indian systems of medicine. *Current Science* 92 (11), June 10: 1499-1505.

Sharma, PV 1995. *An introduction to Dravyaguna (Indian Pharmacology)* Varanasi: Chaukhamba Orientalia.

Sharma, P.V. and Dash, Bhagwaan 2008. *Charaka Samhita*. Chowkhamba, Varanasi.

Sivaramakrishnan. Kavita 2006. *Old potions, new bottles: recasting indigenous medicine in colonial Punjab (1850–1945)* New Perspectives in South Asian History, New Delhi: Orient Longman.

Bhadra Sinha 2007. “Ramayana no basis for Ram Setu debate.” *Hindustan Times*, September 12, 2007.

Singh 2008 <http://ibnlive.in.com/news/ram-setu-not-part-of-hinduism-govt-tells-sc/75806-3.html>

Song, Hoon 2006 “Seeing Oneself Seeing Oneself: White Nihilism in Ethnography and Theory.” *Ethnos* 71(4): 470-488.

Spivak, Gayatri Chakravorty, 1993. *Outside in the Teaching Machine*. NY: Psychology Press.

Stengers, Isabelle 2000. *The Invention of Modern Science*. Translated by Daniel Smith. Minneapolis: University of Minnesota Press.

Strathern, Marilyn 1987. “An Awkward Relationship: The Case of Feminism and Anthropology” *Signs*. 12 (2): 276-292.

-----1999. *Property, Substance and Effect: Anthropological Essays on People and Things*. Athlone Press.

-----2000 *Audit cultures: Anthropological Studies in Accountability, Ethics, and the Academy*. Routledge.

Tata Report 2008-09. Unpublished Lab Report. FRLHT: Bangalore.

Taussig, Michael 1993. *Mimesis and Alterity: A Particular History of the Senses*. New York: Routledge.

Taussig, Karen-Sue 2009. *Ordinary Genomes: Science, Citizenship, and Genetic Identities*. Durham: Duke University Press.

- Thani, Abha 2008 “Deendayal Research Institute: A Success story” New Delhi: CAPART (Council for Advancement of People’s Action and Rural Technology).
- Turner, Victor 1967. *The forest of symbols: Aspects of Ndembu ritual*. Cornell: Cornell University Press.
- Valiathan, M.S. 2006. *Towards Ayurvedic Biology: a Decadal Vision Document*. Bangalore: Indian Academy of Sciences.
- VAR, Anna 1998. *Consumer sensory testing for product development*. Maryland: Aspen Publishers.
- Ved, D.K. and Goraya, G.S. 2007. *Demand and Supply of Medicinal Plants in India*. New Delhi: National Medicinal Plants Board.
- Visvanathan 1997. *A Carnival for Science: Essays on Science, Technology and Development*. Oxford University Press.
- Wang, Jun and Farquhar, Judith 2009. *Knowing the Why but Not the How': A Dilemma in Contemporary Chinese Medicine*. Asian Medicine,
- Whyte, Susan Reynolds, Sjaak Van Der Geest 2002. *Social Lives of Medicines* (Cambridge Studies in Medical Anthropology). Cambridge: Cambridge University Press.
- Wujastyk, Dominik 1998. *The Roots of Ayurveda: Selections from the Ayurvedic Classics*. Penguin India.
- Young, Allan 1993. “A Description of How Ideology Shapes Knowledge of a Mental Disorder (Post-Traumatic Stress Disorder).” In Shirley Lindenbaum and Margaret Lock (eds.), *Knowledge, Power and Practice: The Anthropology of Medicine and Everyday Life*. Berkeley: University of California Press.