TEMPLES OF MODERNITY

NATIONALISM, HINDUISM, AND TRANSHUMANISM IN SOUTH INDIAN SCIENCE

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Introduction

Doorways decorated with banana leaves and designs drawn in chalk before the entrance. A computer, lathe, or distillation machine adorned with sandalwood paste, a flower, and a lemon. These are common sights during *Ayudha Puja*, a Hindu festival widely celebrated in south India. *Ayudha Puja* ("worship of the machines" or "rite of the implements" in English) brings religious practice to scientific spaces. It is a moment when scientists, engineers, and everyday people allow science, technology, and religion to overlap, to become a singular practice. Even atheists, non-Hindus, and foreigners participate. *Ayudha Puja* is a fascinating example of how religion, science, and technology intertwine, yet few studies of Hinduism mention it, and no study of Hinduism and science does so.[1] In fact, the dearth of commentary on *Ayudha Puja* is part of a larger trend in the study of religion, science, and technology, a problematic trend that this book helps rectify. To date, research on religion, science, and technology in India (or anywhere, really) has barely engaged everyday experience. This book explores interactions between Hinduism, science, and technology by revealing clear and specific moments where these intersections are present in three domains of scientists' lives: nationalist politics, scientific community structure, and the adoption/adaptation of transhumanism. Thanks to these investigations, the book offers a methodological correction, showing that scholars in the study of religion, science, and technology should emphasize performance—and every day practice—over doctrines, texts, and beliefs.

The study of Hinduism and science has inadvertently missed moments like *Ayudha Puja*. The field has also ignored the interweaving of key political figures as real spokesmen for how one might think about religion and science. It has forgone the opportunity to ask Indian scientists and engineers how they perceive religion, science, and technology in their daily and professional lives

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and, as a result, has missed out on the important ways in which twenty-first-century technologies provide our mundane world with wonder and meaning. Somehow, the unique ways that religion and science intertwine in India has been ignored while India became an information technology powerhouse and developed a space program that could reach Mars orbit at one-tenth the cost that any other nation had managed.

This book focuses on Hindu traditions, but it is important to recognize that there is considerable religious diversity in India and within Hinduism itself. The term Hindu applies to cultures that differ across time and geography, from global traditions to practices that are local to one specific area or group.[2] The term is thus problematic—subsuming many different elements under one label—but we must carry on nevertheless. As Wendy Doniger puts it, "the fact that the people whom we call Hindus have defined themselves in many different ways—and that these definitions do not always delineate the same sets of people—does not invalidate the category of Hinduism."[3] Nor does the fact that "Hinduism" is not a native term to the people of south Asia. Complicating matters, even the word "religion" is contested: many scholars suppose that the Western origins of the term make it problematic for use outside Western contexts.[4] And yet this is not the book to interrogate conventional words and question the fundamental premises of human intellectual work. For the purposes of this book, religion is "the negotiation of what it means to be human with respect to the superhuman and the subhuman"[5] and Hinduism is a useful, if sometimes problematic, term for describing a panoply of recognizable traditions that emerged on the Indian subcontinent and continue in varying forms today.

Many different modes of practice and belief are common among Indian scientists and engineers, though it would be difficult to identify the precise demographic split among the various approaches. There are even some surprisingly unconventional ways of believing in the traditional gods, an example of which I once overheard at an outdoor café at the Indian Institute of Science: "he believes in Hanuman but not in Rama, and that is outrageous!" Here, the individual expressed shock that anyone could believe in the monkey god who aids Rama in the *Ramayana* without actually believing in the epic's protagonist. As Klaus Klostermaier points out, "Hinduism always left much freedom to its adherents to choose among many options, and it exerted . . . little pressure on its followers in matters of faith and belief."[6] And so diversity flourished.

While some scholars argue over the basic terms and categories of religion and Hinduism mentioned above, others wrestle with whether religion and science could peacefully coexist in contemporary culture. In the United States, such concerns have most explosively engaged whether public schools should teach Darwinian evolution. Supreme Court decisions supporting

evolution in 1968 and 1987 failed to settle the issue publicly or establish classroom peace. Early in the twenty-first century, the federal court systems dealt another blow to anti-evolution advocates when Intelligent Design was deemed unacceptable for public schools in the *Kitzmiller v. Dover Area School District* federal court decision of 2007. Nevertheless, a few years later a poll found that only 28% of U.S. biology teachers described themselves as advocates of evolutionary biology; among the rest, 13% declared their advocacy for Creationism and 60% denied advocating either approach.[7] And so the Western world struggles over whether religion and science are in perpetual conflict—as though concepts can wage war while people stand idly by—while everywhere in the world (including the United States) other interesting questions abound. Can a person believe in both god(s) and evolution by natural selection? Of course! Many people do so even as the legal debate continues and schoolteachers—in the face of controversies in their local communities—apparently avoid scientific responsibility for one of science's most widely supported theories.

But what to make of a day when computers are cleaned, blessed by the prayers of a priest, and given a day of rest and respect? What to think when one of the twentieth century's greatest political leaders declares that laboratories, factories, and hydroelectric dams are the temples of modernity? In the broader Indian context, Sudipta Kaviraj declares that "secular people . . . need and desire transcendence as intensely as the devout. They seek it in art, in music, and in festivals that create an uncanny combination of the various registers of transcendence."[8] Science and technology could and should be included when we list such strategies of transcendence.

But the fascinating practices described in this book reveal much about our entire world, not just India. In the novel *American Gods*, Neil Gaiman notes how Americans have lost faith in many of the Old World spirits and gods; but they have replaced these with new, technological gods of media, computers, transportation, and more.[9] A masterful examination of modern religion and the secularization of American life, *American Gods* points toward the ways in which technologies are the tools of re-enchantment in a world overdetermined by science.

Midway through the twentieth century, it was common for people to claim that science had vanquished both magic and religion. For example, visitors to the Futurama exhibit at the 1939 World Fair were architecturally encouraged to "move progressively and quickly toward the secular—that pure category left over once religion retreated to the mountains of its atavistic past."[10] But the logic of secularism had not run its full course in the World Fair. While its creators imagined a post-religious world, in fact what happened is that science and technology took the place of religion for many people (even as traditional religions remained). Gaiman sees technology becoming itself

divine as it replaces magic and religion, and in doing so rejects the common claim that modernity's chief characteristic is the death of magic.

The triumph of disenchanted science and the twilight of the gods—whether in Gaiman's novel, British folktales, or social scientific theory—has been overstated, to say the least. James G. Frazer, a classic figure in the study of folklore and the history of religion, studied tales that decried the departure of faeries from the world and thereafter invented the modern myth of disenchantment, of the erasure of magic in modernity.[11] Following Frazer—but more powerfully influenced by Nietzsche, Freud, and Weber—contemporary thinkers have claimed that our worldview is characterized by faith in science rather than magic or religion, and that such faiths are mutually exclusive. But even while scholars pronounced such disenchantment, everyday citizens, and often even scholars and scientists themselves, credulously accepted claims regarding spirits, psychics, and other occult powers.[12] The persistence of such beliefs explains why disenchantment is the myth of modernity, rather than its reality. It is the worldview of a promised future in which science overcomes magic, but it is a worldview rarely adopted in totality and certainly not characteristic of the age.

The great sociologist Max Weber offered the most telling promise of disenchantment, asserting in 1917 that all the world had become calculable, had become—at least potentially—comprehensible, and thus had become meaningless and disenchanted. Weber's argument is double-sided: there is the calculability of the world and there is the existential crisis engendered by it. First, Weber notes that science has banished the "mysterious incalculable forces" that once explained the natural world.[13] Following upon this, he argues that this disenchantment means that no longer "can it be proved that the existence of the world which these sciences describe is worth while [*sic*], that it has any 'meaning,' or that it makes sense to live in such world."[14] This, he declared, is the cultural legacy of science.

Thanks to newly available archives, Jason Josephson-Storm now argues that even Weber lacked conviction in disenchantment as the only possible narrative of modernity. He argues that Weber sought mystical paths out of enchantment and may have even seen himself as a mystic.[15] If this is correct, Weber would be just one among many nineteenth- and twentieth-century figures who articulate disenchantment but simultaneously offered some version of re-enchantment in their theoretical contexts or pursued an interest in the paranormal or occult (either within the scholarly apparatus or outside of it).[16]

Regardless, Weber was not entirely correct in his perspective on science and disenchantment: the internal workings of science and technology—the forces that supposedly make the world calculable and meaningless—themselves resist disenchantment. It might be the case that scientific methodologies momentarily make the world look mundane; but their handmaiden,

technology, swiftly takes up the challenge of re-enchanting the world. Technology surely participates in the worldview that declares the world calculable through reason. Without doubt, the primacy of science and technology imply that there are no magical or divine forces that undergird natural phenomena. And yet, contemporary developments in digital technologies reintroduce forces both mysterious and incalculable. Computer-aided software design and hardware design produces results often inscrutable even to software and hardware engineers. The more advanced our technologies become, the more mysterious are their outcomes and the more their production exceeds our capacity to understand them—*even in principle*.

More to the point, the ultimate disenchantment that Weber articulates—the emptiness of the world and its loss of meaning—gets swiftly undermined by technology. This book explores enchantment; in particular, the book describes ways in which science and technology remain tied to belief in incalculable (though not necessarily supernatural) forces and how science and technology get employed to produce human meaning. Technological enchantments do not necessarily presuppose the existence of the supernatural (though in some cases they do); but they are always sources of meaning and value that continue doing the work of traditional religious practices by providing opportunities for community building, ethical reflection, experiences of transcendence, and more. These meaningful, even transcendent, experiences are the human response of enchantment.

This intervention is a global one: all over the world technology provides meaning, wonder, and enchantment for human beings. The forces that make an iPhone operate are clearly—at least in some sense—calculable and comprehensible. But its power to connect human beings, forge relationships, and even attain an aura of commercial worship deny Weber's belief that the rise of modern science excised meaning from the world. Augmented Reality apps like the game *Pokémon Go* provide a perfect example of how smartphone owners use machines to look at the world in newly enchanted fashion: users recognize that the monsters visible through the phone's camera are not "really there," but they simultaneously see the world with new eyes, and with a new capacity to experience surprise and delight in the landscape—users certainly *act* as though delightful monsters romp across the landscape. In fact, digital technologies more broadly act in the stead of religion, often offering many of the same "goods" as traditional religious participation.[17] The process of technologically enchanting the world has grown increasingly obvious in Europe and the United States,[18] but—leaving aside orientalist fancies—there has been very little effort to investigate the precise ways in which the technological enchantment of the world happens elsewhere.

The ideas, practices, and politics described in this book are part of the global process of using technology to give meaning to life and to see wonder

in the world. While it seemed reasonable to Weber that scientific calculability might strip the cosmos of all meaning, human beings have resisted such a dismal fate. Science might offer no answers to the questions of human meaning, but technology often does. Technology is the locus of many human interests, scientific calculability being just one of these. And in technology, we see active efforts to make the world meaningful. It is in this sense that technology enchants the world even while in another sense technology is, itself, mysterious and incalculable (what single person—or even collective of them—can comprehend the complete workings of a smartphone? can anyone understand the design decisions of software-writing AI?). Technology operates according to principles that we know to be rational and calculable, but its worldly operations—its role in human lives—these are rarely calculable, sometimes irrational, and often profoundly meaningful to human beings.

Before moving on, I should note that for me enchantment is an empirical, not normative, category. In this book, I note a variety of ways in which technology provides human beings with a sense of meaning, purpose, or wonder; but I do not want to leave the impression that all technologically informed meaning is morally good or politically neutral. Some of the enchantments of technology are probably good and good for people, but others are probably not. Some of them lead to conflict among human beings while some of them bring people together. All of us should recognize that human flourishing requires careful attention to what values and meanings we adopt.

This book engages the relationship between religion, science, and technology through their intersections in contemporary south India. Time and again, the astute observer sees India referenced with regard to outsourcing, information technology, software engineering, space exploration, climate change, economic liberalization, and nationalism. At the same time, Indian religious traditions remain vital and visible, at the core of national politics and pop culture, making the question of religious modernity a pertinent one. And yet studies of how religion, science, and technology intertwine in India have been startlingly bereft of careful and precise observation.

With some exceptions, the existing essays and books on religion and science in India tend toward bland generalizations about Hinduism as a religion that accommodates modern scientific theories or submit to the orientalist logic that says Indians are spiritual and Westerners are scientific. Neither approach is helpful or illustrative of the myriad ways in which Indian scientists, engineers, and everyday citizens think their way through the complexities of religious and scientific life. Nor do they advance our hope of building a more complete understanding of what religion, science, and technology mean for the human beings who utilize them. Connections between religion and science are hardly unique to India: Euro-American scientists, for example, view the world in ways that have roots in the Western religious traditions,

especially Christianity.[19] So this book rejects the orientalist logic that insists Indians are mystics while Westerners are materialists. Disenchantment never happened: we are all mystic materialists—sometimes one largely to the exclusion of the other, sometimes both simultaneously. To maintain this global context, I occasionally refer to religious approaches to science and technology that occur in the West; but rather than dwell on Western culture (which I've done elsewhere), I focus on the specific ways in which modern Indians have mixed religion, science, and technology to make the world more meaningful and often to preserve—even while modifying—traditional religions.

As a holder of long-standing spiritual traditions and now a leader in the information technology revolution, India is "a fertile ground for . . . an enquiry" into the convergence of religion and science, and it has "a special responsibility toward the future of such a dialogue."[20] This book is one contribution to the needed engagement between Eastern and Western cultures with regard to the interaction of religion and science. While the distinction between East and West is fuzzy, both surely offer separate resources for understanding one another and the world at large. At a bare minimum, I have sought to leverage social theory from India as well as the West, providing as much parity as possible.

This book is not a comprehensive account of all the possible ways in which religion, science, and technology interact in modern India, nor an account of every figure relevant to such study. There are late nineteenth and early twentieth-century scientists such as J.C. Bose, who made clear reference to religion in their work, and religious reformers, such as the members of the Brahmo Samaj, who were interested in scientific education. While the book engages colonial history, I do not inquire into what Shruti Kapila calls the "soft landing" of science into India or the precise ways in which it led to a rationalization of religious beliefs.[21] Today, some religious practitioners continue their interest in describing a scientific approach to religion in some branches of Hinduism or a scientific basis for religious practices such as *vaastu*, a religiously informed system of architectural design principles. Some of these individuals and movements will go unexplored in this volume due to limitations in time, space, and expertise. Finally, while I interviewed non-Hindu scientists as part of this research, I made no specific inquiry into Muslim or Christian engagements with science and technology in India. Comparative research among the religious communities would be highly desirable.

The chapters in this book evaluate past, present, and possible futures through: (1) the integration of religion, science, and technology into nationalist politics; (2) the persistence of Hindu traditions in contemporary science; and (3) the likely integration of a specifically Western religion of technology, that is, transhumanism, into Indian culture and the subsequent transformation

of global transhumanism. These are not the only ways in which one can see religion, science, and technology intersect in Indian culture and the descriptions that I provide cannot possibly apply to everywhere in India even for the three points of contact that occupy the book. Nevertheless, this book is a step forward in showing how religion, science, and technology intersect in the professional lives of Indian scientists and engineers.

Chapter 1 introduces the city of Bangalore, the Indian Institute of Science, and how this book contributes to postcolonial studies of religion, science, and technology. At present, few scholars in the study of science and religion meaningfully engage colonial or postcolonial political contexts. Historians have added significantly to our understanding of colonial science and subaltern theorists have thought with care about the history of oppressed and marginalized communities; but my own field of religion and science has not yet quite integrated these, nor has it properly adopted ethnographic methods to appreciate how religion, science, and technology are experienced in daily life.

Chapter 2 investigates how religion, science, and technology intertwined in India's recent political past. Specifically, it investigates how nationalist politics depended upon the mixture of religion, science, and technology. To set this up, chapter 2 reviews the pre-independence history of science and technology. It then describes two streams in the nationalist mixture of religion, science, and technology. On the one hand, counter-colonial independence movements turned to ancient mythology and equated magic with contemporary technology. For example, the Hindu reformer Dayanada Saraswati believed that firearms, steamships, and other technologies were available in ancient India. His faith in such Vedic technology was aimed at resuscitating Indian self-confidence and resisting colonial power. On the other hand, India's two most famous nationalist leaders—Mohandas K. Gandhi and Jawaharlal Nehru—projected a religious aura on technology and believed it would be essential to establishing an independent India. Gandhi and Nehru differed on the scope of such technologies, with the former advocating small-scale, independent technologies such as the handloom and the latter proposing a massive commitment to industrialization and cutting-edge scientific research. Despite these differences, however, both represented the effort to sanctify technology in service to the nation.

Chapter 3 shifts to the present inheritance of the trends described in chapter 2. Specifically with regard to Nehru, a spiritual vision of science as service to the nation persists among contemporary scientists and engineers. Many describe their work in terms of public need and aspire to make their research relevant to the problems of their fellow citizens. Simultaneously, many in contemporary India continue the attempt to reclaim science and technology from the West by reading it into ancient Indian myths. Nonscientists are

the most common advocates of this perspective, but there are scientists and engineers who describe Vedic technology as possible or even likely.

Having addressed the past in chapter 2 and its relevance to the present in chapter 3, I then reveal religious ideas, symbols, and practices that operate within contemporary Indian science and engineering communities. For example, there are divine icons of Ganesha and Saraswati in universities and members of academic and industrial communities almost universally celebrate *Ayudha Puja*. While icons are easily ignored by the uninterested, festivals and other *pujas* command attention—they take place in public spaces using everyone's time and with an expectation of respect, at the least, and often engaged participation. Chapter 4 explores how religious culture remains relevant to scientific culture and reflects back on the ways that this is true outside of India as well.

One of the chief ways in which religion remains pertinent to contemporary science and visions of the future, especially in the United States, is the transhumanist religion of technology that I discuss in chapter 5. Transhumanism now permeates Western culture, including scientific communities, and it has begun making inroads into Indian scientific and engineering life, especially through increased relevance in pop culture. Transhumanism is a religious or quasi-religious belief that humanity will use technology to evolve into a superior, perhaps even immortal, species. Thus far, transhumanism remains largely—though not exclusively—the domain of white males (it may even reflect a form of white crisis);[22] but the flow of transhumanist thought to India will necessarily change this. Chapter 5 discusses such technological visions and then explores their relevance in India, including both limitations on their potential for growth and the ways in which they might nevertheless integrate into Indian engagement with science and technology.

The book concludes by reflecting on how the relationships of religion, science, and technology in India help us understand the role of science and technology in contemporary life. In order to produce a richer, more nuanced understanding of religion, science, and technology, the conclusion focuses on how the field must grow to accommodate new cultural contexts. It first describes differences between United States and Indian conceptions of secularism, revealing that scientists and engineers in India see religious belief and practice (including in the lab or office) as legitimate elements of secular life. This indicates new territory for the study of religion and science. The study of religion and science suffers greatly from the lack of ethnographic data and suggests that attention paid to people's lives will provide rich rewards in how we conceptualize religion, science, and technology in India and elsewhere. Methodologically, we must push back against the allure of texts, beliefs, and

theories. Our study must include real people and the things they do, not just the beliefs we believe them to hold.

In twenty-first-century India, religious visions inform how people see technology. Drawing on ancient mythology and contemporary practice, this is what Alexander Ornella calls a "technological imaginary" at play.[23] A technological imaginary is a network of technological objects, a search for the sublime, a focus on narratives and aesthetics, and more.[24] It shapes the adoption and institutionalization of technology because it constrains how technological innovations appear and provides ways of integrating new technologies into a preexisting worldview. In the case of Bangalore, cultural storytelling, historical and political processes, everyday practice, and the infusion of Western technological imaginaries link the techno-scientific world of the academy and industry to religious and mythical worlds.

Overall, this book shows that when scientists and engineers tell us about their work, they also explore the significance of religion, science, and technology in India's past, present, and future. To understand how religion, science, and technology intersect in modern India is not a matter of adjudicating scientific worldviews and religious scriptures; it requires that we see how people employ religion, science, and technology in politics, in laboratory and office practices, and in their expectations for how technology will change us in the future.

NOTES

1. Recently, my solo and collaborative work seeks to reverse this change. See Renny Thomas and Robert M. Geraci, "Religious Rites and Scientific Communities: *Ayudha Puja* as 'Culture' at the Indian Institute of Science," *Zygon: Journal of Religion and Science* 53 (2018), and Geraci, "Religious Ritual in a Scientific Space: Festival Participation and the Integration of Outsiders," forthcoming.

2. For a summary of the debate over the term Hinduism, see Michael J. Altman, *Heathen, Hindoo, Hindu: American Representations of India, 1721–1893* (New York: Oxford University Press, 2017), xv–xix.

3. Wendy Doniger, *On Hinduism* (New York: Oxford University Press, 2014), 9.

4. For examples, see Talal Asad, *Genealogies of Religion: Discipline and Reasons of Power in Christianity and Islam* (Baltimore: John Hopkins University Press, 1993), 29; Russel McCutcheon, *Critics Not Caretakers: Redescribing the Public Study of Religion* (Albany: State University of New York Press, 2001), 10; S.N. Balanghadara, *"The Heathen in His Blindness": Asia, the West, and the Dynamic of Religion* (Leiden: Brill, 1994); E. Valentine Daniel, "The Arrogation of Being: Revisiting the Anthropology of Religion," *Macalester International* 8 (2000): 171–191; Steven Feierman and John M. Janzen, "African Religions," in *Science and Religion around the World*, eds. John Hedley Brooke and Ronald Numbers, 229–251 (New York:

Oxford University Press, 2011); Bruno Latour, "'Thou Shall Not Freeze-Frame' or How Not to Misunderstand the Science and Religion Debate," in *Science, Religion and the Human Experience*, ed. James D. Proctor, 27–48 (New York: Oxford University Press). For opposing perspectives, see James W. Laine, "Mind and Mood in the Study of Religion," *Religion* 40 (2010): 239–249; and, in line with Doniger's understanding of Hinduism (previous nt), see Rajeev Bhargava, "An Ancient Indian Secular Age?" in *Beyond the Secular West*, ed. Akeel Bilgrami, 188–214 (New York: Columbia University Press, 2016), 189–190.

5. David Chidester, "Moralizing Noise," *Harvard Divinity Bulletin* 32 (2004): 17.

6. Klaus K. Klostermaier, *A Survey of Hinduism*, rev. ed. (Albany: SUNY Press, [1989] 2007), 7.

7. Michael B. Berkman and Eric Plutzer, "Defeating Creationism in the Courtroom, But Not in the Classroom," *Science* 331 (2011): 404.

8. Sudipta Kaviraj, "Disenchantment Deferred," in *Beyond the Secular West*, ed. Akeel Bilgrami, 135–187 (New York: Columbia University Press, 2016), 177.

9. Neil Gaiman, *American Gods* (New York: William Morrow, 2001).

10. Kati Curts, "Temples and Turnpikes in 'The World of Tomorrow': Religious Assemblage and Automobility at the 1939 New York World's Fair," *Journal of the American Academy of Religion* 83 (2015): 735.

11. Jason Ā. Josephson-Storm, *The Myth of Disenchantment: Magic, Modernity, and the Birth of the Human Sciences* (Chicago: University of Chicago Press, 2017), 125–152.

12. Josephson-Storm, *The Myth of Disenchantment*, passim.

13. Max Weber, "Science as a Vocation," *From Max Weber: Essays in Sociology*, eds. H.H. Gerth and C. Wright Mills, 129–156 (New York: Oxford, 1958), 39.

14. Ibid., 144.

15. Josephson-Storm, *The Myth of Disenchantment*, 269–301.

16. Ibid., *passim*.

17. Robert M Geraci, *Apocalyptic AI: Visions of Heaven in Robotics, Artificial Intelligence, and Virtual Reality* (New York: Oxford University Press, 2010); *Virtually Sacred: Myth and Meaning in World of Warcraft and Second Life* (New York: Oxford University Press, 2014).

18. Classic examples of scholarship in this area include David E. Nye, *American Technological Sublime* (Cambridge, MA: MIT Press, 1994); David F. Noble, *The Religion of Technology: The Divinity of Man and the Spirit of Invention* (New York: Penguin, 1999).

19. For examples, see Ronald Numbers and David Lindberg (eds.), *God and Nature: Historical Essays on the Encounter between Christianity and Science* (Los Angeles: University of California Press, 1986); David Noble, *Religions of Technology* (New York: Penguin, 1997); David Nye, *America as Second Creation: Technology and Narratives of a New Beginning* (Cambridge, MA: MIT University Press, 2003).

20. Makarand Paranjape, "Science, Spirituality and Modernity in India," in *Science, Spirituality and the Modernization of India*, ed. Makarand Paranjape, 3–14 (New Delhi: Anthem, 2008), 13. Unfortunately, opportunities are often lost: for

example, K.S. Arul Selvan notes that participants discuss the relationship between religion and science in Hindu forums online, but tells us nothing of their content, "From Newsgroups to #Hashtags: Mapping Patterns of Online Hindu Religious Practices," *Digital Hinduism: Dharma and Discourse in the Age of New Media*, ed. Murali Balaji (Lanham, MD: Lexington, 2018), 50.

21. Shruti Kapila, "The Enchantment of Science in India," *Isis* 101 (2010): 130.

22. Syed Mustafa Ali, "'White Crisis' and/as 'Existential Risk', or The Entangled Apocalypticism of Apocalyptic AI," presented at the "AI and Apocalypse" conference, Centre for the Critical Study of Apocalyptic and Millenarian Movements, April 5, 2018.

23. See Alexander Ornella, "Towards a 'Circuit of Technological Imaginaries': A Theoretical Approach," in *Religion in Cultural Imaginary: Explorations in Visual and Material Practices*, ed. Daria Pezzoli-Olgiati, 303–332 (Baden-Baden: Nomos, 2015).

24. Ibid., 322.

Navigating Science and
Technology in Bangalore

UPON ARRIVAL

Living in Bangalore to study religion, science, and technology means wrestling with the colonial history of India and requires ethnographic methods that recognize the impact of foreign domination on the development of science and culture. Unfortunately, there is no question that anthropological and sociological fieldwork benefits from an inequality in power structures; but despite such recognizable problems, scholars must find ways to generate new and more accurate understandings of culture. To set up my inquiry into religion, science, and technology in contemporary India, this chapter describes Bangalore and my own fieldwork at the Indian Institute of Science, and then provides a justification for how ethnography might be honestly conducted despite fundamental inequalities in the distribution of power and knowledge worldwide.

BANGALORE AND THE INDIAN
INSTITUTE OF SCIENCE

Bangalore is a remarkable place to study the intersection of religion, science, and technology because it is central to India's rich contemporary boom in techno-scientific industries. There is broad interest in nanotechnology, robotics, artificial intelligence, and biotech in India and Bangalore, but the city is best known as the information technology (IT) capital of India and as a giant in software production. The Indian Institute of Science (IISc), known around town as the Tata Institute, or just Tata, was the point of origin for many of India's high technology efforts in the twentieth century, from producing

scientists who would go on to lead other institutions to providing fertile ground for Bangalore's industrial growth.

Bangalore is a growing metropolis. While it might once have been a sleepy town and a retirement paradise,[1] Bangalore is now a bustling city of ten million or more inhabitants, host to people from every state in India and most nations of the world. The influx of new residents has brought both new wealth and new problems to the city, and its growing pains are often evident.[2] Few of Bangalore's problems are unique to it, but rather reflect the general difficulties that developing nations have in balancing growth with municipal responsibilities. The historical conflict between the British cantonment zone and Bangalore city, only incompletely integrated in the 1950s and after, produces additional difficulties.[3] And of course Bangalore's wealth—much of it now revolving around the IT industry—reflects the emergent market possibilities that global capitalism enables even as it leaves many residents behind while wreaking havoc upon their traditional modes of sustenance.

The city was known as the Garden City of India for its lush vegetation and beautiful climate,[4] but now it is also known as the Science City. While cities like Delhi, Mumbai, and Kolkata had earlier entrances into digital technologies,[5] Bangalore overtook them and its Science City moniker emerged out of industrial work that centers upon IISc. That work did not begin with the arrival of Texas Instruments in the 1980s or the subsequent IT boom. Rather, it began with a conscious effort to industrialize many decades prior. The growth of the sandalwood soap industry, for example, preceded the twenty-first-century IT boom by seventy or so years. Thus, it is not the case that Bangalore became the Science City when Texas Instruments came to town, but rather that Texas Instruments arrived precisely because Bangalore already possessed a nascent double-identity. It was a place renowned for its climate and geography, but also for its technical acumen. Now the city's reputation is so strong that many nonresident Indians return to it from life abroad, drawn by the promise of exciting work and a good lifestyle.[6]

At the same time, the religious life of Bangalore is written into its geography and its social practices. Recognizing their traditions of forestry and gardening, for example, the communities that settled in Bangalore centuries ago reenact their history and their unique relationships with the land and with their gods in annual festivals.[7] The politics of Bangalore's religious landscape even become part of land-use struggles between the state and marginalized people—who often build temples for the specific purpose of resisting metropolitan growth.[8] Naturally, just as there are traditions specific to the city itself, Bangalore also participates in traditions and stories that are common across India. Just outside the campus gate nearest my apartment stands a gorgeously sculpted arch. Stretching over a nearby side street, the arch featured Krishna and other pan-Indic gods (Figure 1.1). Similar to Christian crosses dotting

Figure 1.1   Sculpted Arch on New BEL Road in Bangalore. Photograph courtesy of the author.

U.S. highways—though more common—divine icons and religious art adorn the streets, cabs, auto-rickshaws, restaurants, and many other establishments of Bangalore, reminding patrons of the religious traditions that prevail, literally, across the landscape.

Geographically, the Garden City is in the southern state of Karnataka. It is moderately central between the eastern and Western coasts of the subcontinent, sitting on the Deccan Plain about 3,000 feet above sea level. Though the city was renamed Bengaluru early in the twenty-first century (from the

local language, Kannada), no resident that I met had given up using the "old" name of Bangalore, and one publicly mocked the new name in a presentation on campus. In *Askew: A Short Biography of Bangalore*, T.J.S. George argues that in English the name should always be Bangalore.[9] This marks, perhaps, something of a difference between Bangalore and a few other Indian cities, such as Chennai (once Madras), that have more prominently adopted postcolonial names.

Bangalore's uniqueness means it may not be possible to generalize from it to all of India. So one should bear in mind the warning given by the doyen of Indian social anthropology, M.N. Srinivas, who notes that every anthropologist risks seeing his or her "particular society as Society in general."[10] The cosmopolitan nature of Bangalore and IISc do limit what conclusions may be drawn from my studies there. After all, scientists in other cities— either more religiously conservative or less—might respond differently to religious practices in the lab or the claim that science is social service. They might have different perspectives on technological transcendence. I do believe that this book permits some generalizations regarding the intersection of religion, science, and technology, but the value of ethnography lies principally in its attention to local community. Just as my experience of India is grounded principally in Bangalore and IISc, others' experiences could vary significantly. In keeping with this, fieldwork conducted elsewhere—from Kharagpur to Mumbai—might reveal key differences between those communities and Bangalore.

The Indian Institute of Science was founded in Bangalore out of the hard work of many committed Indians (and, admittedly, a few committed British), but in particular thanks to the generosity and advocacy of the industrial magnate Jamsetji Nusserwanji Tata (1839–1904). Among the wealthiest Indians during colonial times, Tata was the individual who most enthusiastically contributed money to nationalist efforts in the development of science.[11] In his history of IISc, B.V. Subbarayappa describes Tata as "one pensive Parsee, a man of rare foresight . . . of great vision . . . whose philanthropic disposition and sustained efforts" led to the founding of the institute with support from the princely state of Mysore.[12] Krishnaraja Wodeyar IV (1884–1940), the Maharaja of Mysore, was at that time too young to rule. But his mother, Regent Queen Vani Vilas Sannidhana, complemented Tata's financial and political support by donating the initial land for the institute and an annual stipend, which guaranteed it would be built in Bangalore rather than closer to Bombay (now Mumbai).[13] As detailed by Subbarayappa, many Indians fought for an indigenous institute for scientific research and engaged in the political maneuvering that brought IISc into existence.[14]

British control frustrated some of the founders' dreams, as when the Viceroy of India, George Curzon, and Morris Travers, the first director, prevented

IISc from including social sciences among its disciplines.[15] This was part of a broader national trend restricting Indian education. Curzon frustrated numerous efforts to improve technical education in India and disparaged Indian intellectual efforts.[16] Indeed, the overall picture of education was disastrous for Indians during the British Raj, which spent one hundred times more per European student than it did native Indian students.[17]

The subsequent construction of the National Institute of Advanced Studies (NIAS) on the outskirts of the IISc campus in 1988 is, perhaps, some recompense for the government's failing to include social sciences and thus a fulfillment of Tata's original vision. Because it includes social scientists among its faculty, NIAS was lauded as the missing piece of IISc's academic life at IISc's centennial celebration in 2009 (though it is a separate institution with its own faculty and administration).[18] Unfortunately, the absence of social science at IISc has had global consequences. Perhaps had IISc lived up to Tata's dream, we would not now be in a position where an Indian-born scholar can lament that "we look at the world the way the West looks at it. *We do not even know whether the world would look different, if we looked at it our way*."[19]

Nevertheless, IISc has had a seminal impact upon Indian scientific life and the world at large. Many of India's preeminent academic institutes either began at IISc and were spun off, such as the Jawaharlal Nehru Centre for Advanced Scientific Research, the Tata Institute for Fundamental Research, and the National Centre for Biological Sciences; or they were staffed by former IISc faculty and students, such as the early Indian Institutes of Technology. India's aerospace community, made up of Hindustan Aeronautics Limited, the Indian Space Research Organization, and other groups, also emerged out of IISc. And, of course, IISc was the point of origin for Bangalore's thriving IT community, from its first multinational affiliate, Texas Instruments, to its homegrown Wipro.[20] The institute began humbly, with only six faculty members, but has grown to more than 450 faculty members and 2,400 students; by the early twenty-first century, IISc awarded more than 500 degrees per year, of which more than 150 were PhDs, and its students and faculty were responsible for more than 1,200 journal publications per year.[21] It seems reasonable to believe that the successes established in its first century will continue or, more likely, be surpassed in the years to come.[22]

In December 2012, I joined IISc as Fulbright-Nehru Senior Researcher and as Visiting Researcher at the institute's Centre for Contemporary Studies (CCS; see Figure 1.2). The center:

> endeavors to bring to the campus some of the best practitioners of different disciplines in the human sciences, such as philosophy, sociology, economics, law, literature, poetry, art, music cinema, etc. . . . The aim of this experiment

Figure 1.2   The Entry Gate to the Centre for Contemporary Studies. Photograph courtesy of the author.

is to forge a useful and meaningful interaction between the natural sciences and human sciences with a special focus on understanding the diverse research methodologies of different disciplines and creating opportunities to rethink the foundations of our own disciplines.[23]

The center lacks a faculty of its own and is not a research center; rather it is a place for discussion across disciplines at IISc, providing opportunities for thinking about scientific practice and its connection to other human endeavors. Despite its peripheral status in Indian social science, the location of CCS at IISc made it a good home for a social science project about science and engineering in Bangalore.

Being a member of CCS meant access to the institute's facilities and faculty, and having a place of prestige through which to contact other scientists and engineers in Bangalore. In communication with others, I was always a visiting researcher at IISc and a recipient of a Fulbright-Nehru Award. While this did not entirely overcome the suspicions and reluctances of my potential interviewees (and quite possibly increased them in a few cases), it was a necessary foot in the door to make my research possible. It was impossible for me, and would have been ethically inadvisable,[24] to pretend that I and

my project were completely internal to the processes of the institute, and the faculty at IISc and elsewhere had no problem recognizing this. Because anthropologists, regardless of their own political and moral intent, are almost always suspicious to local actors,[25] and perhaps especially so when they deal with scientists,[26] my affiliation with IISc was exceedingly important in building relationships of trust in academia and outside of it.

Of course, my affiliation was always inherently tentative; I was temporary: a visitor and a foreign scholar. Even had I tried, I would have found it impossible to blend in. After all, my foreignness is literally written on my skin—it is not just that I am relatively light skinned or just that I could not speak the local language, Kannada (in fact, many people at IISc cannot).[27] In addition, my arms are covered in tattoos of cave paintings and I wear an unconventional beard and moustache. In many respects, my foreignness was problematic insofar as I did not always know the local customs; for obvious reasons, sometimes a native anthropologist has advantages over the foreign.[28] But in other ways my foreignness created (often unfair) opportunities. For example, I was rarely stopped and asked for identification when entering IISc or other academic institutions despite the general diligence with which the guards attended to their duties. Thus, I benefited from several forms of privilege: some earned (such as my academic and grant associations) and some unearned (through circumstances of birth). These privileges oscillated with the stumblings of a newcomer to Bangalore and IISc, both of them preventing me from having a firm status in the local community.

My social status mirrored my fluctuating professional status. I was not routinely (and certainly not immediately) invited to coffee or a meal at another's house; and it was more trouble than I expected to connect my children with playmates among the faculty's children. On the other hand, chance encounters around campus or at the outdoor café Prakruthi (see Figure 1.3) led to enthusiastic conversations and shared meals. Such conversations eventually led to two dear friendships and more than one interview, as when we were overheard and others joined our conversations about science and scientific education.

The ethnographic work detailed here is thus the outcome of living in Bangalore and alongside the students, faculty, and students of IISc. My relationships with laborers' children near my office and my affection for the café and restaurant staff are woven into my thoughts about Indian science and technology. My love for wildlife viewing and photographing flowers is part of my sense for Bangalore and, especially, IISc. In his magisterial contribution to the ethnographic study of ritual, Ronald Grimes points out that theory-driven explanations of ritual occur with the intention of making "research publicly accountable and scientifically respectable, but the *effect* is also to disembody research, severing it not only from the researcher but also from the research

Figure 1.3   Prakruthi Café, on the Grounds of IISc, at a Rare Moment with Empty Chairs. Photograph courtesy of the author.

narrative (which one typically hears over a beer) and the research perfor-mance."[29] This book does not come with a rich film archive as does Grimes's, but nevertheless it should be apparent that my daily experience of IISc and Bangalore informs this book and its descriptions. While I was in Bangalore to work, I came to know it—as much as I could in such a short time—as a place to live.

INTELLECTUAL RESPONSIBILITIES
IN A POSTCOLONIAL WORLD

The recent history of non-Western countries is a history of truncated develop-ment, a history of Western nations seeking to deprive colonized people of their capacity for self-determination, self-reliance, and self-rule. During the colonial era, travelers, government officials, missionaries, and military officers served as ethnographers, documenting life as they saw it, as they had been trained to see it, or as they wanted to see it. This is true in India, and thus colonial history is a complicating factor for the Western scholar. In prior centuries, ethnographic work in India served the colonial state as a means of domination. This was

not limited to India, of course: the European study of non-Europeans has been problematic across the globe. Anthropologists have gone so far as to literally countenance and rely upon the massacre of indigenous peoples, and scholars of religion have used their studies to authorize and generate colonial power.[30] With a history such as this, one might wonder how any ethical anthropology of religion could be possible; but a minimally colonialist curatorial approach is possible.

To travel across continents and to investigate a foreign culture is by definition an exercise of control. It implies that the local culture might be accessible to the analytical categories of the foreign scholar and it all too often becomes the case that local cultures and the people who constitute them are framed in ways that those people might not recognize. The anthropologist's work is thus politically fraught. Even before he or she meets the locals, a difference of power already exists. Complicating this, in recent years some Indians and Americans of Indian descent have vociferously objected to Western scholars who study India's past and present.[31]

Progress in the humanities and social sciences will, in fact, be dependent upon ending the asymmetry of interpretation that has characterized the modern era. Sanjay Subrahmanyam, in richly describing the shifting terrain of European visions of India, notes that Indian descriptions of Europe were slow to emerge,[32] indicating a long lineage of unequal academic treatment. In the present, resources must be devoted to rectifying this problem by funding research on the Western nations by scholars from outside of them. It is already the case that Indians, for example, have produced a rich body of literature about their own country;[33] but much remains to be learned from their interpretations of Western culture. Importantly, such research should be conducted according to the interests and priorities of non-Westerners themselves, lest it run the risk of replicating Western priorities and perspectives.[34] For the time being, however, ethnography is decidedly, and unfortunately, unidirectional.

The problem of ethnographic colonialism is one that exists within India as well as between India and scholars from the West. Gopal Guru has argued, for example, that there ought to be "moral pressure on the modernist to keep off some fields of knowledge that might get better intellectual treatment from others."[35] For Guru, this means that theorizing about Dalit ("untouchable") experiences in India should be left to Dalit scholars. But even if Guru is correct that only Dalit scholars should discuss Dalits or untouchability in India, we are left wondering which of "some fields" are available to outsiders. Surely Guru does not mean that no scholar may discuss matters outside his or her own personal experience. If this were so, then little scholarship would be possible. Indeed, Guru discusses the experiences of women, a move seemingly unjustified in his own theoretical context.[36] Taking this further, if Guru

means that "no fields" are available to outsiders, then there can be no studies of science except by scientists, no studies of Christianity except by Christians (of the particular sort being studied, no less), no studies of political maneuvering except by politicians. There would be no study of anything by social science except as made possible by the author's own native experience. If, however, Guru truly means "some" rather than "none," we are left wondering what aesthetic judgment allows the scholar to decide whether the study is intellectually and ethically justified. It seems unlikely that an answer could be made to such a challenge.

There is always an element of the colonial in anthropological work, but this is not to say that every anthropologist is doomed to be an imperial subjugator of indigenous people or that there are no ways for an outsider to mitigate his or her background and provide valid and valuable insights. Every anthropologist is by definition a human being, and thus capable of limited moments of transcendence: none of us are prisoners of our upbringing, even if our backgrounds produce critical structures through which we envision the world. The human species is one that always seeks to transcend the barriers of its present reality, and thus do both culture and science progress.[37] A good ethnographic account then, is one produced by partially escaping the confines of the author's intellectual and emotional upbringing to provide insights that are valuable even outside the individual's own perspective.

To begin, we must recalibrate our expectations for *why* one might take up the anthropologist's task. Travelers to other parts of the world once made a deliberate and sustained effort to control those communities through their descriptions; and the interpretations offered by visitors, military officers, dignitaries, anthropologists, and theologians presented the local communities as degenerate and in need of civilizing, at best, and divinely ordained domination or extermination, at worst.[38] In the past, such work was politically guided; but we do not have to accept that all attempts at understanding people are equally attempts at controlling them.

Amartya Sen, one of India's great diasporic thinkers and winner of the 1998 Nobel Prize in Economic Sciences, argues that previous efforts to understand India have fallen into one of three categories: exoticist, magisterial, or curatorial, a list to which C. Mackenzie Brown adds missionary approaches.[39] It is important to note at the outset that by creating such a list Sen rejects the idea that *all* attempts to understand India do fundamentally the same thing (i.e., build up a particular, Western vision of the subcontinent and its cultures in order to subdue it). For my part, I shall seek to maintain a curatorial stance, not because it is without problems of its own, but because it is the most likely to lead toward intellectual progress.

Unlike exoticist approaches, a curatorial approach does not look only for the strange (even though the "different" must have more "exhibit value"), and

unlike the magisterial approaches, it is not weighed down by the impact of the ruler's priorities (even though the magisterial connection would be hard to avoid altogether when the authors are also members of the ruling imperial elite, as they sometimes were). For these reasons, there is more freedom from preconceptions in this third category. On the other hand, the curatorial approaches have inclinations of their own, with a general interest in seeing the object—in this case, India—as very special and extraordinarily interesting.[40]

Of course, one does not circumvent the power structures built into international geopolitics simply by declaring oneself "curatorial" as opposed to "magisterial"; and so the anthropologist must strive to know and understand and illustrate. I am interested in the particular within the universal. That is, if I believe that humanity has a predilection toward technologically enchanting the world (a belief derived, at least in part, from my research into Western technological communities), then I expect such behaviors will exist throughout the world—but there is no reason to believe that they would take the same forms. And so my ethnographic approach assumes the basic universality of human life and then seeks out the differences in expression that emerge in different cultural contexts.

Any curatorial method must balance the presuppostions and worldview of the outsider against those of the locals. S.N. Balanghadara argues that discourse about the non-West only appears to be discourse about those cultures, and that instead it is simply a reflection of Western culture.[41] In this, however, he goes too far. As David G. White has noted,[42] we cannot absolve ourselves of the responsibility to investigate, nor should we consider it reasonable to assume that all scholars provide nothing more than a solipsistic revelation of their own experience. By attending to the words and actions of living people, anthropology can serve curatorial goals.

Performance theory, as articulated by Erving Goffman, provides key methodological tools for understanding people. According to Goffman, society is produced through individual performances by people who use frames of reference to understand the world. Each frame is a way of thinking and speaking and being; each frame of reference operates alongside or nested within many others, sometimes in lockstep, sometimes in divergence.[43] For example, as a scholar I speak to a variety of audiences, but the rules that govern my speaking change across them. My classroom demeanor differs from the way I speak at conferences which differs from how I speak when invited to give lectures at other colleges and universities. The expectations of my audience and the circumstances of my authority to speak change in these different domains, and thus so does my performance. The scientists and engineers I met similarly structured their behaviors according to their environments.

In Bangalore, I frequently heard that science and technology were specifically tied to work life, and even that having conversations about technology

could be difficult away from the office or laboratory. Such self-descriptions make perfect sense when we adopt performance theory. The home environment, the temple environment, the work environment: these are distinct and they call for different kinds of performances.[44] The respective audiences one can expect in each environment would be amenable to only a certain range of performances and perhaps not even capable of maintaining their roles if the performances change. Likewise, the physical space is only amenable to certain performances and many of the men and women I met in Bangalore found their homes unconducive to conversation about science or advanced technology. The environment, Goffman argues, is actually part of the team producing the performance; it helps constrain but also construct the messages performed.[45]

In the performance, a person establishes him or herself as a person. Our very identities emerge out of performances that take place in particular environments and take advantage of those environments' physical reality and the audiences that inhabit them. The means to performing an identity, Goffman claims,

> are often bolted down in social establishments. There will be a back region with its tools for shaping the body, and a front region with its fixed props. There will be a team of persons whose activity on stage in conjunction with available props will constitute the scene from which the performed character's self will emerge, and another team, the audience, whose interpretive activity will be necessary for this emergence. The self is a product of all of these arrangements, and in all of its parts bears the marks of this genesis.[46]

Goffman means that we produce ourselves as persons through highly staged performances (even when we cannot control all the staging). As a corollary to this, the individual self being performed will necessarily vary across different stages.

The shifting of performances—and the possibility that one might deliberately enjoin in contradictory ones—indicates that many beliefs may be less durable than we often expect. Some beliefs may be of the sort that attain across many or even all performances in a person's life; but others may well not be. Of course this leaves us with the problem of sorting out when a belief ought to be durable across two or more related performances. The notion of hypocrisy, for example, presumes that one's beliefs ought to pertain across environments. Thus, a scientist might be considered hypocritical if he or she performs laboratory work without regard for divine intervention but then says a prayer at home or the temple for a loved one to recover from illness—but only if we presume these performances *require* identical sets of beliefs. The purpose of the prayer, however, may go beyond the simple desire to see

miraculous intervention (often prayers are well-suited to meet the emotional needs of the supplicant even if unlikely to affect the course of events), and engaging in prayer might well make sense. In many cases, it might make little sense to ask whether the supplicant believes that the prayer will be efficacious or that there is some transcendent figure prepared to hear the prayer. Rather, we might say that the supplicant believes the prayer to be the right thing to do in the circumstances—particularly when that is precisely what people tell us, as they have regarding science and religion in India. Simply because one person expects that the prayer and the experiment are sufficiently related that beliefs about miraculous intervention should be durable across them does not mean that the performer does or even that the performer shares the observer's interpretation of what he or she believes.

It would be a mistake, however, to perceive work and home performances as disconnected. Ethnographic research into the home lives of scientists indicates that the religiosity of family performances bears upon their professional lives. To explore this, Anjali Roy worked with scientists' families and argues that "a description of the women's activities can provide us a peep into the mindsets of their spouses for the scientists' personal beliefs/practices cannot be altogether isolated from their role as heads of practicing households."[47] Noting that many women attend religious storytelling and textual readings on the campus of IIT-Kharagpur "with the tacit, if not the active consent, of their partners," she argues that scientists engage in religion by proxy, and that such practices are often in variance with the expressed positions of those scientists.[48] As such, the "compartmentalization" of religion and science may be executed not only through discourse but through vicarious participation and cultural expectations.

There are religious, scientific, and technological frames of reference that permit different kinds of performances; in Bangalore, religious frames of reference coexist (generally peaceably) alongside scientific frames, and they are not easily forced into Western assumptions about conflict, cooperation, and independence between religious ideas and nonreligious ones.[49] Instead, practitioners describe themselves as putting one set of assumptions (e.g., scientific ones) to the side while they engage in other kinds of activities. Some scientists and engineers are very comfortable seeing religion and science as separate domains while others find them to overlap. Some disparage the presence of religious performances in scientific institutions, but most—regardless of how they feel about the religious practice itself—are content to leave well enough alone. Seeking a curatorial rather than exoticist approach means recognizing differences in practice and trying to understand their roots in the frames of reference employed by the locals.

Quite often, scientists began conversations or email exchanges with me by informing me that religion has nothing to do with science in India. They often

added that this state of affairs differs from the war between religion and science they presume to exist in my own country, the United States.[50] Potential interviewees wondered why we needed to discuss religion and science at all because they believed that religion and science coexist very well in India and generally do not interact in any way.

These protestations of complete separation between Indian religion and science were despite the obvious presence of religious icons and practice at many academic institutions in India. For example, the Indian Institute of Information Technology has Ganesha's face overlooking the entrance foyer and a beautiful statue and altar for Saraswati in the main hall. The Jawaharlal Nehru Centre for Advanced Scientific Research has icons of Ganesha sprinkled throughout the campus. While IISc lacks public icons, there are also clear "intrusions" of religious practice into its scientific world. Many IISc faculty members have icons in their offices, and the lack of public icons, guessed multiple scientists at IISc, is the result of the timing of its founding during the colonial period rather than out of any deliberate effort to excise religion from the life of the institute or its members. Indeed, while there are no public icons, there are religious festivals observed on campus every year and these draw vast participation. *Ganesh Chaturthi* (Ganesha's birthday) and *Ayudha Puja* are two prime examples for which much of the campus effectively shuts down—which it does not do for secular holidays, such as Republic Day (the celebration of India's secular constitution). I will return to such examples later in the book; for the time being it suffices to point out that while scientists often averred that religion and science have no connection to one another in India, religious images, icons, and ritual practices are substantively present in academic and industrial science.

In order to understand the operations of religion and science at IISc, it helps to think of religious activities, speech, and thoughts as part of religious frames of reference and scientific activities, speech, and thoughts as part of scientific frames of reference. These frames can and do overlap, but by parceling out framed performances, we can more easily appreciate how the intersections of religion and science are far too complex to be seen through narrow visions of harmony or conflict, and we can avoid the colonialist tendency to see certain patterns as the objectively correct ones or as the dominant ones to the exclusion and even suppression of others.

The ethnographic data in this book were taken from contact with academic, industrial, and hacker communities. As such, this book is a kind of multisite ethnography in which meanings and messages transfer from one location to another.[51] The interviews that I carried out, in whatever arena, were semi-structured and open. Always, I had a preset list of questions to ask, but I did not always ask all of those questions. As our conversations progressed, I allowed our conversations to wander across the terrain of scientific

education, research, and the practitioners' experiences. Of course, I was also interested in their reflections upon religion, science, and technology. In this regard, the interviews mark a form of knowledge production that is inherent to, and even exclusively available through, ethnographic research.[52]

I carried out these conversations in many different locations. They happened in offices adjacent to scientific laboratories, in meeting rooms isolated from the "real work" of an academic institution, in the tiny offices of Internet start-ups and the enormous complexes of multinational corporations, and in the Café Coffee Day shops where young, hip Bangaloreans enjoy their coffee. To study science and technology in India is to be always on the move, which mirrors the translation and transference of ideas from one site to another.[53]

For obvious reasons, I could not interview all of Bangalore's academics or workers in every company that has offices there. I visited major academic institutions, including IISc, the Indian Institute for Information Technology-Bangalore, the National Centre for the Biological Sciences, the Jawaharlal Nehru Centre for Advanced Scientific Research, and the National Institute for Advanced Studies. I interviewed employees of multinational companies, start-ups, nongovernmental organizations, and, to a very limited extent, private members of the defense industry.[54] Among IT companies, I spoke with workers in natural language processing, machine languages, software services for foreign companies, and robotics software. In addition, I visited Jaaga, a technology and art collective, and spoke with affiliates of Srishti School of Art, Design and Technology. While this sample of Bangalore's tech community is extensive, it is not perfect or comprehensive. Funding agencies having become loathe to support fieldwork lasting for an entire ritual cycle (usually the solar year); it is often necessary to produce ethnographic accounts in more limited forays. Nevertheless, the attention to members of such diverse fields and at many levels of the technology sector and educational community provides some reasonable hope that one might acquire a broad understanding of the technical culture in Bangalore.

The practitioners with whom I engaged are, of course, deeply enmeshed in the international scientific community. Almost every academic whom I interviewed studied in the United States or Europe, and most earned their PhDs or worked as postdoctoral students at institutions in those countries. Likewise, the culture of industry in Bangalore is deeply informed by global concerns. The multinational corporations include foreigners who work in Bangalore on short- and long-term bases, and the small start-ups employed workers who used to be in multinationals, worked with customers and collaborators in foreign countries, or both. Hackers, of course, also collaborated and communicated across continents.

Despite the variety of contacts I made, no book could possibly apply to the entirety of the Indian subcontinent and its varying communities.

In ethnography, it is important to note who is included in the study and who is not;[55] and that latter would be a long list including everyday people, politicians, religious leaders and practitioners, and more. This book discusses only scientists and engineers, and them only insofar as religion, science, and technology intersect in their professional lives. I offer very few insights into the home lives of those I met and—aside from my historical work—I do not discuss people outside of science and engineering at all. And as I noted above, this is an account of Bangalore, a city which is perhaps unique in India and the world. One cannot assume that fieldwork elsewhere in India would produce the same outcomes as research in Bangalore. So, despite its global ties, this was a local research project. Thanks to the economic and, especially, scientific circuits in which these actors operate, however, it is likely that my understanding of the technical community of Bangalore is relevant to the cities and states beyond. Bangalore is, itself, a global city. Others have noted already that Bangalore's tech workers experience their identities as simultaneously Indian and global.[56] How, precisely, the knowledge derived from my fieldwork in Bangalore can be applied to other communities in India remains a question for further research. Similarly, there are domains of religion and science that are treated only marginally or not at all in this book. The book's focus on technology as a locus for the human manufacture of meaning requires that a host of interesting elements related specifically to scientific doctrines and theological perspectives goes un-interrogated.

A final note on my fieldwork: all but one interviewee gave me explicit permission to identify him or her in my work, but I will generally keep each of them anonymous. There will be moments when I identify the actors by name; but I do so only when the quotation is both uncontroversial *and* inherently tied to the speaker him or herself. Anonymity is important because my ethical obligations to the scientists and engineers who spoke with me trump my desire for scientific accuracy and even their own willingness to speak openly. Given that we never know when an apparently harmless statement or association with some other project like this book can become problematic for the speaker, I have chosen to avoid such dangers altogether. The quotations, themselves, have been cleaned up to eliminate vocal pauses such as "ah," "uh," and "okay."

CONCLUSION

In Bangalore, twenty-first-century technology meets traditional religion. This encounter leads to culturally specific modes of technological enchantment that I found at IISc and elsewhere in the city. My own travels through

Bangalore reveal fascinating interactions among religion, science, and technology. I do not describe these with the intent of spiritualizing or orientalizing India, but rather in the hopes that we can better understand our human relationships with religion, science, and technology. As one would expect, the cultural integration of technology differs from place to place, and so a complete understanding of India is possible only when we locate religion, science, and technology on the ground. My previous research sought to do so with regard to technology in the United States; in my study of robotics and other digital technologies, I have found that many scientists and engineers work diligently to enchant the world. It stands to reason, however, that modes of enchantment vary from place to place, and we know even less about how that process operates outside of Western nations. Rather than simply apply a theoretical context derived from the history of religion and science in the West and lay it over a textual analysis of Hinduism, I traveled to Bangalore where I could speak with scientists and engineers. In the chapters to come, I offer a description of how they use and view technology, from the infusion of transhumanism to India that is the subject of chapter 5 to the fusion of technology with religion in nation-building that occupy chapters 2 and 3.

NOTES

1. See Peter Colaco, *Bangalore: A Century of Tales from City & Cantonment* (Bangalore: Via Media, 2003).

2. See, for example, Janaki Nair, *The Promise of the Metropolis: Bangalore's Twentieth Century* (New Delhi: Oxford University Press, 2005); Harini Nagendra, *Nature in the City: Bengaluru in the Past, Present, and Future* (New Delhi: Oxford University Press, 2016); T.J.S. George, *Askew: A Short Biography of Bangalore* (New Delhi: Aleph Book Company, 2016).

3. See Nair, *The Promise of the Metropolis*, 23–76.

4. In *Nature in the City*, Nagendra documents Bangalore's historical and present relationships to its gardens, parks, green spaces, and lakes.

5. For a strong introduction to the history of computing in India, see Dinesh C. Sharma, *The Outsourcer: The Story of India's IT Revolution* (Cambridge, MA: The MIT Press, 2015).

6. Elizabeth Chacko, "From Brain Drain to Brain Gain: Reverse Migration to Bangalore and Hyderabad, India's Globalizing High Tech Cities," *GeoJournal* 68 (2007): 131–140.

7. See Smriti Srinivas, *Landscapes of Urban Memory: The Sacred and the Civic in India's High-Tech City* (Minneapolis: University of Minnesota Press, 2001).

8. Nair, *The Promise of the Metropolis*, 152–158.

9. George, *Askew*, kindle location 36–40.

10. M.N. Srinivas, "Social Anthropology and Sociology," *The Oxford India Srinivas* (New Delhi: Oxford, 2009), 461.

11. Pratik Chakrabarti, "Science, Morality, and Nationalism: The Multifaceted Project of Mahendra Lal Sircar," *Studies in History* 17(2001): 261. The essay was published under the variant spelling Chakraborty.

12. B.V. Subbaryappa, *In Pursuit of Excellence: A History of the Indian Institute of Science* (New Delhi: Tata McGraw-Hill, 1992), 8.

13. See Karthik Ramaswamy, "How IISc Found a Home in Bangalore," *Connect* (Mar 1, 2018), http://connect.iisc.ac.in/2018/03/how-iisc-found-a-home-in-bangalore/ (accessed March 1, 2018).

14. Subbarayappa, *In Pursuit of Excellence*. For a very brief summary of IISc's history, see P. Balaram, "The Indian Institute of Science: Marking a Centenary," *Resonance* 14 (2009): 416–429. Balaram is, of course, dependent upon Subbarayappa in his account.

15. Subbarayappa, *In Pursuit of Excellence*, 32–3, 73, 85.

16. Ross Bassett, *The Technological Indian* (Cambridge, MA: Harvard University Press, 2016), 44–5, 53; Ishita Banerjee-Dube, *A History of Modern India* (Delhi: University of Cambridge Press, 2015), 226. British rhetoric generally disparaged Indians as being incapable of modernity; Maria Misra describes this latter with regard to British responses to the 1857 Rebellion in *Vishnu's Crowded Temple: India Since the Great Rebellion* (New Haven, CT: Yale University Press, [2007] 2008), 8.

17. Venu Madhav Govindu and Deepak Malghan, *The Web of Freedom: J.C. Kumarappa and Gandhi's Struggle for Economic Justice* (New Delhi: Oxford University Press, 2016), 24.

18. Indian Institute of Science, *Celebrating 100 Years of the Indian Institute of Science* (Bangalore: IISc Press, 2008), 21.

19. S.N. Balanghadara, *Reconceptualizing India Studies* (New Delhi: Oxford University Press, 2012), 69, emphasis original.

20. For a lengthier evaluation of IISc's contributions to Indian science, see Srinivasa Ranganathan, "IISc as the Fountainhead of Indian Science and Technology." *Celebrating 100 Years of the Indian Institute of Science* (Bangalore: IISc Press, 2008), 20–24.

21. Indian Institute of Science, *IISc Profile – 2009* (Bangalore: IISc Press).

22. It is worth noting that Indian scientists recognize that their colleges and universities currently lag behind their world peers and need improvement. See E.C. Subbarao, "India's Higher Engineering Education: Opportunities and Tough Choices," *Current Science* 104 (2013): 55–66.

23. Indian Institute of Science, "Centre for Contemporary Studies," *IISc Profile – 2009* (Bangalore: IISc Press), 57.

24. For an argument for how some research projects ought to be engaged through covert fieldwork, see David Calvey, "The Art and Politics of Covert Research: Doing 'Situated Ethics' in the Field," *Sociology* 42 (2008): 905–918.

25. Erving Goffman, *Frame Analysis: An Essay on the Organization of Experience* (Boston: Northeastern University Press, [1974] 1986), 122. For a concrete example, see Peter Gottschalk, *Religion, Science, and Empire: Classifying Hinduism and Islam in British India* (New York: Oxford University Press, 2013), 326–327.

26. See Bruno Latour and Steve Woolgar, *Laboratory Life: The Construction of Scientific Facts* (Princeton, NJ: Princeton University Press, [1979] 1986), 19.

27. Nair points out that the cosmopolitanism of Bangalore (not just IISc) is a crucial problem for those who wish to make *Kannada* the primary language in Bangalore. See *The Promise of the Metropolis*, 234–270, 278–287.

28. This has been obvious since the beginning of sociological and anthropological research in India, as exemplified by the response to work by L.K. Ananthakrishna Iyer; see Kalpana Ram, "Anthropology as 'Ananthropology': L.K. Ananthakrishna Iyer (1861–1937), Colonial Anthropology, and the 'Native Anthropologist' as Pioneer," in *Anthropology in the East: Founders of Indian Sociology and Anthropology*, eds. Patricia Uberoi, Nandini Sundar, and Satish Deshpande, 64–105 (Ranhikhet, India: Permanent Black, 2010), 79.

29. Ronald L. Grimes, *The Craft of Ritual Studies* (New York: Oxford University Press), 22.

30. For examples, see David Chidester, *Empire of Religion: Imperialism and Comparative Religion* (Chicago: University of Chicago Press, 2014), 30, 46, 62.

31. For a summary of several controversies, see Elizabeth Redden, "The Religious War against American Scholars of India," *Inside Higher Ed* (April 12, 2016), https://www.insidehighered.com/news/2016/04/12/scholars-who-study-hinduism-and-india-face-hostile-climate (accessed January 10, 2017).

32. Sanjay Subramanyam, *Europe's India: Words, People, Empires, 1500–1800* (Cambridge, MA: Harvard University Press, 2017), 312.

33. For an overview of twentieth-century Indian sociology and anthropology, see the various contributions in Patricia Uberoi, Nandini Sundar, and Satish Deshpande (eds.), *Anthropology in the East: Founders of Indian Sociology and Anthropology* (Ranikhet, India: Permanent Black, 2010).

34. On this concern, see Patricia Uberoi, Satish Deshpande, and Nandini Sundar, "Introduction: The Professionalisation of Indian Anthropology and Sociology: People, Places, and Institutions," in *Anthropology in the East: Founders of Indian Sociology and Anthropology*, eds. Patricia Uberoi, Nandini Sundar, and Satish Deshpande, 1–63 (Ranikhet, India: Permanent Black, 2010), 16–17.

35. Gopal Guru, "Egalitarianism and the Social Sciences in India," in *The Cracked Mirror: An Indian Debate on Experience and Theory*, eds. Gopal Guru and Sundar Sarukkai, 9–28 (New Delhi: Oxford University Press, 2012), 11.

36. See Gopal Guru, "Experience, Space, and Justice," in *The Cracked Mirror: An Indian Debate on Experience and Theory*, eds. Gopal Guru and Sundar Sarukkai, 82–83 (New Delhi: Oxford University Press, 2012) for one example of his theorizing about women's experiences.

37. See Karsten Harries, *Infinity and Perspective* (Cambridge, MA: MIT Press, 2002).

38. See David Chidester, *Savage Systems: Colonialism and Comparative Religion in Southern Africa* (Charlottesville: University of Virginia Press, 1996). On the history of India, in particular, and historical research as a colonizing endeavor, see Kumkum Chatterjee, "Discovering India: Travel, History and Identity in Late Nineteenth- and Early Twentieth-century India," in *Invoking the Past: The Uses of History in South Asia*, ed. Daud Ali, 192–227 (New Delhi: Oxford University Press, 1999), 195. On the political power of knowledge making in the colonial period, in general, see Edward Said, *Orientalism* (New York: Pantheon, 1978).

39. Amartya Sen, *The Argumentative Indian: Writings on Indian Culture, History and Identity* (London: Penguin, 2005), 141; C. Mackenzie Brown, *Hindu Perspectives on Evolution: Darwin, Dharma, and Design* (New York: Routledge, 2012), 72–74.

40. Sen, *The Argumentative Indian*, 142.

41. Balanghadara, *Reconceptualizing India Studies*, 41.

42. David G. White, "Digging Wells while Houses Burn? Writing Histories of Hinduism in a Time of Identity Politics," *History and Theory* 45 (2006): 116, 130–1.

43. See Erving Goffman, *The Presentation of Self in Everyday Life* (New York: Anchor, 1959).

44. For a similar example, see Thomas Renny, *Religious and Scientific Imagination: A Study of Religious Life of the Scientific Community in India.* PhD Dissertation (New Delhi: Jawaharlal Nehru University), 122. For scientists who take a contrary view, see Thomas, *Religious and Scientific Imagination*, 133–4.

45. Goffman, *The Presentation of Self*, 78.

46. Ibid., 253. On the importance of objects in mediating human communication and meaning, see also Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (New York: Oxford University Press, 2005).

47. Anjali Roy, "Faith Outside the Lab," in *Science, Spirituality and the Modernization of India*, ed. Makarand Paranjape, 231 (New Delhi: Anthem Press, 2008).

48. Roy, "Faith Outside the Lab," 231, 232.

49. For examples of the typologies usually applied to religion and science in the West, see Ian Barbour, *Religion and Science* (San Francisco: HarperOne, 1997) and Michael Stenmark, "Ways of Relating Science and Religion," *Cambridge Companion to Science and Religion*, ed. Peter Harrison, 279–95 (Cambridge: Cambridge University Press, 2010). For criticisms of this approach, especially that of Barbour, see Geoffrey Cantor and Chris Kenny, "Barbour's Fourfold Way: Problems with His Taxonomy of Science-Religion Relationships," *Zygon: Journal of Religion and Science* 36 (2001): 765–781 and Geraci, *Apocalyptic AI*, 144–145.

50. Western scholars of India often share this perspective; for example, Klostermaier, *A Survey of Hinduism* ([1997] 2007), 466.

51. See George Marcus, "Ethnography in/of the World System: The Emergence of Multi-Sited Ethnography," *Annual Review of Anthropology* 24 (1995): 95–117.

52. On ethnography and the production of knowledge in interviews, see Gilberto Rosas, *Barrio Libre: Criminalizing States and Delinquent Refusals of the New Frontier* (Durham, NC: Duke University Press, 2012), 25.

53. Quite literally, Johannes Quack had to ride around Maharashtra in the "science van" owned by the rationalist organization with whom he affiliated in India. See Quack Johannes, *Disenchanting India: Organized Rationalism and Criticism of Religion in India* (New York: Oxford University Press, 2012).

54. Alas, after an initially positive contact at the Defense Research and Development Organization, I was informed that military groups were not permitted (by law) to have communications with foreign scholars. A reasonable, though lamentable, restriction.

55. Mitchell Dunier, "How Not to Lie with Ethnography," *Sociological Methodology* 41 (2011): 2–6.

56. Smitha Radhakrishnan, "Examining the 'Global' Indian Middle Class: Gender and Culture in the Silicon Valley/Bangalore Circuit," *Everyday Life in South Asia*, eds. Diane P. Mines and Sarah Lamb, 461–471 (Bloomington: Indiana University Press, 2010), 462–463.