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Spectacles of Development

The Materiality of Success at the Barefoot College, Rajasthan

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PhD in Social Anthropology
The University of Edinburgh
2013
Declaration

I declare that, except where otherwise indicated, this thesis is entirely my own work, and that no part of it has been submitted for any other degree or professional qualification.

Stewart Allen

April 2013
Abstract

Through an ethnographic study of the ‘Barefoot College’, an internationally renowned non-governmental development organisation (NGO) situated in Rajasthan, India, this thesis investigates the methods and practices by which a development organisation materialises and manages a construction of success. In this conceptualisation, success is not an output of good development practice, but is rather a socially and materially generated construction sustained via robust interpretations, mobilised meanings, and strong networks of support. This thesis pays particular attention to the material processes by which success is achieved and the different meanings and discourses that they act to perform.

Attending to the different ways in which success is produced in development, from locally produced assemblages, to regional and global deployments of application, reminds us that knowledge forms are never fixed, but are rather contingent upon the materials, locations, and persons that conceive and comprise them. How the Barefoot College achieves its success over time and circumstance is the subject of this thesis.

Drawing upon Debord’s (1967) notion of ‘spectacle’, I argue that the College, as a prolific producer of various forms of development media, achieves its success firstly through materially mediated heterotopic spectacles: enacted and imperfect utopias that constitute the desires, imaginings and Otherness of its society; and secondly through the ignorance that these spectacles generate: constructed spaces of silence and invisibility that serve to reify this theatre of dreams. With a particular focus on its community-managed, solar photovoltaic development programme, one that trains illiterate women from countries across Africa and beyond as ‘Barefoot Solar Engineers’ (BSEs), this thesis analyses firstly how heterotopic spectacles are produced, the machinations, strategies, persons and materialities involved in development work (e.g. material props, stage sets, rehearsals, and embodied training); and secondly, what makes it successful, what kinds of ideas, visions, and discourses do these persons and materialities draw upon (and help augment) to account for its growth from small-scale, rural experiment in skills-training to celebrated, globalised development model.

The chapters that follow consider different scenarios through which success was realised at the College. They embrace diverse yet interconnected themes relating to the temporality of development success over decades of societal change; constructions, concealments, and silences of knowledge claims as they are enacted through an architectural awards controversy; the performance of notions of development, enlightenment and the formation of the state via technology and energy; a discussion of how donors and supporters are enrolled in a development programme through material acts of ‘witnessing’; an exploration and critique of technologically mediated ‘empowerment’-related agendas; and finally, an examination of how success was generated via processes of ‘replication’. 
Notice of Publication

With permission from the supervisor, parts of this thesis have been published in the Journal of Comparative Research in Anthropology and Sociology, and Anthropology Matters as the following:


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Introduction

Selling the Barefoot College

Setting the scene: the following is a transcript taken from a conference address by the director of the Barefoot College, Sanjit ‘Bunker’ Roy during the TED (Technology Entertainment and Design) Global Conference hosted in the city of Edinburgh in July, 2011. In the following address, Bunker presents to a large audience of several hundred people on a podium in front of a large screen. Although not giving justice to his delivery, the following excerpt gives some indication of his method.

"I'd like to take you to another world, and I'd like to share a forty-five year old love story with the poor living on less than one dollar a day. I went to a very elitist, snobbish, expensive education in India, and that almost destroyed me (slight laughter among audience). I was all set to be a diplomat, teacher, doctor, all laid out. I don't look it, but I was the Indian national squash champion for three years. A whole world was laid out for me, everything was on my feet, I could do nothing wrong. And then I thought out of curiosity I'd like to go and live and work, just see what a village is like. So in 1965, I went to what was called the worst Bihar famine in India and I saw starvation, death, people dying of hunger, for the first time, it changed my life. I came back home, told my mother I'd like to live and work in a village, mother went into a coma (more laughter).

Why is this? A whole world is laid out for you, the best jobs are laid out for you, and you want to go and work in a village; I mean, is there something wrong with you? I said no, I've got the best education, it made me think, and I wanted to give something back, in my own way. What do you want to do in a village? No job, no money, no security, no prospects. I said I want to live and dig wells for five years. Dig wells for five years? You went to the most expensive school and college in India and
you want to dig wells for five years? She don't speak to me for a very long time, because she thought I'd let my family down.

But then I was exposed to the most extraordinary knowledge and skills that very poor people have, which was never brought into the mainstream, which was never identified, respected or applied on a large scale, and I thought I'd start a barefoot college, a college only for the poor. What the poor thought was important would be reflected in the college. I went to this village for the first time, elders came to me ... they gave some very sound and profound advice, they said please don't bring anyone with a degree and qualifications into your college. So it's the only college in India where if you should have a PhD or a Masters you're disqualified to come (laughter). You have to be cop-out or a wash-out or a drop-out to come to our college. You have to work with your hands, you have to have a dignity of labour, you have to show that you have a skill that you can offer to the community and provide a service to the community.

So we started the Barefoot College and we redefined professionalism – who is a professional? A professional is someone who has a combination of competence, confidence and belief. A water diviner is a professional, a traditional midwife is a professional, a traditional bone-setter is a professional. These are professionals all over the world, you will find them in any inaccessible village around the world, and we thought that these people should come into mainstream and show that the knowledge and skills that they have is universal.

So the college works following the lifestyle and work style of Mahatma Gandhi. You eat on the floor, you sleep on the floor, you work on the floor, there are no contracts, no written contracts, you can stay with me for twenty years, go tomorrow and no one can get more than one hundred dollars a month. You come for the money, you don't come to the Barefoot College, you come for the work and the challenge, you come to the Barefoot College ... it is the only college where the teacher is the learner and the learner is the teacher, and it is the only college where we don't give you a certificate, you are certified by the community that you serve, you don't need a paper to hang on the wall to show that you are an engineer.
So when they said that, they said, well show us what is possible, what are you doing, this is all mumbo jumbo if you can’t show it on the ground. So we built the first Barefoot College in 1986 (A photograph of the College under construction is displayed on the screen behind Bunker). It was built by twelve barefoot architects who can’t read or write, built on one dollar fifty per square foot. One hundred and fifty people live there, work there. We got the Aga Khan award for architecture in 2002. But then they suspected, they thought there was an architect behind it, I said yes, they made the blueprints, but the barefoot architects actually constructed the college. We are the only ones who actually returned the award for fifty thousand dollars because they didn’t believe us and we thought they were actually casting aspersions on the barefoot architects of Tilonia.

It’s the only College which is fully solar electrified. All the power comes from the sun. Forty-five kilowatts of panels on the roof and everything works off the sun for the next twenty-five years, so long as the sun shines, I have no problem with power. But the beauty is, that it was installed by a priest, a Hindu priest, who has only done eight years of primary schooling, never been to school, never been to college. He knows more about solar than anyone I know, anywhere in the world, guaranteed.”

[Bunker proceeds to highlight many of the programmes and achievements of the College, including the training of illiterate grandmothers as ‘barefoot solar engineers’ and ‘barefoot dentists’. At one point, he brings out a puppet to demonstrate to the audience how social messages are delivered the traditional way, constructed, he adds (to laughter and cheering), from recycled World Bank reports. His speech ends with a standing ovation from the audience].

I chose the above speech excerpt to introduce this thesis because it highlights not only the approach and concerns of the Barefoot College – the subject of this thesis – but also because it underlines the often overlooked importance of narrative construction, spectacle and mobilization to modern-day development organisations. Indeed, Bunker’s rich and arresting speech may serve as an allegory for the themes of this thesis.

Bunker, as the reader can tell even from this decontextualized piece, is a master at capturing the imagination of his audience. In the above, he begins with a recognisable ethnographic trope – by parting his audience from the world he has arrived from – by laying emphasis on how dissimilar his audience is from the world in which he lives and works. He stresses his own elitist background and educational achievements before rejecting them and emphasising how much he has sacrificed and renounced to be where he is today. He at once identifies himself with much of his audience while seemingly rejecting them and emphasising his kinship with the poor.

Renunciation and self-sacrifice, as the above clip demonstrates, form a pervasive place in Bunker's conference and media addresses. Stress is laid on the gilded life he was born into and the treasures that awaited him as a diplomat or doctor. He threw all of these opportunities away, however, to live and work among the rural poor in the village and to build them a place of learning that rejected the worldly letters of educated men and women. Through such purported sacrifices, Bunker puts forth a certain ideal of authenticity to his audience, as an individual who is at one with the everyday rural realities of the people whom he serves. Aware of his predominantly Western audience, he uses this 'halo' of legitimacy to draw upon familiar images of the orientalist Other – the water diviner, the traditional bone-setter – to re-cast them as modern-day professionals and in effect challenge the social hierarchies prevalent in rural India.

Bunker proceeds to highlight the ingenuity of the poor and the lack of recognition that their own skills and knowledge have been accorded before denying a place for higher education in his organisation. This is highlighted when he later challenges the validity of formal education and training with an account of how the College campus was solar electrified by an uneducated Hindu priest who "knows more about solar than anyone I know, anywhere in the world, guaranteed." Via a redefinition of what constitutes a 'professional', Bunker calls attention to his organisation's affinity to a Gandhian existence of austerity. He then demonstrates how this approach to development plays out in practice through a tangible example of the construction of the College campus buildings. His recounting of the tale, however, also alerts us to the fact that all is not as it seems, with an opposing version of events that attempted to challenge his own
translation of the resourcefulness of twelve 'barefoot architects'. This seemingly innocuous incongruity, a mere footnote in an all-encompassing 'barefoot' success story provides us with a fissure of opportunity to consider how success is generated and sustained in development narratives.

Bunker’s address can also be read as alluding to India’s own modern day narrative. In his espousal of a Gandhian way of living, one that rejects certification, professionalism and wealth accumulation, and instead promotes a life of local knowledge production, simple living and rural harmony, Bunker’s address serves as an implicit critique of modernity. It also reflects, to some degree, the choices faced by a post-Independence India and the discourses that continue to shape it. On the one hand, Gandhi, trenchant critic of modernity and advocate of decentralised politics, rural living and indigenous industry; on the other Nehru, architect of statist modernization and advocate of industrial expansion and centralised planning (Prakash 1999: 224). Through the mobilization of historically and culturally embedded concepts and discourses, narratives can thus act to persuade, to enrol and to shape the perception of certain events and circumstances by different audiences.

In modern day accounts of India, it is easy to retreat into generalizations and simplistic narratives. However, narratives hold power over the imagination, helping to conceal the cracks and splits in everyday realities and providing the necessary force and authority to impose alternative accounts of being. As Downing (2011: 1) notes, a successfully deployed narrative can help resolve ambiguities and uncertainties, enrolling supporters through persuasion and storytelling. Carrithers (2009) similarly draws upon rhetoric as the means by which desired understandings and policy orientations are achieved for different ends through “a deflection of minds, hearts and events” (2009: 3). However, as Bunker’s opening address demonstrates, narratives are not just limited to words and text, but also encompass spectacles of objects, people, buildings, and materials. In their reconstitution as spectacles of development, ideals of progress, modernity and social

2 Translation is a term coined by Michel Callon (1986) in his study of the attempt by marine biologists to restock the St. Brieuc Bay for the scallop industry. In short, it involves a set of negotiations during which certain primary actors act to construct and define a situation or problem; impose and lock down the roles of other actors in the network; and then establish themselves as spokespersons for the collective effort of other actors.
transformation are mobilised and made robust, which in their dynamism, helps resolve ambiguities and doubt, enrolling supporters and concealing the cracks and fissures in official accounts.

Through an ethnographic study of the ‘Barefoot College’, an internationally renowned non-governmental development organisation (NGO) situated in Rajasthan, India, this thesis investigate the methods and practices by which a development organisation materialises and manages a construction of success. In this conceptualisation, success is not an output of good development practice, but is rather a socially and materially generated construction sustained via robust interpretations, mobilised meanings, and strong networks of support. This thesis pays particular attention to the material processes by which success is achieved and the different meanings and discourses that they act to perform. Attending to the different ways in which success is produced in development, from locally produced assemblages to regional and global deployments of application, remind us that knowledge forms are never fixed, but are rather contingent upon the materials, locations, and persons that conceive and comprise them. How the Barefoot College achieves its success over time and circumstance is the subject of this thesis.

Drawing upon Debord’s (1967) notion of ‘spectacle’, I argue that the College, as a prolific producer of various forms of development media, achieves its success firstly through materially mediated heterotopic spectacles: enacted and imperfect utopias that constitute the desires, imaginings and Otherness of its society; and secondly through the ignorance that these spectacles generate: constructed spaces of silence and invisibility that serve to reify this theatre of dreams. With a particular focus on its community-managed, solar photovoltaic development programme, one that trains illiterate women from countries across Africa and beyond as ‘Barefoot Solar Engineers’ (BSEs), this thesis analyses firstly how heterotopic spectacles are produced, the machinations, strategies, persons and materialities involved in development work (e.g. material props, stage sets, rehearsals, and embodied training); and secondly, what makes it successful, what kinds of ideas, visions, and discourses do these persons and materialities draw upon (and help augment) to account for its growth from small-scale, rural experiment in skills-training
to celebrated, globalised development model. Each chapter in this thesis thus explores the different materialities and modalities through which spectacles are produced and sustained.

Spectacle as mobilising metaphor suggests elements of design and stagecraft enacted through combinations of theatre and speech, props and performance to a diversity of audiences. In critical terms, however, spectacle is also a manifestation of advanced capitalism in which critical thought is impeded and social relations are supplanted by images and representations. Through the use and expansion of Debord's (1967) concept of spectacle to one that takes account not only of images, but of mediums and materialities, this thesis attempts to move away from an overly discursive view of development work, one rooted in words and texts, to one that takes account of the materiality of development, and the ways in which ideals and imaginings are translated through the spectacle of objects and people, technologies and skilled practices.

Spectacles however, by their very nature, also imply acts of concealment and silence, which act to generate spaces of ignorance. Their explanatory power to simplify, illustrate, justify, and to give meaning to various publics is done through exercises in the fragmentation of knowledge which acts to secrete and silence conflicting and often rival accounts of being. In the performance and projection of spectacle, a process in which certain knowledge spaces are framed and edged, other often rival accounts are ignored and muted in the process of amplification. Thus, this thesis also considers the silences of development work, how spectacle often induces, indeed depends upon, the silencing of different narratives and constructions. Just as spectacle relies upon visually striking and extravagant displays to hold the gaze of the viewer and conceal its backstage workings, so too must development work obscure its underpinnings to produce a convincing performance of developmental change. By conceiving of silence and ignorance as productive acts, as opposed to an absence of knowledge, this thesis argues that an anthropology of development may benefit from an assessment of how spaces of ignorance are shaped and wrought.

A consideration of the Barefoot College as a purveyor of development spectacles that acts to disseminate certain ideals to enrol support allows an understanding of how it
manages and sustains success. However, the question remains of what sorts of hopes and dreams are being mobilised at the College, or indeed why they achieve significance and resonance for different audiences both nationally and globally. To help resolve such questions, I draw upon Foucault’s (1967 [1986]) notion of the “heterotopia” and suggest that the College, as a heterotopic space acts in a mirror-like fashion, at once a reflector and generator of dreams, imaginings and social anxieties.

Foucault (1986) defines the heterotopia as a space of Otherness, of alternate social ordering, an enacted space of utopian ideals, which is constituted in relation to other sites of difference. Taking inspiration from Venkatesan’s (2009; 2009a; 2010) study of traditional Indian craft in which she employs Foucault’s notion of the heterotopia to focus on the transformation of people and things as “valued objects of attention” (2009: 78), I suggest the Barefoot College shares many of these same attributes. As a site that draws in marginalised persons, alternative technologies and things, visionary ideals and practices, the College re-constitutes these actors within shifting development ideologies and nation-building practices of progress and modernity. An analysis of a development institution as a heterotopia allows an understanding of how certain utopian ideals are performed through materials, persons and practices and subsequently how they are juxtaposed to the various challenges that they seek to confront and address (Venkatesan 2009: 79). Thus, in the bringing together of spectacle and heterotopia, this thesis, seeks to describe the material processes by which heterotopic ideals are mobilised through the spectacle of development work and the success that is generated as a result (See chapter one for a fuller discussion of spectacle, ignorance, and heterotopias).

Accordingly, this thesis situates itself broadly within the anthropology of knowledge, and the material mechanisms and constraints through which knowledge is produced in the context of development. Conversely, this thesis also accounts for the flip-side of an anthropology of knowledge, that is the ways and means by which ignorance is produced through silencing and concealment within development (Hobart 1993). Attending to what objects, and material practices ‘do’ in certain contexts, how they enable or inhibit what can be known, allows us to account for the ways in which assemblages of persons and things interact to produce new spaces of power and control.
In most cases, the methods and outcomes of development initiatives are confined to the specific audiences of the development community, enrolling donors and augmenting support. In the case of the Barefoot College however, the diversity and appeal of its spectacle extends not only to funding bodies and development institutions, but to a broader national and international consciousness.

Thus, in attempting to account for the 'why' as well as the 'how', this thesis positions itself within 'post-development' approaches (e.g. Mosse 2005; Mosse & Lewis 2006; Yarrow 2011) to development work. As Mosse (2005) notes, in recent decades, post-development theory has broadly fallen either side of two main approaches. Firstly, an instrumental view, whereby development efforts are narrowed to the means and ends of rational policy planning that serve to satisfy targets and goals; secondly, a critical view that regards development policy and practice as concealing hidden discourses and powers that seek to construct and suppress developing nations for the purposes of Western hegemony (2005:2). Both approaches, however, function to dissolve their objects of study either by 'black-boxing' the development process through a simplified input/output view or by replacing the contingencies of development work with diffuse patterns of power and control.

To moderate such approaches, in my exposition of how the Barefoot College functions, this thesis seeks to reinscribe development policy and practice with the materialities that act to shape and move it. Development work is comprised of an array of objects, practices, relations, concepts, and people. Attending to these agential becomings, and the ways in which they act to create the worlds under study, enables us to explore how certain spaces, visions and ideals are generated through the material enactment of practice. Thus, this thesis also draws upon the work of Science and Technology Studies (STS) and actor-network theory (ANT). With their empirical studies of large-scale technical systems (e.g. Hughes 1983; Latour & Woolgar 1986) and the crossing of multiple ontological borders, such studies allow a consideration of how development

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3 The term 'black-box' originated in science and engineering and was used to refer to a device or system that was rendered opaque by reducing it to its input and output mechanisms, thereby simplifying its complex inner workings.
"works" and the dense assemblages of objects, artefacts, people and concepts that coalesce and produce the spaces by which we order our lives.

As Bebbington et al (2004) argue, the material dynamics through which ideas and discourses are shaped and mobilised remain, to a large degree, understudied. They are the voiceless and overlooked spaces of the contact zone, the 'missing masses' of the actor-network. Through a consideration of different 'actors' within a programme, I consider not only ideas, concepts and people, but also objects, materials, embodied practices and the ways in which they weave, knit and shape the outcomes and trajectories of the Barefoot College's development projects. Thus, this thesis expands upon earlier accounts of the generation of development knowledge and success (e.g. Mosse 2005), to consider how knowledge is performed by way of the materially enacted spaces of spectacle and ignorance. The Barefoot College relies heavily on the spectacle that material objects play in its success, both in the mobilisation of its message through information communication technologies and in the affordances and discourses of the objects themselves. Thus, a consideration of these elements, and the heterotopic spectacles that result, leads, I suggest, to a more convincing analysis of the College's materially mediated success. In this way, this thesis follows Venkatesan and Yarrow's (2012) approach to development as "anthropologies with development in them", that is, studying and writing about development neither instrumentally nor as critique, but rather in relation to established anthropological concerns (2012: 16-7). As such, the chapters that follow reflect this eclectic and heterogeneous approach.

Formed by Sanjit 'Bunker' Roy in 1972, the Barefoot College tackles issues relating to education, skills development, health, drinking water, women empowerment, and electrification through solar power. A central feature of the Barefoot College's methods is the training of illiterate and semi-literate individuals in practical technical skills that help to empower them and provide a sustainable solution to poverty alleviation. The College terms this the "de-mystification" of technology, a process that involves the preparation of communities and individuals to accept, understand, and own technology

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4 I broadly follow Latour's suggestion in declaring that an 'actor' is anything that acts, or is granted activity by others, human or otherwise (1997).
and has ranged in the past from I.T.-managed irrigation controls to hand-pump mechanics, water testing, health care and architecture. In its expansion into solar energy, where, as noted above, the College enlists illiterate women from across the world to be trained as "solar engineers", the College has seen its profile rise on a global scale, winning innumerable awards and funding, to become one of the most recognisable development organisations in India and increasingly beyond, with an international profile matched only by its global ambitions.

In terms of media coverage, the College features regularly on international news reports and has built a worldwide reputation for its various programmes, and in recent years, particularly, its solar programme. Its reputation for grassroots development work has also seen it receive a host of prominent international figures from the late Robert McNamara, to Charles, Prince of Wales, and most recently, the Dalai Lama. How this success has been achieved, and why it holds such widespread appeal is the subject of this thesis.

One of the theoretical arguments I make is that in the bringing together of marginal persons and things, the College acts to re-constitute and mobilise them as heterotopias of development that enact certain resonant ideas of progress, modernity, social change, and the nation-state (Venkatesan 2009). It does this, I argue, through the heterotopic spectacle that such objects, practices and persons engender, and the ignorance that their mobilisation and deployment induces via material mechanisms of information technologies. Conceiving of the College as a site that mobilises heterotopias through spectacle allows an understanding of how the College stays on top of the development game by continually modifying its scripts and material props in conjunction with the wider spaces through which it defines itself. By mapping out these entwined relations, I attempt to unravel the dynamics involved in the operationalization of a development organisation with particular attention to how success is generated and how it moves through different materially mediated spectacles. In the course of unravelling these discourses and spectacles, this thesis considers the breadth of development work involved at the College, from the reversal of gender roles and the challenging of social and professional hierarchies, to the weaving of development narratives and their
mobilisation via information technologies. Spectacle and ignorance are the means by which this is realised, the methods by which heterotopic visions are mobilised to achieve their resonant effects.

To reiterate, this thesis will consider how constructions of development success are crafted and constituted through the Barefoot College’s globally renowned solar development programme. I argue that such compositions are managed through the spectacle of development and the concomitant ignorance of development praxis. I will further explore the kinds of ideas and imaginings of development that are being fostered in the generation of success. I suggest that through the mobilisation of certain utopian ideals of social change and equality, the College acts as a heterotopic space of Otherness, reflecting back to its various audiences their hopes and dreams for a better future. As Mosse (2005) has stated, development success relies on the stabilisation of particular interpretations: “Power lies in the narratives that maintain an organisation’s own definition of the problem” (2005:8). Light, as metaphorical agency, has the capacity to reveal, to highlight and expose, but also to cast shadows that conceal. The material manifestations of such power, the ways in which it acts to convince, to conceal, to consolidate or ultimately misrepresent, are the subjects of this thesis.

In the discussion that follows, I firstly introduce the field site, its recent history, philosophy, programmes and organisation. Along the way, I also discuss how I came to be there, my daily routine and work environment, and attempt to give a flavour of the material dynamics through which this thesis itself was formed and wrought. I then briefly introduce aspects of methodology and some of the ethical issues that I faced while conducting fieldwork.

The Barefoot College

The Barefoot College is a non-governmental organisation (NGO), sometimes known as a community-based development organisation5 (CBO), located on the outskirts of the

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5 On its official website, the Barefoot College currently terms itself an NGO. During my time at the College, however, it also employed the terms CBO and Voluntary Agency in different contexts. For the
village of Tilonia in Ajmer District, Rajasthan, India. A small village of 2000 inhabitants, it is situated 400 miles south-west of New Delhi in the centre of the desert state of Rajasthan, the largest state of the Republic of India. It is one of the most recognisable NGOs in India with a wide domestic and international profile, and has appeared in the past on the BBC, CNN and countless other newspapers and magazines. It has also been the recipient of numerous awards, including the Ashden Award in 2003 for bringing solar power to remote villages and the Skoll foundation award in 2011 for environmental sustainability. In 2008, The Guardian newspaper recognised the Founder Director of the Barefoot College, Sanjit ‘Bunker’ Roy as one of fifty people who could help save the planet (The Guardian 2008), and in 2010, TIME magazine named Roy as one of the 100 most influential people in the world (Mortenson 2010).

The inauguration story of the Barefoot College is a well-known and oft-repeated mythologizing foundation narrative, one version of which can be found in the opening section of this chapter. The official version of the events begins in 1972 when its founder Sanjit ‘Bunker’ Roy, together with a small group of young, likeminded university graduates, each with different educational backgrounds, chose to break away from the traditional Indian social-work experience which they felt was out of touch with rural realities. To this end, they established the ‘Social Work and Research Centre’ (SWRC), a voluntary organisation that aimed for sustainable development through self-sufficiency and to work with local people in an integrated and practical approach to research and development. They were committed to combining rural skills with urban knowledge, and to working with rural populations to identify the issues affecting them in a collaborative venture. Through this dialogic approach, they identified principles that formed the basis to this emerging organisation including a commitment to gender and caste equality, to honesty and integrity, and protection of the environment (Srinivisan and Anandalakshmy 2003: 232).

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sake of consistency, I will use the term NGO forthwith when referring to the College. Available at: http://www.barefootcollege.org/ [Accessed: 13 September 2012].

6 Tilonia is one of the 110 villages in Silora Block, one of eight development Blocks in Ajmer District spreading over 82,349 square kilometres. Community development blocks in India are designated development zones administered by a Block Development Officer.
In its formative years, the centre began with a two-year groundwater survey of the 110 villages of Silora Block and moved on to a health and education programme in 1974, and the Rural Industries Section and Agriculture Extension Programme in 1975. In the years to come, they added a hand-pump section which later became the rainwater harvesting section as ground water supplies slowly diminished; a women’s section providing support and information to women’s groups; a communication section using traditional hand-puppets to communicate social messages; arts and crafts section, and latterly a solar section providing training in the assembly and maintenance of solar photovoltaic technology both domestically and internationally. Today, the College groups its various activities around: “Solar Solutions” (solar lighting, solar parabolic cookers, solar water heaters, solar-powered desalination plant & reverse osmosis); “Water” (rain water harvesting; dams; ‘Neer Jaal’: an Information Communication Technology that enabled a water resource management portal for grassroots communities, which allows regular monitoring of water quality); “Education” (Balwadis (rural creches); night schools; a day school); “Livelihood” (healthcare, craft, communication); and “Activism” (social, economic, political) (Barefoot College Website).

Initially, the SWRC was committed to providing urban expertise in an effort to address economic and technical issues affecting all the villages in Silora Block. However, after a number of years, it became clear that this policy was not working, as more powerful individuals and castes sought to influence decision-making for their own benefit. As a result, the decision was made to work exclusively with the rural poor. They identified marginal farmers, landless peasants, rural artisans, women, children, and scheduled castes and tribes as their main target groups.

This progressive approach eventually led to the formation of two major objectives that formed the backdrop to all subsequent developments, the first of which was participatory decision-making involving both the community and the SWRC workers. After a major review of operations towards the end of the 1970s, changes giving decision-making power and positions of authority to local workers were implemented. Concomitantly, the decision was made to level the organisational structure of the
organisation and pay everyone a comparable salary. This change prompted many of the urban professionals to leave the organisation.

The second major objective involved decentralisation of the organisation's initiatives to field centres away from Tilonia to villages throughout Silora Block. These localized centres have their own decision-making powers to address particular issues identified by the workers and villagers as especially pertinent to their area. They work on multiple levels of development at any one time, typically a night school, women's committee, rainwater harvesting and NREGA (National Rural Employment Guarantee Act). The 110 villages of Silora Block are now served by six field centres, each catering for between nine and thirty-five villages. Currently, the College employs approximately 150 full-time employees across its main campus in Tilonia and its various field centres.

The review of the College's operations also led to the establishment of five "non-negotiable principles", as stated on the College's website (Barefoot College website 2012). These are:

- **Equality**: The College maintains that every member of the Barefoot team is equally important and must be respected. An individual's education, gender, caste or class does not make her or him any less or more valuable and all are eligible for any staff position.

- **Collective Decision Making**: The Barefoot College provides equal opportunity for all in decision-making as well as planning and implementation. Collective decision-making is considered essential for problem solving.

- **Decentralisation**: Rural communities can identify their needs and solve their own problems when they have access to information and education. The programme is based on decentralisation of planning and implementation at the grassroots levels, enabling and empowering individuals to articulate their needs.

- **Self-Reliance**: To ensure a sustainable development process, self-reliance and self-esteem are given high priority. Dependence on external agencies and government for knowledge and skills is minimal. Natural-resource management
and adequate provision of basic needs are all looked after within and by the community.

- **Austerity:** The College believes in simplicity and moderation for a balanced way of life. As most members of the College come from rural backgrounds, living conditions have been made simple so that they feel comfortable. Everyone works for the collective aspirations of rural communities, rather than striving for individual material goals.

Today, the SWRC is more popularly known as the "Barefoot College" – a rebranding exercise that according to O'Brien (1998) occurred in 1992. I will discuss this move in more detail in chapter two. For now however, let us briefly look at how the Barefoot College is structured and run.

**Organisation of the Barefoot College**

The College itself operates under a relatively horizontal and decentralised power structure. Decisions at the local level are held in monthly village meetings involving local people and field centre staff, after which proposals and decisions are taken up at the field-centre level where they are discussed further before finally a group meeting involving field-centre coordinators and section heads is held in the Barefoot campus. I say ‘relatively’ because several workers during the course of fieldwork expressed frustration and anger at what they described as the overbearing influence of an inner-circle of university educated section heads in the decision-making process. These same section heads could also sometimes be found sitting on the board of governors.

The board of governors consisting of Bunker himself and several other longstanding associates of the College oversee and review any new developments of the College, including Government partnerships, programme changes, awards received, and various other administrative procedures. They meet quarterly in Bunker’s Delhi residence, which serves as a city-hub for Barefoot activities and also for those of his wife Aruna’s organisation, the MKSS (Mazdoor Kisan Shakti Sangathan).

The various programmes operating through the College are referred to as sections. These sections have emerged over time, some of which (e.g. the hand-pump section) have
dropped out of view while others have taken their place (e.g. rainwater harvesting). The present sections, as noted above, encompass: “Solar Solutions”, “Water”, “Education”, “Livelihood”, and “Activism”.

The SWRC also has affiliated organisations, called sub-centres in thirteen states across India which are coordinated by the umbrella organisation SAMPDA. The College today provides basic services to over one hundred villages and more than 100,000 people spread over five hundred square miles. A diagram of the organisational structure of the College can be seen below (figure 1).
Figure 1. Organisational structure of the Barefoot College
The Research Context

My first awareness of the Barefoot College came by way of a newspaper article on participatory approaches to collaborative working. This was during a period in the mid to late-2000s in which a general movement of collaborative creativity, of crowd-sourcing and open-source software platforms were high in the public consciousness. YouTube had only just started, Wikipedia, the collaboratively edited free online encyclopaedia, had been going for only a few years more, ‘You’ the people had been voted *Time’s* person of the year. A general ethos of ‘do-it-yourself’ through the creative power of collaboration and sharing was pervasive, and not a little intoxicating. The philosophy of the College as spelled out in that article glowed with an ethic of non-hierarchical and mass-participative self-help solutions to rural poverty. It was innovation by the masses, not just for the masses, where local people, trained in basic techniques in a variety of disciplines from healthcare to architecture and without formal education, stepped in to fill in the gaps of their own communities. It seemed such a powerful idea, and written with such obvious enthusiasm, that I could not help but follow it up further. The central concept of the College, that of informal, non-hierarchical collaborative approaches to working, with a healthy scepticism for formal education was both appealing and continued a line of previous research on pro-active ‘hands-on’ forms of learning that I wished to continue.

With further research, the College, I was to learn, operated a seemingly miraculous solar-energy programme in which groups of illiterate women from countries across the world were trained as ‘Barefoot solar engineers’ (BSEs) to maintain and operate complex technologies for the benefit of their communities. Without a common language of instruction, and utilising an ad hoc form of sign-language to communicate, this seemed a remarkable instance of collaborative working that by-passed the formal hierarchies and standard channels of pedagogical communication. My original aims for this research were to investigate how such learning and understanding took place and how it might foster forms of innovation that could lead to new, locally appropriate and sustainable technologies.
Having contacted the College with a view to carrying out research there, and receiving no reply for several weeks, I eventually received a reply from the founder of the College, Bunker Roy himself, stating that he was going to be in Aberdeen, Scotland in the coming weeks for a conference and might we meet for a chat about the proposed research. This was to be the first time that Bunker was visiting Aberdeen and as a native of the city, the coincidence of the occurrence did not escape me. As it turned out, he also had a favour to ask of me, requesting that I contact an acquaintance of his to pick up some money in Aberdeen.7

I met Bunker at the airport and accompanied him about the train station where I had the opportunity to briefly chat to him on the way about the proposed research and the College in general. He was wholly receptive to the proposal and raised no objections. On the contrary, Bunker was already making plans to send me out into the field to learn first-hand solar-system maintenance.

After many months of protracted visa difficulties, I finally made it out to India at the tail end of December, 2008. I arrived in a surprisingly misty and cold Delhi in the early hours of New Year's Eve. With most of the city under a tight police presence following the Mumbai attacks a few months previously, New Year was a quiet affair with little in the way of celebrations. A few days later I eventually arrived at the gates to the College off a dusty road, 7 kilometres from the highway in the early evening.

The College is situated within an oasis of trees among flat dusty fields stretching as far as the eye can see, only interrupted by the bony outcroppings of the Aravalli mountain range in the distance. At first sight, the sprawling campus is a little incongruous. The only sign indicating what is beyond the tree-shaded perimeter is a sign pointing to commercial activities of the College - the craft shop. Beyond the dusty fields surrounding the campus lay an array of stone and concrete buildings, none of which indicated the nature of business within. I strolled around trying to find someone to point me in the right direction, eventually chancing upon someone locking up for the

7 Despite the somewhat disreputable tone of this, the money, as it turned out, was from a charity collection conducted on behalf of the College by a local visitor. The 'acquaintance' was an elderly, bespectacled woman in her seventies with a penchant for knitting and Highland short bread.
day, and in halting Hindi, I explained who I was and who was my contact for the College.

The 'new campus' as it is locally known (see figure 2), and which was to be my base for the year ahead, houses the main administrative offices, in addition to a central mess, the library, the medical section, guest accommodation, a large stage area, the community radio, and Bunker's own private residence. It was built in the mid-1980s and is completely solar electrified, with electricity generated from rows and rows of large solar photovoltaic panels running the length of many of the buildings' roofs.

The old campus (see figure 3), is a fifteen-minute walk away across maize and mustard fields. This sprawling and neglected looking campus houses an array of buildings spreading over forty-five acres and is where the solar training takes place, as well as the recycling, woodwork, and blacksmith sections. It was the first residence of the College when it began operating in the early 1970s before they relocated much of their operations to the new campus.

The old campus is situated adjacent to the small village of Tilonia. The village itself houses two elementary schools (up to the age of fourteen), one government run, the other an experimental school run by the Barefoot College for children of the College staff 8, several tea shops, two small grocery stores providing basic household goods: noodles, biscuits, cigarettes, stationery, medical supplies and sweets, a railway station serving local trains, and a Hindu temple giving a good view of the village and surrounding area. The village is overlooked by a snaking mountaintop of jagged rock with a small temple cut into a cave at the base. About halfway up is a large out-cropping of rounded rock with concave craters that give, when viewed from afar, the distinct appearance of a human skull surveying the village below. Most locals avoided climbing past the temple due to the risk of cobras, a common sight especially in the summer months when they would emerge from crevices in the rock to bask in the sun. During the cooler months, however, it was usually safe to climb, and once at the top, a good view could be had over the surrounding area.

8 The school follows a government curriculum but the methodology and teaching methods are based on a 'Barefoot' approach: primarily, relating standard teachings to local phenomenon.
It was to the village that I usually escaped when the confines of the campus got too much or I just wanted a cold drink for relief, if only temporarily, from the midday heat. I had a favourite tea-shop around the back of the railway station where I ate barfi and sipped chai. It was quieter than the tea-shops on the main road into town where the local men would gather to gossip over chai and beedies and the owner, unlike many of the villagers, was generally positive about the College.

Despite being the nearest village to the College, relations between the College and Tilonia were surprisingly strained. This was mainly attributed to disputes during the early years of the College when the founders decided to focus their efforts on the poorest members of society without recourse to village elites. This, combined with what were largely viewed as 'Western' and hence 'outsider' ideas of women's rights and employment, caste flattening and new medicinal and hygiene advice leading to the usurping of traditional village roles, inevitably led to friction. During my time there, contact between the village and the College was minimal at best, confined to local people who worked at the College but who remained living in the village.

My first few days at the College were spent residing in guest accommodation - simple, Spartan rooms housing the many national and international visitors that the College receives - before moving into permanent accommodation on campus. The College accommodates many of the staff and their families within the grounds of the campus in concrete and stone apartment-type homes arranged around a central courtyard (see figure 4). These homes uniformly have a kitchen, a front room for eating and receiving guests that often doubles as a sleeping area, and a bedroom. The bathroom is shared between the block. Most families have at least one gas cylinder for making tea and heating water, with the main meal often cooked outside in small clay ovens built into

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9 A South-Asian sweet made from condensed milk and sugar, and cut into small squares when solidified.
10 A South-Asian cigarette made from tobacco leaf and wrapped in a tendu leaf. Beedies are favoured over conventional cigarettes in rural areas due to their low price, typically 2-8 rupees (Approx. 10p) for a pack of 25.
11 Local power structures pose significant problems for NGOs involved in the implementation of development programmes since they may challenge existing material conditions, access to resources, status, and positions of power for local elites (1999: 350). As Sen (1999) notes, the particular character of NGO directed programmes also has important bearings on the kinds of local relations enacted, with empowerment oriented NGOs particularly susceptible to creating antagonisms with local elites who may see their positions threatened (1999: 350).
the ground itself. Water is provided by several bore-hole water pumps dotted around the campus. Accommodation, electricity and water are provided free of charge to staff and their families.

I moved into one of the empty apartment blocks on the edge of the campus that had previously housed long-term visitors. My simple abode, strung with spider webs from disuse, the odd mouse, and in the hot months one or two scorpions, became home for the next fifteen months. To the back of the apartment was a plot of scrubland looking on to ploughed fields of mustard. To the front, an open patch of sand where stray dogs from the surrounding fields, attracted by leftover food scraps, would come alive during the cool night and bark and howl and fight. Each morning, I swept my room and entrance way of the incessant dust that gathered just about everywhere before queuing for water from the communal hand pump to do my washing and fill my *matka* (earthenware water cooler). I then took a breakfast of hot sweet chai in the central mess accompanied by one or two greasy *paranthas*12 cooked on a hot pan. The mess area was generally used only by the single men and women of the campus, with the majority of the campus families doing their own cooking at home. Lunch and dinner were also provided by the mess, usually consisting of rice, lentils, seasonal vegetables, and *chapatis*13 served on metal plates and eaten cross-legged on the floor of the mess. Afterwards, we washed our plates under the running water of a nearby hand pump, using the sand of the ground as an abrasive to clean the yellow turmeric stains from our fingers.

There are around sixty people living and working at the new campus, comprised mainly of families, but also single individuals and couples, plus twenty to thirty individuals and families living at the old campus. These individuals make up the majority of the workers at the College, employed in its various sections from solar to rainwater harvesting. Across the College and its different field centres, there are around 150 full-time workers. As an official policy of the College dating back its early days, caste discrimination is prohibited; everyone drinks from the same wells and for those who use the mess area, eat

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12 Unleavened flat bread popular in Northern India, pan fried with ghee or oil.
13 Similar to paranthas but rolled thinner and with no oil.
from the same pot. Such policies, as noted above, have led to antagonism in the nearby village of Tilonia, where caste separation is still practiced, most notably in the tea shops where lower castes are provided disposable cups, rather than the re-usable glass tumblers provided to higher castes. The College presents itself as a community living in harmony, with caste, gender, age, literacy, education and disability divisions prohibited. Officially, this policy works well, with higher and lower castes working alongside one another, women are given prominent positions in less traditional occupations such as solar master trainers and computer instructors, those with disabilities such as polio, which, in rural areas, usually acts against those seeking employment, are employed across the College in various positions, while illiteracy and lack of education are seen as no barrier to carrying out a range of functions. Despite such ideals, and as in any community, complaints and misgivings were never far from the surface. Most complaints were related to the dominance of the higher castes in decision-making roles at the College. Many of the section-heads belonged to higher castes, who as a result of better life-opportunities, also tended to have longer educations, and in some cases, university degrees. These individuals, it was said, dominated the committees put in place to ensure that everyone had an equal say in the decision-making process at the College, with some going as far as to claim that the College was run by a small clique close to Bunker Roy.

I made friends quickly on the campus, and spent most nights watching Bollywood movies on laptops and experimenting with new cooking styles and ingredients. Other nights, I ate with a local Muslim family in the old campus, enjoying the rare luxury of a chicken or fish dish. While meat and animal products were not strictly off-limits on campus, they were deemed socially unacceptable. Muslims and lower castes tended to occasionally, when money allowed, eat animal products, while those of the higher castes disavowed it. This is not to say, however, that meat was not consumed, but when it was, it was spoken of in hushed tones, with orders for meat and eggs often put in to those travelling into town who could be trusted to keep quiet and to purchase it surreptitiously. People often joked that the old campus got away with far more than the new campus because it was more spread out, and less monitored by the prying eyes of neighbours than the relatively densely packed new campus. Indeed, while residents of
the new campus were often discouraged from owning televisions, residents of the old campus often sported not only televisions but DVD players too! One of my most vivid nights was with a local family, watching a newly acquired DVD of spandex wearing, pneumatically enhanced American female wrestling, who nodded sagely along to the bone-crunching brawls and histrionic insults of the competitors. These inauspicious beginnings mark the start of my own, and this document’s inauguration, and much like the mist of that first cold New Delhi dawn, tell an often time shadowy story that slowly emerges into light.

Figure 2. The entrance to the College. On the left is the telephone dhaba, housed in a locally built replica of Buckminster Fuller’s ‘geodesic domes’; on the right are staff field vehicles
Figure 3. The ‘old campus’

Figure 4. The rooftop of a staff accommodation block. In the centre can be seen the central courtyard surrounded by collection areas for rooftop rain water harvesting, towards the top of the picture are some of the solar PV panels
Methodological Considerations

During my first month or so, I spent the majority of my time with the rain water harvesting (RWH) and women’s empowerment sections. From here I would travel to the various field centres, attend village level meetings and sit-in on women’s rights meetings. Ramkaran, the head of the section, a small, wiry man with a penchant for wearing baseball caps and who always seemed to be in a rush somewhere was keen to show me around and extol the virtues of the College. I was more than happy to listen and follow and help out around the office often following up on e-mails to foreign funders when Ramkaran’s English would not suffice.

However, I soon moved upstairs to the solar office as my research focused where I spent the majority of my time. I shared the office with the head of the solar section, Bhagwat Nandan or Guru ji (‘teacher’ in Hindi) as he was affectionately known, and two other employees, both in their mid-twenties who were, unlike every other employee in the campus, more comfortable with English than Hindi and were from out-with the state of Rajasthan. It was here that I browsed the internet, wrote evaluation reports for Bunker, helped write the content for the new website of the College, drank tea, gossiped, snoozed and snacked.

The solar section was one of the main hubs of the College and each day, visitors, both domestic and foreign, dropped by to wonder at the marvels of the Barefoot solar engineers. The Barefoot solar engineers (BSEs) were the main draw for many of the visitors. The BSEs were part of a South-South Government of India aid initiative that sought to utilise Indian expertise to provide relevant skills training to countries in the South. Elderly women drawn from many of the least developed countries in Africa spend six months of the year, six days a week, learning the intricacies of solar ‘engineering’: wiring and assembling lantern and light casings, soldering and wiring circuit boards, and testing and diagnosing completed circuits. These spirited women, the majority of whom were illiterate and spoke no English, the language of instruction, stoically grappled with a foreign land and alien methods of teaching, with strange foods, loneliness, a lack of freedom and a constant stream of visitors snapping away with cameras as if attractions in a fun park. I joined these women for six months and trained
alongside them as a solar engineer. I wrote the lessons out in their jot books for those who were unable, I chalked up pictures of the tools and circuit parts on the board and repeated the English terms, I accompanied them on trips to the Taj Mahal, and I shared their frustrations, toil and boredom in the workshop.

The training begins soon after the women arrive. They are granted one or two days to settle in, get a feel for the campus, have a medical check-up and get tested for eye glasses if needed before starting instruction at the workshop. I formally joined the second group of women to arrive at the College as part of the ITEC training scheme during my third month in the field. Previously, I had spent time with the first group of ITEC women during their last three months in the workshop, but held off from participating in the work fully until I could start the training from the beginning. It was my intention to train alongside the women, learning as they learned, techniques and skills that were as unfamiliar to me as they were to them. I wanted to know if this much vaunted approach to development work and knowledge-transfer, an approach that has won countless awards and press adulation, was as effective as the Barefoot College claimed. Was it really possible to teach illiterate trainees complex skills and knowledges without a common language of written or verbal communication? To answer this, I decided the most conducive method to employ was an apprenticeship-as-field-method approach, which I hoped would furnish me with a more in-depth understanding of the learning process.

As Marchand and Kresse (2009) note, apprenticeship-as-research-method is an increasingly common way for anthropologists to gain a closer understanding of their subjects' world view. Such an approach immerses the researcher in a shared motor-cognitive and socio-political field environment (2009: 3), providing a more embodied understanding of particular field experiences and practices. Growing numbers of anthropologists have employed this approach in subject areas as diverse as weaving (Dilley 1989), Icelandic fishing (Palsson 1994), blacksmithing (Keller and Keller 1996), minaret building, and woodworking (Marchand 2001; 2010a). These studies share a general view of learning as an active engagement between social actors and their environment, rather than a passive internalisation of a stock of knowledge. In a
participatory account of a six-month apprenticeship in blacksmithing, Keller and Keller (1996) suggest that it is perhaps essential for the fieldworker to acquire competence in the activities under study if they wish to gain a thorough understanding of the agents involved in the study. In foregoing such an engagement, the data received will amount to little more than descriptions of systems without the perspectives and understandings of those who create and shape those very systems (1996:169). Performing actions oneself thus provides a unique perspective of how certain activities and bodily dispositions constitute and relate to other aspects of a research subject.

The engagement of the researcher in fieldwork practices is not without criticism, however. Lemonnier (1992) notes that involvement of the fieldworker in the activity under study can be disastrous for the ethnography, if it entails interrupting the activity, boring the informants or breaking things in the course of learning. Furthermore, performing such actions "from the inside" runs the risk of lapsing into an ethnocentric perception of the task (1992: 27). He concludes, however, that a combination of careful description and performance of the actions to be described, all the while guarding against an overly ethnocentric projection of the task at hand, constitutes the most fruitful approach to technological ethnography.

Such methods, I might add however, were not merely restricted to the workshop space itself, although undoubtedly this was an important element, but were rather employed throughout my time in the organisation. Thus, when not at the solar workshop, this "apprenticeship" also took me to the various field centres of the College following the business of the field centre staff and assisting whenever I could. This often took the form of photographing sites that had been earmarked for development (e.g. a new rainwater harvesting structure, photographs were thus used to chart the progress of construction for eventual filing of reports to donors). I also spent a considerable amount of time writing reports for various donors, helping staff members answer questions via e-mail and helping out with the content creation of the new website that the College was constructing.

While the primary field centres of the College were situated within the state of Rajasthan, I also travelled to the remote field centre in the foothills of the Himalayas in
Himachal Pradesh, twenty-four hours away by road. There, with two other employees, I spent several weeks trekking each day to surrounding villages to interview a cross-section of villagers who were currently using solar panels for electricity generation. The College had installed solar units in various villages in 1997 and 2001, but since then had not had much contact with the settlements. Our job was to survey the current situation and determine what needed to be upgraded.

As a reflection of the work that the College carries out not only domestically, but internationally, I also made a three-week field trip to the West African country of the Gambia to follow up on one of the trademark solar projects that the College had implemented there. I had previously spent three months in the Gambia completing fieldwork for my Masters degree, so I was familiar with the setting and had friends there who could assist me. I also met and was in contact with the local NGO representative who liaised between the College and the villages that were solar electrified while I was in Tilonia. Four women from the Gambia received training from the College, two in 2006, and two in 2008-9. I met and interviewed the latest of these trainees during my field work in India. Although it was impossible for me to gauge the overall success of the entirety of the Barefoot College solar mission based solely on my experiences of one country, the point was never to determine success or failure in binary terms, but rather to try and describe the various manoeuvrings involved in the continuing operationalization of a project.

I made further trips around India visiting conferences and speaking on behalf of the College, discussing and presenting short films of their work. I visited academics working in the areas of NGOs and development, and contacted previous employees of the College to gain more detached views of their working methods and history. I also spent a memorable, if exasperating week, negotiating the convoluted mechanisms of the Indian bureaucratic machine in New Delhi when several members of the African ITEC group mistakenly out-stayed their visas. I also, however, enjoyed frequent nights of hospitality, dance and music at the many displays of ‘traditional’ Rajasthani culture hosted by the College and frequented by musicians far and wide. This thesis is the story of my time at the College, learning to learn alongside the people I shared my life with.
Ethical Considerations

With regard to the issue of 'non-knowledge', studies of ignorance raise difficult ethical considerations when in the field, particularly so when the researcher is confronted by overstated claims or fabricated truths. This is exactly the issue that Downing (2011) raises in relation to misleading claims surrounding genetic modification and local food networks in SW England: “What should he/she do when confronted in the field by exaggerated claims or misinformation? Should an ethnographer, when pressed, endorse the strategic transfer of ignorance as part of a commitment to cultural relativism? What if the spread of ignorance could be said to be intentionally manufactured?” (2011: 10).

Downing notes that continued relations of trust and acceptance within the field may prevent the researcher from challenging intentionally crafted narratives; researchers run the very real risk of not only damaging relationships with friends and collaborators, but of prematurely ending on-going access to a field site. The issue is one of ethics and from a personal point of view, offers no easy solutions. On the one hand, if serious issues of misrepresentation arise, should we as researchers raise our ethical concerns with the relevant parties in the hope that something is done? On the other hand, by raising these issues we run the risk of losing permanent access to a field site and the potential access to further knowledge on the workings of ethically dubious practices.

In terms of my own fieldwork, my awareness of issues relating to misinformation and misrepresentation arose gradually during the course of fieldwork. Indeed, in the early months of fieldwork, I was very much involved in producing those misrepresentations myself through the writing of reports and articles for the College. However, my awareness of possible breaks in the Barefoot narrative grew slowly. The practicalities of gaining in-depth access and knowledge of particular spaces entails that one lives and breathes the life-worlds of others. In the case of the Barefoot College, a phenomenally successful NGO that attracted not only money and awards, but a constant stream of news agencies and high-profile visitors, this omnipresent narrative of success was contagious. Even when I was presented with evidence that contradicted its claims, I found it challenging to accept.
Given my own precarious position within the College as an invited guest researcher, I was well aware that my continued presence depended on the goodwill of Bunker. When doubts on the veracity of claims presented by the College did arise, I was, admittedly, reluctant to raise these with Bunker out of fear of prematurely ending my access to the College. Furthermore, I was deeply aware that by raising doubts about certain claims made by the College, I was also jeopardizing the continued employment of my informants (the College environment was inherently insular, everyone knew the movements of others, who had been speaking to whom, and especially who had been speaking to the resident foreign researcher).

Due to the incremental unravelling of the Barefoot narrative, I was also never one hundred per cent sure of my own convictions. Fieldwork, as many authors have noted (e.g. Coffey 1999; Davies 1999; Hovland 2009), is fraught with emotional work and may include periods of loneliness, frustration, doubt and guilt. I can certainly relate to the feelings of doubt, and guilt; as an invited researcher to a community who had taken me in and shared their lives with me, feelings of guilt and responsibility as my research unfolded were common. It was not until I returned from the field with a clear spatial separation in place, that I felt able to formulate my thoughts properly, and disentangle myself from a narrative whose webs were not only pervasive, but also enveloping.

Such ethical issues are also related to the corollary issues of criticising a host institution after subsequent fieldwork. Such dilemmas have been brought into sharp focus in recent years with the publication of David Mosse's *Cultivating Development: An Ethnography of Aid Policy and Practice* (2005), a monograph that was subsequently challenged and contested by members of the host institution for being, among other things, unfair, biased, defamatory, and damaging to the reputations of individuals and institutions (Mosse 2006: 935). The issue of responsibility to one's informants when research reflects negatively upon them is a dilemma faced by many anthropologists, particularly in relation to issues of access when studying powerful institutions. Sridhar (2005) suggests that a balanced path of constructive criticism, which does not depart from

14 I was aware that such a scenario did have a precedent. In the course of our interview, Neehar Raina (see chapter three) explicitly stated that he was "scared" to return to Tilonia because of Bunker, who he claimed had threatened him during their dispute over the Aga Khan controversy.
critical reflection but also constructively engages with a development project to contribute to their knowledge and understanding, can be maintained. What this amounts to in practice is transparency about research intentions. While I am in agreement with this statement, as we have seen above, transparency when in the field is sometimes not such a simple matter and instead involves negotiations, compromises and concessions. In some cases my field access, whether intentionally or by accident, also relied upon my own ignorance. These are choices that we must make as researchers, if we are to bring such instances to light.

Studies of the Research Site
Due to the impact and visibility of the College at both national and international levels, the College has, unsurprisingly, attracted its fair share of previous academic studies. Below, I briefly outline the main research papers to give some idea of what has gone before.

In his unpublished MA thesis, Matins (1997) discusses participatory development within the context of the Barefoot College with particular emphasis on accountability within the voluntary sector. The study provides a broad overview of the College and its sections; the limited extent of fieldwork conducted by the author (one visit) is clearly evident. O'Brien (1998), in an unpublished PhD thesis titled Education for Sustainable Development in the subject of ‘Administration and Policy Studies in Education’, discusses education in the context of the Barefoot College as an essential component of success for sustainable community development. O'Brien gives an informative if tame overview of the various schemes and ventures that the College is involved in. Grötschel (2003), in another MA thesis, discusses the impact of the Barefoot College's night-school programme on rural livelihoods. With a distinctive focus on education both in the broad Indian context and within the setting of the night-school programme, Grötschel provides a thorough and critical account of one of the College's often overlooked success stories. Bruce (2007) in a chapter of a PhD thesis titled Capability Building for the Manufacture of Photovoltaic System Components in Developing
Countries provides what is undoubtedly the most comprehensive study thus far of the solar section of the Barefoot College. In an international case-study based analysis of small-scale PV manufacture in developing countries, Bruce discusses micro-level capabilities and constraints of several PV enterprises in relation to national strategies with a particular focus on technological learning processes. Bruce's chapter on the Barefoot College is comprehensive and detailed enough, providing a good understanding of the solar section's working practices and technical capabilities, as well as how these are impacted by factors such as finance, local governance, and national and regional policies. Roy and Hartigan (2008), in one of only two published articles in a peer-reviewed journal thus far, focus on the College's philosophy of enabling the rural poor to extricate themselves from poverty, given the right support and skills, and in the process sets themselves up against mainstream, top-down development models. While informative, it judiciously ignores much of the bottom-up grass-roots work of contemporary development agencies in order to construct an artificial dualistic view of development with itself as saviour. Elkington (2008), in a discussion article in response to Roy and Hartigan's published above in the same journal, asks to what extent the Barefoot College model is scalable and replicable. Elkington notes the spin espoused by entrepreneurs like Bunker Roy and cautions against many of the more grandiloquent claims made by the authors. Elkington is balanced in his appraisal of the 'Barefoot approach', noting that much of the College's success is down to the stamina and vision of Bunker Roy himself, a point that ultimately guards against large-scale scalability.

Outline of Chapters

This thesis is divided into seven chapters. In chapter one, Spectacle, Otherness, and Ignorance: the Materiality of Success, I provide an overview of the central ethnographic literatures informing this thesis, and how they will help apprise the chapters that are to follow. Within this section, I firstly discuss Debord's (1967) concept of spectacle, setting forth its principle characteristics and its applicability to the current study. I then demonstrate how it might usefully be applied to the current study through a discussion of gender construction by the College and explore how the College mobilises these as
aspects of its heterotopic spectacle of development change. I next explore Foucault’s concept of the heterotopia and its relevance to the Barefoot College, discussing along the way its main principles and practices. I then turn to some of the central ideas and concepts that an anthropology of ignorance has brought to bear, tracing its recent history and emergent present. I reflect upon how ignorance has been studied within the anthropology of development, suggesting that while not a substantive area of study, anthropologists in the past have nevertheless noted the strategic uses of ignorance and non-knowledge in the stabilisation of knowledge systems.

Chapter 2 Strands of History: The Voluntary Sector in India. Chapter two explores the history and development of the Barefoot College in relation to wider social and political contexts, in particular the advancement of the voluntary sector in India from a largely voluntary based industry to one of professionalization. Against this backdrop, it charts the emergence of the Barefoot College from the early 1970s: how it developed, its aims and philosophy, and challenges it faced. I demonstrate how the College adapted and revised its approach to rural development in line with national policies and international discourses. This chapter predominantly draws upon key policy texts and archival materials.

Chapter 3 An Award Controversy. Chapter three takes a case-study approach to a controversial episode in the College’s history to explore the concept of ‘translation’ as it was enacted through particular human-environmental relations. To this end, I re-visit the controversy of the Aga Khan award for architecture, which the College won in 2001 for the design and construction of its new campus by a team of ‘Barefoot architects’. This chapter throws light on the ways in which the College’s interpretive constructions, concealments, silences and mobilizations help it to adapt itself to subject areas outwith the concerns of solar and development. The power and flexibility of the Barefoot narrative is thus laid bare as I explicate various disputes and deliberations in the College’s attempt to supplant one professional discourse for another.

Chapter 4 India is Shining. Chapter four introduces the solar programme of the Barefoot College and considers government policies relating to rural electrification, off-grid solar PV, and a case-study of a Barefoot solar project in Himachal Pradesh. This
Chapter explores how material aspects of technology and energy have become embedded within notions of development, enlightenment, and the formation of the state. In this way, it continues on from the previous chapter by exploring how the College integrated its programmes in line with state-led development policies, in the process constructing authoritative narratives of progress, advancement, and modernity.

Chapter 5 Solar Spectators. In this chapter, I consider how the College enrols donors and supporters through the act of witnessing. Drawing upon Shapin and Schaffer’s (1985) concept of the virtual witness, I argue that the College’s success depends largely on the visual spectacle of its lamps and solar training to enrol supporters worldwide. It achieves this firstly through the limited capacity of first-hand witnessing in the solar training workshop, and secondly (and more significantly) through the virtual witnessing of solar projects by partners and donors worldwide, via multi-media activities including literary technologies, but also short films and presentations. Through a carefully managed and highly visible marketing agenda employing stage-managed workshop demonstrations, conference addresses, literary outputs and digital technologies, the College was able to generate a consensus of success that helped validate its knowledge claims and ultimately extend the “Barefoot approach” worldwide.

Chapter 6 Circuits of knowledge. In this chapter, I explore the workshop training of the Barefoot College’s solar programme that aims to turn subaltern women into ‘Barefoot Solar Engineers’ (BSEs). I aim to challenge the prevalent discourse of the “developed woman” as a self-maximising subject able to channel voice and power through these newly developing knowledge spaces. Such discourses often fail to register the particular kinds of material assemblages through which they are enacted and the tangible ways in which knowledge and subjects are formed, yet also silenced by different materialities.

Chapter 7 Replication and its Troubles. Chapter seven takes off from the previous chapter by discussing how the skills learned by the trainees are implemented upon their return to their home communities. It does this through an exploration of a case-study of an ITEC-funded and Barefoot-implemented solar project in the Gambia, West Africa. I explore the issue of replication of the solar programme via an account of the ‘failure’ of two Barefoot solar projects, in the process bringing to light difficulties and labour
involved in the translation of development ‘success’. I argue that despite the relative ‘failure’ of the solar transfer projects, ‘replication’ as it is documented via public witnessing of the projects through digital media and development reports signifies the ‘success’ of the project and has been a key, if not the key, component in the solar programme’s worldwide success.

Chapter 8: Conclusion
Chapter 1

Spectacle, Otherness and Ignorance: the Materiality of Success

"In societies where modern conditions of production prevail, life is presented as an immense accumulation of spectacles. Everything that was directly lived is now merely represented in the distance" (Debord 1967 section: 18).

Introduction

In Solar Mamas (2012), a documentary film on the solar programme of the Barefoot College that was honoured by the Sundance Institute15 and was recently shown on BBC television, the spectacle of development is never far from the surface. The film follows Rafia, a Bedouin woman from Jordan on her journey to India to be trained as a Barefoot solar engineer and her subsequent return to implement what she has learned. The film, however, is more than just an account of her time at the College, but is rather a dramatization of Rafia’s passage from illiterate mother and wife to modern, independent, technologically literate woman. The film follows Rafia and her negotiations with her husband as he threatens to divorce her and leave with their children, if she does not return from India, forcing her to cut short her training and return to Jordan to intervene. Eventually, after conciliations have been made, Rafia returns to India, completes her training, and in the final segment, is seen returning to Jordan a hero to install the solar equipment in her village and pass on the light of hope and knowledge.

15 The Sundance Institute is a nonprofit organization attached to the Sundance Film Festival that seeks to support independent film and theatre artists from the United States and around the world, and to introduce audiences to their work.
Solar Mamas is indeed an engaging film, highlighting the human stories behind the incredible skills training conducted by the College. It also, however, highlights how an image-based culture “communicates through narratives, pictures, and pseudo-drama” (Hedges 2009: 49) to produce spectacles that entice, beguile and mesmerise. In the film, Rafea’s struggle with her dominating husband and traditional societal roles is shown to coincide with her own struggle to master the solar training. In her transformation from downtrodden wife and mother to successful solar engineer, stepping out from the shadow of tradition and poverty to become a newly empowered entrepreneur, Rafea embodies the ideals that have made the College and its solar programme a development success story. The film exemplifies, as the opening quote to this chapter suggests, the ways in which social change is enacted through materialities to be viewed and consumed as spectacle by viewing publics. However, the film is also a material device comprised of a multitude of actors that are just out of view of the camera lens, which shape and stabilise it, and allow it to be performed as spectacle. In what follows, I outline the tools and concepts that I draw upon to lift the curtain of this spectacle, to observe and account for the backstage workings of this theatre of dreams.

Development, as Mosse (2005) has argued, concerns not only social work, but the conceptual work of translation and mobilisation that act to sustain authoritative narratives and networks for the continued support of policy. The materials and practices through which these narratives are performed - solar circuits and lamps, technical training, energy production, buildings, and communities - are mobilised through mass-communication technologies (computer screens, tablets, mobile phones, televisions etc.) creating their own veneer of reality and judged not on the truth or falsity of such events, but on whether they are convincing as theatre and spectacle. A consequence of this visibility-making as Zehner (2012) has stated in a recent critique on alternative energies, “is the necessary invisibility of other options. There’s only so much room on the stage” (2012: 150).

As a conjurer of the ‘WOW!’ factor designed to produce excessive reactions in audiences through their affective displays (Kershaw 2003: 592), spectacles have reflected back to their audiences the concerns and anxieties at play within changing worlds and societies.
In modern times, with the advent of media culture and internet based forms of mass communication, the spectacle has come to play an increasingly pervasive role in the shaping of public life. As Kellner (2003) relates, the internet based economy deploys spectacle as a means of promotion and reproduction through the selling of commodities and the capture of audiences for both power and profit (2003: 1).

As a dominant form of social life, one that reaches out into every domain, from religion to politics to entertainment, this thesis furthers an examination of the part played by the spectacle in the work of development. The spectacle of developmental change, I suggest, is an important part of modern-day development efforts, helping organisations to enrol supporters and influence policy through the demonstration of the efficacy and efficiency of development programmes to effect change on people and communities. In this opening section, I provide an overview of the concept of spectacle as it has been apprehended within critical theory by philosopher Guy Debord. I argue that Debord's analysis of spectacle has particular relevance for an account of how the Barefoot College, as a mobiliser of development, from gender equality to sustainable energy, has managed and sustained its success over time and conflicting fortunes. I go on to discuss how such spectacles are connected to notions of separation and alienation by the audiences of development, and how a consideration of the role of what is not known, of the ignorance and silence that this entails, and which spectacle relies upon, can lead to productive insights into the workings and operationalization of development.

**Spectacles of Development**

In the Oxford English dictionary, 'Spectacle' is defined as "a visually striking performance or display". It is derived from Middle English meaning "specially prepared or arranged display", which was borrowed from the Old French 'spectacle', itself a reflection of the Latin 'spectaculum' meaning "a show" "to view, watch". Spectacle as a noun conjures up images of visually striking and extravagant displays; this visual force, however, as Khan notes, also denotes an affective response in the viewer or spectator

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16 Online Etymology Dictionary:
where much of its visual power is derived owing to its ability to hold the gaze of the viewer (Khan 2004). Thus spectacle, as its Latin root above suggests, is predominantly a *visual* force and has in the past been associated with performance and theatre and latterly modern forms of entertainment via television and cinema. It should also be noted that the alternative definition of spectacle as a pair of spectacles or glasses refers to a mediating instrument used in assistance of sight (Khan 2004). Thus, both definitions of spectacles whether as a theatrical event or as a material mediator for sight refer equally to “a form of mediation between the eye and the affective senses of the spectator” (Khan 2004), an important point in a consideration of spectacles as I demonstrate below.

As a concept, spectacle has also been apprehended within critical theory. In *Discipline and Punish* (1977), Foucault refers to the spectacle of public executions and torture as disciplinary social theatre. In *Suspensions of Perception*, Crary (1999) argues that forms of vision were reconstructed in the late nineteenth century with the advent of new forms of technological spectacle and wider historical transformations of modernization and rationalisation. These processes converge, he argues, in a culture of the spectacular that acts to disempower and isolate individuals (1999: 3).

Guy Debord (2002[1967]), however, has perhaps provided the most forceful analysis of spectacle to date through his critical analysis of the development of spectacle as a reflection of a wider capitalist system whereby increasing corporatization, a pervasive media culture and glossy marketing generate a consumer culture in which our social relations are mediated by the images and things we consume: “The spectacle is not a collection of images; it is a social relation between people that is mediated by images” (1967 section: 4). Debord published *The Society of the Spectacle* in 1967, one year before the worker and student uprisings of 1968 that sought an answer to felt and experienced dissatisfactions with capitalism, imperialism, and in France at least, Gaullism. Debord, acutely aware and involved in the kinds of manifest discontents that were being spoken of, addressed these concerns with his philosophical treatise on the nature of the spectacle. An understanding of the spectacle, as Debord saw it, was central to elucidating how a consumer society promoted by a mass media created a “pseudoworld” that ruled and defined the workers, rather than being ruled by them.
The spectacle was thus the reification of this world turning active consumers into passive subjects.

In an analysis that draws upon Marx’s theory of commodity fetishism and alienation, Debord characterises the spectacle as transforming human relations into objectified relations “where the real world is replaced by a selection of images which are projected above it, yet which at the same time succeed in making themselves regarded as the epitome of reality” (1967 section: 36). The spectacle thus promotes and reinforces the continued ignorance of this mediated reality: “The spectacle is capital accumulated to the point that it becomes images” (1967 section: 34). Debord describes modern life as presented through an immense series of spectacles, in which images are detached from everyday life and presented as autonomized aspects of reality. In this “separate pseudoworld” constructed through mass-media technologies and advanced capitalist modes of production, the spectacle becomes a version of reality that re-configures social relations between people, objects and materials. In its re-constitution of society to one dominated by the image, the spectacle, Debord argues “presents itself as a vast inaccessible reality that can never be questioned”, the passive acceptance of which is imposed by its monopoly of appearances (1967 section: 12). Thus, as Best and Kellner relate, “the spectacle is a tool of pacification and de-politicization” (1999: 133).

The spectacle, as the projection and inversion of a particular economic mode of production is not just an immaterial manifestation, but requires a degree of material “staging” in its display and exhibition. The material props, plots, actors, and scripts that contribute and underwrite the spectacle were perhaps overlooked in Debord’s original philosophical conception. Taking an anthropological lens to the spectacle, however, and tracing the material actors involved in its creation and support, lifting the curtain so to speak to peer into its black-box, provides new ways of apprehending the material basis of the spectacle of development: how it is sustained and what provides its sustenance. The spectacle in this instance then is rather not a separate illusory projection that stands apart from a ‘real’ world, but rather acts much in the same way that the heterotopia does, both as a reflection, yet also a very real material device, framing and cutting fragments of reality and transforming them in the process of their reproduction.
Debord developed his ideas in tandem with other scholars of the time, most notably those associated with the Frankfurt school, who coined the term "culture industry" to denote the industrialization of mass-produced culture (music, television, radio etc.) and its role in the reification of capitalist society. During this stage, subjects of the spectacle were conceived of as passive spectators, who watched and consumed rather than actively participated. Today however, with the proliferation of new forms of user-centred internet communication technologies, subjects are rendered more participative, actively contributing to the spectacle. Thus, I would argue, following Best and Kellner (1999), the spectacle today is not so much characterised by domination of the subject, but by transformation and alteration with a partial collapse of the subject/object distinction through a new fusion in cyberspace. Expanding and updating Debord's use of spectacle to the present day allows us to embrace the multiple and diverse forms of materialities employed in contemporary culture and its deployment in development institutions, such as the Barefoot College. Thus, through a broadened conception of spectacle from one dominated by the image, to one that encompasses the materialities of modern day development - internet based communications, videos, reports, people, narratives, the material devices of development work - I argue that the College actively assembles and mobilises marginalised people and things to produce spectacles of developmental change, simultaneously helping to enrol supporters to sustain its success. These material things act as powerful emblems through which ideas of development and social change are presented and performed to viewing audiences. In this instance, development, as the fetishization of the local and the traditional and its transformation via progress and modernity is not a new phenomenon, rather, I wish to suggest that conceiving of it in terms of the consumption of spectacles offers new ways for thinking and theorising about it. Thus, in the harnessing of new communication technologies for the purposes of sustaining convincing policy narratives through spectacle, the commodification of the transformation of the Other has gained new ground in development. The concept of spectacle, however, also highlights several tensions at the heart of the development project, namely the interrelated issues on the nature of the spectacle, the displacement of time, and the re-constitution of community.
The spectacle, Debord states, acts to conceal and hide from view a "real world" that is transformed and fragmented into a new "pseudoworld" of images and representation. In this conceptualisation, the spectacle transforms authentic social relations and modes of being, obscuring and disrupting all that was once directly lived, into mere representation. Thus, through a rampant consumer culture, something akin to an alternative reality is generated, where fantastical images, illusory dreams, and limitless choice replace the dull ordinariness of everyday life (Walton 2012). Debord and his fellow situationists argued that behind this façade there exists a 'real' world, an authentic world, unencumbered by the falsities and simulations of this consumer-led spectacle. As such, the very notion that there existed a 'reality' or 'truth' behind this spectacle was pre-given; reality could be discerned and it was waiting for the sceptical discerner to discover it. In advanced economies of today, however, we are awash in a sea of electronic mass media spectacles. As Walton (2012) has suggested in a recent comment piece on the spectacle, in this age of media saturation, in which incredulity replaces considered scepticism, and nihilism replaces belief in genuine knowledge, the line separating 'truth' from 'falsity', the visible from the invisible, becomes blurred and indistinct: "the laws of physics have no greater claim to finality than do poorly produced video-hoaxes on YouTube" (Walton 2012). This permeability of previously distinct realms in which everything is considered on an even surface, leads, paradoxically, to an uncritical outlook, one in which going along with this spectacle is the only choice available, for there is no alternative. As such, reality and unreality become blurred in the spectacle, which also affects the perception of time.

Development work, which aims ostensibly to improve standards of living and the economic outlook of certain areas, is a decidedly future-and-progress-oriented project. In Debord's conception, however, spectacle also acts to conceal and obfuscate a linear sense of time, producing instead a series of "pseudo-events that vie for attention in spectacular dramatizations [that] have not been lived by those who are informed about them; and in any case they are soon forgotten due to their increasingly frenetic replacement at every pulsation of the spectacular machinery" (1967 section: 157). Thus, through a "false consciousness of time" (1967 section: 158), historical time is replaced.
by a surface spectacle of commodified events and experiences, collapsing past, present and future distinctions, and precluding radical action. This appraisal of the spectacle and its effect on time also shares many of the characteristics of what Shane (2006) refers to as "heterotopias of illusion", a term that he applies to certain urban constellations, which utilise modern technologies to facilitate or arrest change through imaginary illusions. Heterotopias of illusion, he states, "allow actors to monitor and adjust the shifting balance of images and values ... by manipulating symbolic icons within communication systems" (2006: 260). The spectacle, much like a heterotopia of illusion, allows the creation of virtual images of people, objects and practices across space and time through modern communication technologies such as television and the internet. Through the use of these technological utopias instant connectivity is possible, recombining and compressing images of people, places and periods, producing new heterotopic assemblages, which act to disrupt a linear sense of time (Shane 2006: 264).

In the Barefoot College, which at once projects itself as both traditional and modern, time is collapsed within a never-ending present. This is augmented via its projection of spectacular events that vie for attention and are quickly forgotten as new concerns come to light. From integrated development to participation, women's rights and caste equality, to more recently sustainable energy production and village entrepreneurs, the College continually adapts itself to an ever-changing development landscape, marketing underdevelopment for consumption by a development industry. In this disconnected landscape, each moment, each spectacle is presented "on an even surface, without depth or a sense of the historical process, as bricolage" in ways that maximise their impact (Firat & Dholakia 1998: 80). (In chapter two, I further explore the ways in which the College has sustained its success through the spectacle of the heterotopia).

A further tension inherent to spectacle and its use as an analytic in conjunction with the College is the way in which it weakens social connections. In the same way that spectacle inhibits a consciousness of historical time it also acts to undermine a sense of community through the alienation and isolation of its subjects, thus hindering meaningful social ties. The Barefoot College, however, generates and re-constitutes certain kinds of interpretive communities around its production of spectacle. As
mentioned above, it is worth remembering the historical context that *Society of the Spectacle* was written, in which a youth culture, marginalised and powerless voiced their frustrations at a perceived out-of-touch and imperialist state. This was augmented by a dominant culture industry, selling dreams that few could hope to afford or achieve. While, to a large extent, television acted to sustain and augment the spectacle through the transformation of all that "was directly lived" into mere representation, it was also the medium through which the youth of France and beyond in 1968 learned about others who shared their hopes and values. It has been suggested previously that for the first time, television united a global generation in common purpose and vision (Kurlansky 2005).

In the latter part of the 1960s, two innovations in technology changed the way broadcast news was relayed and experienced. The first, videotape, allowed an inexpensive means through which everyday scenes could be recorded without recourse to elaborate stage-setting and planning, an issue previously associated with expensive and time-consuming film shooting. Thus, video recording allowed much greater flexibility and application of its use. The second major technological development to change television was live satellite transmission which allowed same-day broadcasts to be transmitted across the world (Kurlansky 2005: 53). Cohn-Bendit, one of the leaders of the student protests, has previously stated of his fellow leaders: "We met through television" ... "through seeing pictures of each other on television. We were the first television generation. We did not have relationships with each other, but we had a relationship with what our imagination produced from seeing the pictures of each other on television" (Kurlansky 2005: 240). Thus the mediums of the spectacle may also act to bring about change and protest against its very processes.

Today, these mediums include the plethora of applications associated with internet-based communicative technologies, many of which the Barefoot College utilises judiciously in its own form of spectacle. From social networking sites such as Facebook and Twitter, to video-sharing websites such as YouTube, online news-sites, blogs, and traditional electronic mail (e-mail), the internet provides a multitude of platforms through which individuals may communicate, rally, share common interests and make
themselves heard. Such technological catalysing agents perhaps reached their zenith in the recent Arab Spring uprising during which social and digital media were widely seen as playing a crucial role globalizing the reach and appeal of domestic movements for democratic change, and brokering connections between previously disconnected groups. Notions of social change also call attention to the ways in which the spectacle may be resisted. Debord and his fellow situationists emphasised strategic aspects of ‘détournement’ through which pre-existing elements of the spectacle may be subverted, reassembled and turned against it. These assertions echoed later shifts within cultural studies that reacted against ‘transmission’ based models of communication associated with the Frankfurt school and instead asserted the agency of the ‘active audience’ in delineating control over the message. The transmission-based model conceptualised the movement of media content as a linear process of information transfer, from an authoritative source to an uninformed receiver, often referred to as the “hypodermic needle” approach (Hooper-Greenhill, 2000: 133). It conceptualised the communication process as a single, one-way, linear trajectory. The selection, definition, and control of the ‘message’ lies with the communicator who as power-broker has both authority and power to select the message and define it as ‘true’ (Hooper-Greenhill, 2000: 134). The learner, or receiver of the message, is rendered cognitively passive and as such, plays no part in the making of meaning. The adequacy of this approach, however, has been called into question in recent decades by communication theorists who have developed the concept of ‘the active audience’. They attributed a measure of power to audiences, who they argued, appropriated media texts, emptied them of their original meaning, and filled them with new, locally relevant meanings (Askew 2002: 8).

Thus, it may be argued that there is room for manoeuvre within the spectacle, to gaze back at its all-encompassing brilliance and reassemble its message. Certainly, as I document in this thesis, there are times when this is possible. As I highlight in chapter three, one of the key actors in question challenged the dominant narrative put forth by the College to enact his own version of events, and in chapter seven, another key actor in the Gambia becomes resolutely disillusioned with the spectacle of development offered by the College, but finds his own voice silenced in the process. However, as
other authors have suggested (e.g. Rumbo 2002), opponents to the institutions of consumer society are hard pressed to avoid being commodified themselves with those critiques that cannot be successfully re-appropriated, routinely marginalised and silenced by their exclusion from mainstream media discourse (Rumbo 2002: 143), a point which I demonstrate throughout this thesis (in particular, see chapter six). Thus, by co-opting the voices and imaginings of those individuals, it can be argued that those very same radical ideas and images are neutralised, absorbed, defused and incorporated into the spectacle of dreams, nullifying their force and energy, and sustaining the status quo. In a point that I will return to in the conclusion of this thesis, I suggest that the spectacle of development, as the deployment of hopes and dreams, acts in a mirror-like fashion, reflecting desires for a better world, yet at the same time precluding their realisation.

In the production and implementation of images, displays, practises, and materials, spectacle is often a theatrical performance that acts ostensibly to legitimise and conceal symbolic acts of violence while masquerading as a celebration of progress and betterment (Boje 2001: 437). As a performative activity, it is worth briefly considering how performance has been apprehended in anthropology and its relevance to the current study. Performance studies as they have been considered in anthropology, have largely taken the form of what it can show about other institutions in social life such as religion, politics and gender (Beeman 1993: 370). Bateson and Mead (1952) developed some of the earliest theoretically informed work on performance through their film on *Trance and Dance in Bali*, which in turn helped establish performance as a recognized field of study in anthropology. Goffman (1959, 1974) further developed the idea of the "frame", a concept borrowed from Bateson (1972 [1955]), to demonstrate how individuals conceptually organise their experiences of social life by structuring or 'framing' experiences and events. Other anthropologists who have studied performative aspects of culture include Turner (1967, 1969) through his early work on Ndembu ritual and Geertz (1973) who developed notions of performance in relation to religion and politics in his study of Balinese life. Turner in particular drew upon the idea of the 'frame' to delineate the relationship between performance-related events and everyday life (Beeman 1993: 379).
This separation of "real life" from performative activities were also picked up and developed by scholars of theatricality, including Beeman (1982, 2007), Davis (1982), and Schechner (1985, 1988). As a way of apprehending many of the performative activities undertaken by the Barefoot College and development in general (see for example Mosse 2005: 169), many of the modalities associated with theatre and performance can be usefully applied in the current context. Thus, characteristics of theatrical performance, as Bauman (1989) relates, include a temporal and spatially bounded character performed in an enacted space to a viewing audience (1989: 265). This is often complemented with situational markers such as paraphernalia, costumes, and elements of setting that function to signal the act of the performance and frame the event from external reality (Bauman 1989: 264). Furthermore, in theatre and spectacle, Beeman (1993: 379) states, performers present themselves in roles outside of their everyday identities, usually as representative of a wider collective or reality. Thus, as I detail in chapters six and seven, the solar trainees are surrounded by the paraphernalia of solar engineering at all times during visits by donors and guests. Their "stage" area is the workshop, their dress the traditional Indian garments of colourful saris, which act to separate them from their "normal" existence as mothers, grandmothers, and farmers. In this respect, in their performance of the role of solar engineer to a viewing audience, they stand as symbols for social progress, the reversing of "traditional" gender roles, and the levelling of social hierarchies.

The significance of performative activities, much like spectacle, is in many instances proportionate to the degree in which the events portrayed to an audience are meaningful to elements in their own social and professional lives (Beeman 1993: 380). Thus, as I illustrate throughout this thesis, the Barefoot College and the solar trainees are embedded within, and indeed enact profound developmental themes from gender equality and empowerment (chapter six), to knowledge transfer (chapter seven), and the reversal of social hierarchies (chapter three). These heterotopias of development are mobilised and made meaningful by the audiences of development who, as participants in the network, act to enrol support, translate outcomes, and continue the functioning of the Barefoot College.
As an example of how spectacle may contribute to an analysis of systems of knowledge and representation within the Barefoot College, I would like to briefly consider how the College draws upon discourses of gender and technology as part of its heterotopia of development change. As a mobiliser of development spectacles, the College combines deep-seated and pervasive development discourses of gender equality, social transformation, self-development, and progress through technology to convince donors and supporters of its efficacy. In the following, I begin with a very cursory overview of the main approaches to gender in the fields of technology and development, and go on to discuss how such discourses are mobilised by the College.

**Gender, Technology and Development**

As Bray (2007) observes: “One fundamental way in which gender is expressed in any society is through technology” (2007: 38). Technology plays a central role in how individuals live their lives, helping to shape identities, forms of power, and everyday experiences of gender. Commonly, men in the modern world are viewed as having a natural affinity with technology, tinkering, fiddling, making and using - technology is resolutely coded as male; women, on the other hand, are ordinarily considered at odds with technology, anxious and afraid of it (2007: 38). As Bray outlines, such constructions have been tackled most forcefully by scholars in the field of gender and technology studies, or feminist technology studies (FTS), who have been at the forefront of debates on the role that technology plays in the shaping of gender regimes (2007: 38).

With the simultaneous analysis of technology and gender, FTS scholars have developed innovative approaches to the ways in which technology has conventionally been approached in the social sciences, undermining gender stereotypes and overturning masculinist accounts of modernity (2007: 40). Notable areas in which FTS scholars have made significant contributions include constructivist approaches to technology, particularly how technological artefacts are shaped by social forces. Two seminal works, *The Social Shaping of Technology* (MacKenzie and Wajcman 1999) and *The Social Construction of Technological Systems* (Bijker, Hughes et al. 1987) epitomized the new
turn to technology and with it, the aim to uncover the influence of society on technology.

As Bray notes, however, such “upstream” approaches initially excluded the role of women in the construction of artefacts (2007: 40). Later studies though uncovered previously unseen aspects of the gendered construction of such artefacts e.g. the “gender scripts” incorporated into the telephone (Rakow 1992); electric shavers (Van Oost 2003); and the mobile phone (Shade 2007), amongst others. This mirrored a general trend to studying “downstream” approaches to the consumption and meaning of technology for consumers, and the gendered dimensions of how users engage and think about technologies (Bray 2007: 40). Drawing upon gender theorists such as Butler (1993), FTS scholars have since been prominent in the study of how gendered identities are performed through technologies, forms of practice and skill, as they uncover the broader configurations of power that act to shape such identities (2007:41). Such work has also influenced recent approaches to masculinity and technology in the production of gendered selves and persons. Cross (2012), in a study of tools, machines and practice within a diamond-cutting factory, explores how embodied engagements between persons and things produce gendered selves and understandings, in the process, challenging conventional understandings of industrial technology. Critical studies such as these have helped challenge and question hegemonic masculinist imaginings of technology as the purview of white, Western men, by integrating female, non-Western, non-white users as co-producers (a point that the Barefoot College skilfully draws upon in its development initiatives).

Academic debate on the topics of gender and technology has also had significant impact on the role of women in development. In the field of development, the place of women and their role in the social and economic development of countries and communities had until this time been dominated by the so-called ‘Women in Development’ (WID) approach.17 In the mid-1980s, insights generated by FTS scholars and others (e.g. Oakley 1972; Rubin 1975) led to a recognition of the limitations of studying women in development and the important, yet previously neglected role of women in income-generating activities in developing nations and the differential challenges and constraints that women faced (1993: 2).

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17 Moser (1993) traces this concern to the United Nations’ Decade for Women (1976–85), which played a crucial part in highlighting the important, yet previously neglected role of women in income-generating activities in developing nations and the differential challenges and constraints that women faced (1993: 2).
isolation and hence attention shifted to ‘Gender and Development’ (GAD) as a focus that took account of the socially constructed relations between men and women in development, and the ways in which they acted to subordinate women (Moser 1993: 3). Since this time, gender has become a central feature of development policy and practice, helping to redefine and reshape development interventions (Cornwall et al 2007: 5).

Whilst gender today is a mainstay in the development theory and practice, the same cannot be said for gendered dimensions of technology within development. As Everts (1998) notes in one of the few books to address the topic, the importance of technology for development cannot be overestimated, generating the potential for enormous social change, both positive and negative, particularly so in the case of women (1998: vii). As a byword for knowledge, progress, and modernity, technology holds the promise of development of undeveloped societies and empowerment of disadvantaged communities. In gender and development discourse, technology is often linked to notions of agency, independence and the challenging of social norms where educational or professional forms of expertise exclude women as participants and users of technology.

In relation to traditional Indian craft, Venkatesan (2009) shows how in the performance of craft and the relations between people and materialities, “Indian craft specifies utopian and ideologically driven relations between persons and things that are abstracted from other social spaces and associated (Latour 2005) in specific ways” (2009: 83). In comparable ways, the Barefoot College’s success, I argue, is partly attributable to its role as a site that enacts and makes visible these different heterotopias. In the performance of gender through technology, the College draws upon and enacts certain social categories and discourses that produce a forceful dialogue of utopian social change with appeal reaching beyond the relatively closed doors of the development community.

As a tangible example of how technologies, gender and practice are performed, it is possible to usefully compare such material and abstract assemblages to the film spectacular Solar Mammas that opened this chapter. In the tracing of the various material (both human and non-human) and conceptual actors comprising these knowledge systems, and the ways in which they combine to form identities, narratives,
and sociotechnical systems, actor-network theory (ANT) provides a useful analytical and methodological fit to uncovering the backstage workings of the spectacles produced by the Barefoot College. Furthermore, in its pursuit of exposing the often ignored 'infrastructure' that is usually left out of "heroic" accounts of scientific and technological achievements (e.g. Latour 1988), ANT\textsuperscript{18} would appear methodologically well-suited to the spectacles and ignorance produced by the Barefoot College.

As Latour (see 1987; 1988; 1993; 2005) and others (e.g. Callon 1986; 1987; 1999; Law 1986; 1988; 2001) have argued, networks of seemingly incommensurable actors comprising objects, persons, and ideas are the stuff by which complex systems are given meaning and stability. Uncovering the various actors involved in the construction of these systems and spectacles, opening up the black-box to view its backstage workings, may provide us with clues as to how the success produced by the spectacle of the Barefoot College is achieved. Solar Mammars constitutes by most measures, a successful documentary film that was honoured by the Sundance Institute. Its very success however, the fact that it works well as a dramatization of development, showing Rafea's struggles with her controlling husband, the threat of losing her daughters, and her transformation from 'oppressed' Muslim wife to liberated and enlightened solar engineer, causes all the work and labour that created it to disappear from view. Paradoxically, as Latour (1999) notes, the more successful a venture is the more opaque and obscure it becomes (1999: 304). However, drawing back the curtain of this spectacle to expose its offstage workings, the networks that stabilise it, unveils the missing masses that comprise its success. As a material device, the film illustrates how development spectacles are framed and filtered in the production of fragmented realities. As audience members, we are permitted to see only that which is selected and edited in fulfilment of particular narrative constructions. Scenes move slickly from one to the next, omitting the 'messy', disorderly work involved in development. Rafea is shown arriving at the College, settling down to the work of solar engineering before things take a twist and she has to attend to her worsening family situation. Six months later, Rafea is

\textsuperscript{18} The distinctive approach of ANT is to collapse typical ontological distinctions and traditional sociological dualisms of nature/society; agency/structure; human/material by drawing attention to their interlinked domains and the inherently heterogeneous networks of entities that comprise them.
shown passing out of her final training session as an accomplished solar engineer. The intervening period is passed over for the human drama of Rafea’s family struggle, with the disorderly work of development reduced to an input/output view. In addition, the actors that comprise its performance: video cameras, lighting, camera operators, narrators, and translators, the infrastructure involved in bringing the film to our screens, are overlooked and ignored in the projection of an engineered display of development spectacle.

The seeming dramatic transformation of marginal individuals to confident users and producers of sophisticated technologies, as demonstrated in Solar Mammas, constitutes an attractive spectacle of development change that has appeal beyond the development world. This discourse of the development of ‘disadvantage’ is forcefully enacted and marketed within the space of the College, one that, through its spectacle, acts to augment its success. In their abstraction from a more fragmented and disordered whole (Venkatesan 2009: 82) that conceals and obfuscates wider issues and power imbalances, the Barefoot programme constitutes a kind of development “magic bullet” which in its discreteness threatens neither current forms of power nor does it demand radical structural change. On a more popular culture front, such mobilisations also have resonance to contemporary Western notions of social transformation of the individual, hence its widespread coverage in international media outlets. As I discuss in later chapters, the College draws upon the material enactment of these knowledge systems and mobilises them through modern communication technologies in its pursuit of the further enrolment of donors and supporters.

The mobilisation of these discourses into meaningful practices of social transformation produces a carnivalesque spectacle of development, which in its visual force acts as a veritable black-box to its viewing audience. As I will show in later chapters, through its opaqueness, the spectacle conceals the fragmentary and often contradictory networks that are embedded within. In this way, and as Debord (1967) has elaborated, the spectacle transforms the “real world” into images that cannot be questioned: “It is whatever escapes people’s activity, whatever eludes their practical reconsideration and correction. It is the opposite of dialogue” (1967 section: 18). Such mobilised meanings
are given weight and significance by “interpretive communities” (Mosse 2005), which act to enrol support and participate in this mediated reality as if it were objective fact. These groups of “believers” (Mosse 2005: 172) are the public audiences for the drama of development change within the Barefoot College. The spectacle is thus an example of how development projects manage and sustain success, helping to “conceal the contradictions and weak causal connections between project activities and claimed outcomes” (2005: 18). As I noted in the opening chapter to this thesis, such masquerades are not the result of a cover-up or plot of intrigue, but are rather part of a heterotopic spectacle so robust, compelling and convincing, one that a development audience needs to ‘believe’, that the contradictions occasioned in its course go unquestioned and ignored.

However, the question remains as to why the kinds of spectacles being marketed and sold by the Barefoot College, as discussed above, are appealing; why do they hold such power over the imagination? To answer such questions, I turn to Foucault and his imperfect approximation of a worldly utopia, that is, the ‘heterotopia’. In its manufacture of spectacles of gender, underdevelopment, social transformation and technological empowerment, the College is marketing particular kinds of spectacles to particular audiences. The College, I suggest, is marketing hopes and dreams of what is possible to a development audience that needs to believe in the impossible.

**Spectacles of Otherness**

In medicine, the term ‘heterotopia’ refers to the formation of a tissue, or group of cells, in a part of the body where its presence, although abnormal, is tolerable. Such notions of ‘Otherness’ and co-existence sparked Foucault’s interest, who extended the concept to describe spaces that have more meanings and associations with other spaces than is immediately apparent. Foucault describes the real and imagined areas of the world that act as “counter-sites”, that is “a kind of effectively enacted utopia in which the real sites, all the other real sites that can be found within the culture, are simultaneously represented, contested, and inverted” (1986: 24). In the following, I describe the
characteristics and principles of the heterotopia and why it has applicability to the Barefoot College as a heterotopic space.

The heterotopia, in Foucault’s conception, is a site that inverts, contests and suspects all the relations in which it mirrors, speaks about, and to which it is set against. The heterotopia is a place of Otherness, which is constituted in relation to other sites by their difference. It is a world in the process of becoming, one of constantly evolving relations, and one that discloses and makes real through inversion all the other spaces in which it is located. Thus, its role is one of exposure, to bring to light the chaotic and disordered spaces of its environs, and to create a contrastive space that displays and performs its ‘perfect’ Other (Venkatesan 2009: 82). In the Barefoot College, an idealised spectacle of development, self-transformation and radical social change is produced and enacted through a variety of persons and materials that is contrasted with the inequities of a wider society where casteism and gender inequality are widespread, and the inadequacies and disorganisation of a development industry that is seen as out-of-touch with rural realities. As I demonstrate throughout this thesis, the College is a space that invokes and mobilises these contrasts, from indigenous, rural know-how and wisdom in contrast to urban, professional elitism (chapter three), to the transformation of uneducated and illiterate women into confident users of technology (chapter six). The College as a heterotopic space is one that reconstitutes these various persons and things into objects worthy of praise and wonder.

Another principle characteristic of the heterotopia, Foucault states, is its symbiotic role in society and history as that society unfolds over time. As the culture in which it is embedded within changes and transmutes, so too does the heterotopia to which it reflects. Thus, as I demonstrate in chapter two, the College as a heterotopia, is a site that has continually altered and modified its vision in line with changing nationalist and development concerns. The College has drawn upon notions of the village, of the ‘real India’ and contrasts it with a corrupt and globalised metropolitan imaginary, projecting itself as at once authentic yet progressive, and connecting past to present. Similarly, with its adoption of solar technologies as a development tool, turning marginalised persons into modern, knowing entrepreneurial subjects, the College has embraced not only new
forms of development ideology, but also new forms of nationalist power as a modern, self-confident India turns from aid receiver to aid giver.

The heterotopia is also capable of juxtaposing in one place several different spaces that are themselves incompatible. Thus, the Barefoot College as a development institution embraces both the timelessness of its rural environs, generational knowledge and traditional ways of knowing, yet also contrasts these with modern ways of doing, of gender and caste equality, and the empowerment of women through technology, namely technologies that are traditionally coded as male. Similarly, in its use of modern forms of technology such as solar photovoltaics for lighting, the College employs modern signifiers of progress within ‘pre-modern’ ways of knowing and doing.

Lastly, the heterotopic space always presupposes a system of opening and closing that “both isolates them and makes them penetrable” (1986: 26). Thus, the heterotopia looks like it is accessible, yet it is not: “To get in one must have a certain permission and make certain gestures” (1986: 26). The Barefoot College, as a development institution that brings together marginalised persons and things also reserves the right to refuse entry to those that do not match its criteria. Thus, as I discuss in later chapters, in its solar programme, only those who are deemed poor, uneducated, old and illiterate are given entry. Similarly, in its dispute over an architectural award (chapter three), only those without qualifications and education were accorded recognition in the construction of its campus buildings. Reflecting Venkatesan’s (2009) study of craft producers in India, the marginalised persons identified by the College as in need of social change are also presented as victim or symbol (2009: 83), valued for what they signify, rather than what they actually have to say (see chapter six). Their entry into the heterotopia is a highly managed and choreographed affair. What distinguishes the College, however, are the ways in which they mobilise and deploy these heterotopic images through spectacles of development.

The Barefoot College is a site in which heterogeneous assemblages of people, materials, practices and concepts converge, interact and make manifest different social orderings as defined by their contrast with other sites, and other worlds. The heterotopia of development as performed by relations between people, things and practices at the
Barefoot College enacts certain ideals and values that are then mobilised and deployed as its influence and pursuit of success grows. These relations are abstracted from other social spaces, reassembled and given significance in culturally resonant ways through heterotopic spectacles. Thus, this thesis takes a step towards understanding how heterotopias move beyond the walls of the sites in which they are conceived, to consider the material enactments through which they travel and are translated. In the case of the Barefoot College, it does this through the spectacle of development and the ignorance of development praxis. Thus, to answer the question of what gives the spectacle produced by the College its resonance and power, I suggest that through the inversion of social and developmental outlooks and the projection of their Other, the College acts in a mirror-like fashion, reflecting back to its audiences all that they wish and hope for whilst excluding from view that which does not measure up. The concealment of such contradictions, routed in what is not known, of the ignorance of development machinations to a viewing audience, is what concerns us in the next section.

**Spectacles and Ignorance**

In my consideration of what is not known about the Barefoot College, of the ignorance that ensues when the methods of a development organisation are effectively black-boxed through spectacle, I contemplated a number of theoretical approaches that might best account for such opaqueness, including the silence of the subalterns as expressed by postcolonial writers such as Spivak (1988), and Said (1978), and the “contact zone” of colonial encounters as conveyed by Pratt (1992), and Clifford (1997). However, while insightful, such approaches did not fully cover the material means by which silence was enacted and the ignorance, or non-knowledge that resulted.

In its pursuit of what is not known, of the ways in which deficiencies in knowledge are formed within particular social contexts and the substantive effects that such absences can incur, the anthropology of ignorance, I propose, provides a constructive approach to the question of how the College manages success whilst screening out the resulting ambiguities and contradictions. Heterotopic spectacles, by their very nature, involve the
foregrounding of certain voices, images and events, yet also the back-grounding and omission of others in order to *work*. Much of this occurs in the same way that Harman and Chomsky have explored in relation to television, itself a medium of the spectacle, whose power resides in its ability to select certain topics for contemplation through the framing of issues, the filtering of information, and selective emphasis on tone and engagement (Herman & Chomsky 1988: 298). A consideration of how ignorance supplements spectacle as a distinct, yet complementary activity, may lead, I argue, to unique insights into the ways in which development work functions. In the following section, I outline what an anthropology of ignorance entails and what it offers to a study of the field site.

The study of ignorance in anthropology, as Mair et al (2012) suggest in a recent edited collection, has traditionally been conceived as a purely negative phenomenon, “as the null state that obtains when the flow of knowledge is interrupted” (2012: 3). In this view, ignorance has no effect other than that performed by the absence of knowledge; ignorance is thus rendered devoid of form or substance. In contrast, however, an anthropology of ignorance starts from the premise that under certain circumstances, ignorance can have a form all of its own “as the product of specific practices, with effects that are distinct from the effects of the lack of knowledge to which the ignorance in question corresponds” (2012: 3). Thus, as the authors note, in their pursuit of knowledge, anthropologists have perhaps overlooked the importance of ignorance in the construction of knowledge practices and systems. Ignorance, they argue, implies absence, which by its very non-existence, as a negative without effect, without form or shape, has perhaps precluded serious anthropological study (2012: 3). Ignorance, however, as Vitebsky notes (1993), far from equalling a shadow-like state of emptiness, is rather knowledge of another kind denied, denigrated or altogether suppressed in the struggle for dominance and the authority to speak on its behalf (1993: 101). Ignorance, therefore, is an active, rather than a passive process of enfolding, a moving shadow to its luminous twin.

It is with this premise in mind that I come to an anthropology of ignorance, one that seeks to explain not gaps in knowledge, but rather how those gaps are fashioned and
how such ignorance can be a ‘productive’ force for the on-going success of an organisation. Ignorance, in terms of the functioning of the Barefoot College, acts as a black-box, the inability of its audience to question and engage with its spectacle of development, serves to reify and further convince spectators of its legitimacy. Before commenting further on what an anthropology of ignorance offers to a study of the Barefoot College, I will briefly outline how anthropology and development studies have approached ignorance in the past.

**Ignorance in the Social Sciences**

As Mair et al note (2012), from the 1970s onwards, most classical anthropological treatments of ignorance did not address the subject substantively; rather it was conceived as a consequence of a Marxian perspective on the limits of cultural knowledge, as a form of false consciousness (2012: 14). In contrast, authors such as Foucault and Bourdieu approached ignorance as a form of social control, of the ways in which the unsaid could be constructed and mobilized in the interests of power (e.g. the ‘medical gaze’, the disciplinary power of penal systems and schools, symbolic violence and bodily habitus). These developments led to new approaches to ignorance, of the ways in which social actors potentially use ignorance and the suppression of knowledge to facilitate their own aims and goals (2012: 14).

Mair et al (2012) suggest that part of the reason is concerned with wider intellectual developments concerning the limits of the known, foremost of which is the growing influence of the sociology of knowledge, and science and technology studies (STS), the methods of which trace the entanglements of material objects and various forms of knowledge in the displacement of rival knowledge networks (e.g. Latour & Woolgar 1986[1979]; Hughes 1983; Bijker et al 1987; Latour 1987). STS and its sibling actor-network theory (ANT) have both been concerned, in one way or another, with the wider investigation of how certain knowledge systems come to displace rival networks through the translation, stabilisation and defence of certain heterogeneous networks of association (e.g. Hughes 1983; Callon 1986; Latour 1988).
As a topic of investigation, the study of ignorance and its effects in different contexts has ebbed and flowed in the social sciences, the majority of which have taken ignorance as an absence of knowledge, rather than a productive force in its own right. More substantive examinations of ignorance in this vein include Mark Hobart's edited collection *An Anthropological Critique of Development: The Growth of Ignorance* (1993), in which various authors explore the dismissal of local forms of knowledge by Western development experts, in the process contributing to the growth of ignorance, rather than the growth of knowledge. In a special issue of the journal *Social Analysis* (2000), Gershon et al take issue with the notion of ignorance as a blank state and instead explore ignorance as an active social process. Ignorance has also been a theme considered within social studies on India, in particular through the work of the Subaltern Studies Group (SSG), a diverse body of scholarship that emerged in the 1980s with the aim of reinscribing Indian history with the voices of a previously ignored social group (see Arnold and Hardiman 1994; Chatterjee and Pandey 1993; Guha 1997; Spivak 1988). The Subaltern Studies Group, influenced in large part by the Maoist Naxalite uprisings of West Bengal in 1967 (Young 1990: 18) and various postcolonial writings, most notably Edward Said's *Orientalism* (1978), were formed in response to the West's homogenising and totalizing view of Indian history without recourse to the resistances and voices of the non-elites of Indian society.

One field where this approach has had particular influence is within development studies. In the employment of ignorance and its surrogates - silence, obscurantism, secrecy, and disinformation - post-development theorists have perhaps been exemplary in demonstrating how ignorance and non-knowledge have been used strategically either to stabilise disorderly knowledge systems or to highlight the unequal boundaries of knowledge systems. With regard to the latter, one particularly strong vein of writing within development has highlighted how certain knowledge systems such as science, rationalisation, and Western development discourse in general have sought to displace indigenous knowledge systems as the one 'true' epistemology (Gershon & Raj 2000: 6). Authors in this vein (e.g. Escobar 1995; Ferguson 1994; Arce and Long 2000; Mosse
2005) have variously explored how ignorance is constructively utilised for the purposes of influence, control and power.

In their various ways, anthropologists of development have tackled the very real uses and abuses of ignorance in the constructions of development discourses and practices. As we noted above, anthropologists have, in the main, approached ignorance tangentially, more as an outcome of deficient practice, rather than an instrumental goal. Throughout this thesis I argue that in certain circumstances, ignorance can be a productive force in life, and further, that it may usefully be applied in the study of how development, and life in general, is apprehended. In the context of development, as Ufford (1993) notes, this means the study of how knowledge and ignorance are generated in the course of policy production and its implementation. In addition, this does not so much constitute a comparison of development representations with “actual” on-the-ground realities, but instead, involves trying to trace the part played by knowledge and ignorance in the struggle for power between competing groups and networks in their efforts to build robust interpretive narratives (1993: 141-2).

Development efforts, as Ufford (1993: 142) has stated, must fit the requirements and views of those who set in motion the wheels of aid work: donors, policy makers and supporters. At the same time, however, it must also appeal, to its various public audiences in such a way that it not only convinces without question or ambiguity, but also displays elements of novelty and uniqueness. The balancing of the two to achieve a credible end requires both the spectacle of development policy being effectively implemented, and the silence and ignorance of its inevitable limitations. Ufford (1993) suggests that this balancing act, the co-existence of multiple, often contradictory bodies of knowledge, is achieved via the segmentation of knowledge within an organisation to achieve an overall coherent framework (1993: 142). I argue, however, that in the case of the Barefoot College, ignorance is produced through the spectacle of certain heterotopic orderings that the College disseminates through a plethora of multi-media events, awards, conference addresses, project documents and videos, and the ignorance that such spectacle inevitably induces.
Thus, through the material *spectacle* of contemporaneous concerns, some voices are silenced and shrouded, while others are elevated and amplified. The kinds of spaces in which spectacle is played out in the College, namely that poor, uneducated individuals have the potential to pull themselves out of poverty, reverse gender norms, challenge social prejudices of caste (in the case of Indian trainees), age, and education, tells us more about the kinds of concerns and world-views of the donors and audiences of development than they do about the recipients themselves (Ufford 1993: 154). Such silence, however, is never inert, but is rather fashioned through particular socio-material assemblages; to silence, to hide from view, is to actively construct.

Such silence and ignorance, however, need not be seen as manifestations of a deliberate cover-up or deception, but are rather the result of the black-boxing of development work, one in which, the spectacle of developmental change increasingly acts to conceal the relationship between policy and outcomes (Mosse 2005: 4). As Ufford et al (2003) note, as the ambitions of development work shift from local concerns to national and international approaches, the black box separating inputs from outputs is drawn wider and wider, obscuring and silencing on-the-ground realities (2003: 9). Ignorance, as Ufford (1993) argues in an earlier paper, is an essential aspect of development work, helping to ensure that official development policies, images, representations and discourses are neither questioned nor disturbed. As Ufford states: “In a sense, ignorance and bias are not just important, but inevitable, at this stage, although no one involved would admit it” (1993: 154). This is particularly apt in the case of the Barefoot College analysed here, a community-based development organisation that has, in recent years, seen its reach extend to all corners of the globe through its worldwide solar development programme. By prising off the lid of the black-box, to consider the mechanisms underpinning spectacle and silence, this thesis attempts to account for how such success is achieved and sustained.

As an example of the ways in which an anthropology of ignorance may be approached, in chapter four, I discuss how ignorance was utilised by the College in its pursuit of an award for the construction of its main campus. As I outline, in its acceptance of the award for the construction of its campus buildings by uneducated “Barefoot Architects”,
the College judiciously ignored that they had in fact been designed by a professional architect who drew up plans and oversaw their construction. As I discuss more fully in the chapter, the question of who is “right” and who is “wrong” misses an important point. Rather, the question that concerns an anthropology of ignorance, is how such knowledge claims are generated and the uses to which ignorance and silence are employed in their construction. Thus, in the denial and ignorance of modern professionalised forms of architectural expertise, the College simultaneously challenges social hierarchies based on education and puts forth a development discourse that celebrates the resourcefulness of uneducated, rural ‘architects’. Through the tracing of these power struggles, and the parts played by knowledge and ignorance, we at once become aware of the role played by certain discourses (e.g. the prevalence of an ideological viewpoint that often celebrates the ‘grassroots’ perspective while opposing modern forms of expertise), and additionally, how these are enacted within material practices of development.

Ignorance, however, is not just something practiced by dominant society institutions such as development organisations, but can also be advantageously employed by its subjects. Many of the solar trainees during my time at the College spoke fluent English in addition to their mother tongue, could read and write, and had clearly been educated beyond primary levels. Some others were also too young to be grandmothers. Others still were not the actual trainees selected by the College; rather, the communities in question substituted their own choice of trainee in place of the College’s. Such attainments were in contrast to the College’s remit of training illiterate, uneducated grandmothers chosen on the basis of their marginality and certain socio-economic criteria. This was to be a recurring issue for the College. On one such occasion while I was sitting outside the STD (telephone) booth drinking tea, a group of Sierra Leone trainees arrived, fresh from the airport. A senior Barefoot management head sitting with me commented that “They are too urbanised” (field notes 23.3.10). Pointing to the large suitcases strapped to the roof of the jeep, nice looking clothes and well-nourished frames, he explained that neither were they poor enough nor were they from the villages. This was confirmed, he stated, when they stopped for food mid-way to the College from New Delhi and the
women stated they could eat only meat. A true villager, he explained, should be used to surviving on a vegetarian diet, at least some of the time, and would have no money for such large suitcases. Thus, the communities and trainees in question employed their own forms of ignorance to provide themselves with new skills and further their life prospects.

**Concluding Remarks**

In conclusion, through an ethnographic study of development organisation, this thesis seeks to explore the methods and practices by which the organisation in question produces forms of knowledge and 'success'; how they are enacted and made mobile through different material becomings. It achieves this, I argue, through a combination of the spectacle of development, yet also through the silence and subsequent ignorance of development praxis. Echoing Venkatesan's (2009) study of traditional Indian craft, the College, I suggest, is a space in which marginalised people and things are brought together and re-constituted as valorised objects worthy of attention and acclaim (2009: 78). Such valorisation is both a consequence of certain material attributes that they combine to perform, yet also a reflection of certain ideals that they are embedded within and in which they augment through their mobilisation. The contexts in which this thesis seeks to describe these ideals include notions of authenticity and the 'real India', technology for progress, social transformation through education, gender equality, and the nation-state. Such ideals, when performed and mobilised through the materials described in this thesis, constitute a spectacle, which in its dynamism acts to conceal the disjointed and chaotic whole from which they are derived. The spectacle then at once objectifies and silences fragmented and isolated parts, unifying them around a common theme of development for consumption by viewing audiences. Individually, these atomised parts: solar lamps, marginalised women, buildings, practices, tools, and light itself, do not merit the kinds of acclaim that the College has become accustomed to. However, when performed together, when mobilised as a heterotopic spectacle, they occasion national and international wonder, re-defining them as objects of the 'sublime'
(Nye 1994), which then draws upon and enacts certain ideas and discourses which have resonance to their viewing audiences.

The spectacle of the heterotopia relies heavily on the meaning that certain assemblages of persons and things generate, and on their mobilisation via information communication technologies to viewing audiences. Spectacle coalesces with silence and ignorance in the praxis of development to generate the convincing narratives required in the translation of development success. Thus, a consideration of these elements and the resulting spectacles, leads, I suggest, to a more convincing analysis of how development initiatives not only ‘work’, but also how they are sustained over time and conflicting results.

With this in mind, I consider in the next chapter the history and development of the College and the ways in which it has invoked various narratives and imaginings to sustain a coherent interpretation of its trajectory and growth.
Chapter

Signs ofdataset

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Chapter 2

Strands of History

"Please understand, Your Excellency, that India is two countries in one: an India of Light, and an India of Darkness. The ocean brings light to my country. Every place on the map of India near the ocean is well off. But the river brings darkness to India—the black river."

The White Tiger

In The White Tiger (2008), Arvind Adiga's award winning novel of modern-day India and its rise as a world power, the protagonist, Balram, describes an India of binary opposites: one of progress, enlightenment and renewal represented by the 'light' of the urban spaces; the other of backwardness, superstition and want represented by the 'darkness' of the rural areas. These contrasting symbolic worlds have played a pervasive role throughout India's development in the 20th and early 21st centuries.

The dichotomy of rural and urban India looms large in the consciousness and imagination of modern India, a land commonly portrayed as one of striking contrasts and polarized social cleavages. On the one hand, the economic 'miracle' of modern-day India is predominantly an urban miracle with approximately sixty per cent of GDP attributable to urban areas in 2008, estimated to rise to seventy per cent by 2030 (Sankhe et al 2010). By 2030, it is further estimated that India will have 68 cities with more than one million inhabitants, thirteen cities with more than four million inhabitants, and six megacities with populations of ten million or more. The cities are the engines of economic growth and the hubs through which India's newly emerging globalised elite reach out to the rest of the world.

By contrast, the Indian village has for long been viewed as the authentic signifier of traditional Indian social life, the beating heart of an ancient and contradictory land. As an ideological category and reference point by which nationhood and culture, values and
purity have all been judged against the corrupting influences of modern-day life, it is often referred to as the 'real' India and the 'basic unit' of Indian society. In the last government census in 2011, the number of villages in India was put at 640,876 comprising 68.84 per cent of the populace19.

Indian villages have existed for thousands of years, however it was during the British colonial era that villages were constructed as ‘village republics’ complete with qualities of autonomy, stagnation and continuity ostensibly to help justify Britain’s own case as foreign rulers to their subjects back home (Jodhka 2002: 3343).

As Jodhka (2002) notes, the idea of the village has continued to persist in the Indian imagination since this time and has been taken up by a variety of groups for different ends. The nationalist movement and subsequently leading political parties have invoked the village in different guises throughout the 20th and early 21st centuries. It is also the village that leading politicians today often visit to demonstrate their bond and empathy with ‘traditional’ India and the struggle and plight of its rural people. Gandhi is perhaps the most recognisable proponent of the Indian village, invoking it variously to critique the West, modern Western culture, and as an alternative way of living. Such commentaries have become popular with many environmental action groups and non-governmental organisations (NGOs) that have drawn from Gandhi’s writings to propose alternative remedies to the country’s social problems.

One such organisation that has persistently summoned the spirit of this rural-urban divide is of course the Barefoot College. The College has invoked, in various ways throughout its history, the imagery of the rural ideal and its sometimes-fraught relationship with the outside world. Through the summoning of these binary opposites, the College sought to project itself as a forward thinking, progressive, yet ultimately authentic space in contrast to a corrupt and globalised metropolitan imaginary. In the following chapter, I argue that by situating itself within both places at once, equally rural and authentic, yet also modern and progressive, the College as a heterotopic space, could exist outside the vagaries of time. Being of ‘no-place’, neither past, present or

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future, but rather floating free above the fray, the College has been able to situate itself, at different times, within different development trajectories, altering its vision in line with changing political and economic concerns. In the process of this, through the implementation and reflection of a changing nationalist and development landscape, the College, I suggest, was able to navigate and in a sense stay ahead of the 'game' to ensure its success.20 Such imaginings are highlighted through the tripartite nexus of civil society/the market/the state and the rhizomic ways in which these institutions dynamically constitute one another. Through an outline of pre and post-Independence practices and policies of voluntarism and community development in India, I demonstrate how the College situated itself and became enmeshed within such trajectories. Through an examination of early documents, archival materials, official reports and media releases, I chart the organisation's development and growth as its founding members - urban educated doctors, teachers and engineers - experimented with different approaches and struggled with rural realities. What emerges is less a picture of a design in practice, and more a series of ad hoc trials and tribulations the outcome of which is never lastingly determined, but rather shifts and transmutes over time and circumstance.

Pre-Independence Development: From Philanthropy to Resistance
Voluntary work in India can be traced back to the medieval period through the operation of social institutions in the fields of medicine, education and drought relief (Inamdar 1987). However, it was in the mid-colonial period from the early 19th century onwards that voluntarism really hit its stride when large-scale voluntary efforts were instigated by Christian missionaries and the philanthropy of the Indian bourgeoisie (Sen 1992). Despite a foremost goal of propagating Christianity, Christian missionaries were among the first organised groups to build schools, hospitals and orphanages for the uplift and benefit of the marginalised and socially excluded.

20 In later years, as new communicative technologies became available, such heterotopic manoeuvrings were augmented through the manufacture of spectacles of development, which added new dimensions to the College's capacity to reflect current development concerns.
In Bengal, the local bourgeoisie were among the first to be influenced by the philanthropic actions of the Christian missionaries and began a similar missionary drive, this time derived from both Hindu and Christian writings under the leadership of Keshab Chandra Sen, a young radical and disciple of Debendranath Tagore one of the early founders of the Brahmo religion, himself a disciple of the social reformer Rammohun Roy (Jones 1989). Tagore revived Roy’s reformist organisation Brahma Sabha, subsequently changing its name to Brahmo Samaj. It was Sen, however, who helped spread the reformist ideals of the Samaj throughout Bengal and beyond by establishing small hospitals, orphanages and leper asylums, as well as by providing legal assistance to oppressed women and addressing issue based social reforms: the abolition of child marriage, education for women, remarriage for widows and so on (Jones 1989: 38).

With a view to regulating and monitoring these new organisations, the colonial government enacted the 1860 Registration of Societies Act. As Sheth and Sethi (1991) note, these new self-help philanthropic organisations increasingly acquired an anti-colonial political dimension as they became associated with social reform programmes, which in turn came to be understood as non-governmental (1991: 51).

From 1850 to 1900, a growing educated middle-class stratum and increasing nationalist consciousness led to the spread of ideas of indigenous self-help in opposition to Colonial administered state development programmes. By the turn of the century, such sentiments were further stimulated through the Swadeshi movement and Gandhi’s increasingly vocal championing of voluntary activity as the solution to rural poverty through self-governing, self-reliant village republics free of external influence and dependence (Sen 1992: 178).

By 1916, Gandhi had entered politics and began a series of strikes at Champaran Satyagrah in 1917 and Ahmedabad in 1918 which culminated in his campaign of non-cooperation in 1920. Throughout the 1920s and 1930s Gandhi implored the youth to go out and work among the rural poor, the dalits and tribals (Sooryamoorthy & Gangrade 2001: 46). Gandhi’s belief that India’s heart lay in the villages inspired him to
commit his energies to rural development where he established a wide network of institutions, voluntary associations and social welfare programmes.

The outbreak of the Second World War in 1939 marked the beginning of the end of the British Raj when India was made party to the war without consultation. Mass walkouts by Congress leaders followed. The successful *Quit India Campaign* launched in Congress in 1942 convinced the British government of the strength and depth of the support base of the Congress. With Britain left virtually bankrupt following the end of World War II and resources stretched thin, an inevitability slowly built up culminating in the Independence Act of 1947 (Guha 2007).

**Post-Independence India: Nation Building and Integrated Development**

In the years that followed Independence from 1947 until the early 1960s, a newly independent India - under the leadership of Nehru - embarked upon a series of wide-scale planned development strategies with significant support from international donors, particularly the United States (Ebrahim 2003: 35). In contrast to Gandhi, who advocated decentralisation and the establishment of autonomous village republics, development under Nehru was understood as centrally planned economic progress and growth. Many such strategies were carried out by voluntary organisations already on the ground, which could broadly be distinguished between those of a Gandhian bent and those founded on religious principles. As Sen (1992) chronicles, such groups can broadly be described as providing on the one hand development and empowerment programmes as the Gandhian organisations did, and on the other hand, welfare and development. Gandhian groups tended to be involved in handicrafts, village industry projects and educational programmes, whilst religious groups were more likely to provide relief for flood and famine victims and the provision of health and nutrition programmes for the poor (Sen 1992: 180).

While religion based groups were primarily motivated by religious philanthropy, the Gandhian groups were closely linked to the emerging policies of the new government and the establishment of new funding opportunities for development work, in particular
the formation of the Central Social Welfare Board (CSWB) in 1953 for the administration of funds to these organisations (ibid.).

As Sheth and Sethi (1991) suggest, the reliance of many of these organisations on central government funding led, in large part, to the dissolution of difference between government social welfare programmes and these independent organisations, with many implementing official government projects through local political systems such as the Panchayati Raj (1991: 53). As such, this comprehensive stream of social-reform-based voluntary work, from health and education, to disaster relief, has been described as a phase of nation-building as constructive efforts were directed to the uplift of the populace leading to the co-optation and formalisation in government of many of the targeted sectors (1991 Society for Participatory research).

From the early 1960s onwards, centrally planned development initiatives came under increasing scrutiny from a variety of sources and events leading to disillusionment and comprehensive re-evaluations. The apparent failure of the 'trickle down' theory of development manifested in a series of famines, inflations, rises in unemployment, political and social instabilities, and militant movements forced a radical re-think on government development policies (Sheth and Sethi 1991). As Ebrahim (2003) notes, such events contributed to a move away from macro-level growth targets to those more focused on the individual and meeting the needs of the identified poor. Changes in policy duly followed, most noteworthy of which was the adoption of 'Green Revolution' technologies as India sought to become self-sufficient in terms of food supply, improvement of nutrition, and the overall health of the populace.

This period also witnessed changing social and political conditions for many parts of India, including the defeat of Congress in several state assemblies in 1967, the Naxalite uprisings in 1967-70, and an increasing divide between urban and rural areas (1991 Society for Participatory Research). This era was also notable for the implementation of new and alternative development models, most notably 'integrated development' in the late 1960s, which sought to develop communities from a more holistic perspective focusing not only on economic initiatives, but also on health, education and the environment. The liberation of Bangladesh in 1971 also led to tremendous upheaval
leading to many young people becoming involved in social and voluntary work. A growing student movement from 1967-69 was given impetus by the National Social Service Scheme (NSS) launched in 1969, providing support to newly graduated students to work on a voluntary basis for poorer sections of society. It was to this background of political and social upheaval, a questioning of the old order and student activism that the Barefoot College was born. As shown in the next section, many of the graduate professionals who grew up and lived through this period, subsequently set up their own voluntary organisations as they attempted to channel the energy and idealism of the age.

The Social Work and Research Centre: An Idea in Practice

If we are to trace the beginnings of the Barefoot College, we must look not to the dry and impoverished hinterlands of Rajasthan, but rather to the green and affluent surroundings of St. Stephen’s College, New Delhi. It was here, in perhaps India’s most famous higher educational institute that its founder, Sanjit ‘Bunker’ Roy (henceforth Bunker), formed many of the relationships that were to sustain his vision of an integrated and professionalised rural-development organisation with the aim of melding urban expertise with ‘traditional’ rural know-how.

Bunker Roy was born in the Industrial city of Burnpur in West Bengal to an elite Brahmo Samaj family. His father was an engineer and manager of the Burnpur plant of the Indian Iron and Steel Company (IISCO). His mother, the late Aruna Roy, retired as India’s trade commissioner to Russia. Both his grandfathers worked for the Indian Civil Service (ICS)\(^\text{21}\). From 1956 to 1962, Bunker attended the exclusive Doon School in Dehradun Uttarakhand where he was a schoolmate of the late Indian Prime Minister Rajiv Gandhi. He then attended the renowned St. Stephen’s College in New Delhi from 1962 to 1967 where he gained a Master’s degree in English and became Indian National Squash Champions three times. In the years that followed, Bunker would work for various social relief agencies: the Catholic Relief Service (CRS) from 1967-1968,

\(^{21}\) The ICS was the predecessor of the Indian Administrative Service (IAS) and was traditionally associated with elitism and power. It was described by the former British Prime Minister David Lloyd George as the “steel frame” of the Indian government.
followed by work on a water development programme in Ajmer District from 1968-1971. He has subsequently stated that it was during these formative years that he saw first-hand not only the poverty and hardship of the rural people, but also their dignity and perseverance in the face of social and environmental ruin that convinced him to set up a community-based rural development organisation.

With the support of his old alma mater St. Stephen's College and financial assistance from the Government of India, the Tata Trust and OXFAM, Bunker and several friends registered the *Social Work and Research Centre* (SWRC)\(^{22}\) in 1971, with work beginning in the field in November 1972 with a two-year ground water survey of the surrounding area. The director of the College has stated now, as then, that this new venture was, from the start, experimental in nature and broke with conventional development work in India, which was primarily voluntary based, by attempting to 'professionalise' rural development practice. Such exhortations, however, were far from new; rather, they reflected general trends current in the development community at this time.

Bunker's rejection of the conventional middle-class life that awaited him, to take up a role working for the benefit of the rural poor, is a theme, as noted in the introduction, that runs pervasively throughout the Barefoot originating narrative. However, it is also one that has widespread appeal in Hindu thought. Renunciation, or *sannyāsa* occupies a central place in Hindu culture and is often considered its most well-known cultural ideal (Madan 1987: 1). The figure of the renouncer, an individual who gives up all worldly possessions to live a life of austerity and spirituality, is a pervasive image on the Hindu political stage, perhaps most closely associated with the figure of Gandhi and more recently through the social activism of Anna Hazare. Dumont described it as a "sort of universal language in India" (1970: 52) and has suggested that it takes its meaning from a dialogic encounter between the renouncer and the man-in-the-world, the pure and the impure (1970: 37). Mayer (1981: 171) has suggested that in recent times, the

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\(^{22}\) The *Social Work and Research Centre* (SWRC) is the registered name of the 'Barefoot College' under the 1860 Societies Registration Act. However, for consistency, and because it is better known today as the Barefoot College, I will refer to the organisation as the 'Barefoot College' or the 'College' throughout this thesis.
renunciation of selfishness through social service has replaced the traditional form of renunciation leading to spiritual merit. Sannyāsa is also often spoken alongside Seva, meaning selfless service as an essential practice of indirectly serving God. However, as Copeman notes, in modern times, Seva is increasingly being directed towards the service of "humanity" or the nation, rather than merely gurus and deities (2009: 56), in particular through the service of voluntarism.

As Mohanty and Singh (2001) note in a wide-ranging account of the history of voluntarism in India, during the period of the early to mid-1970s, many professionally trained and educated young people were encouraged to enter the voluntary sector to work as social activists in rural areas through government incentives and programmes, such as "integrated rural development". This was a period when government development programmes were experimental in nature, undergoing changes in orientation and approach from community development to target beneficiaries such as small farmers, women, scheduled castes and dalits. Policies refocused from agricultural production to employment generation, and ideas about people's participation began to take root (2001: 13). Ebrahim (2003) notes that many development organisations in this period were critical of state development policies, sometimes violently so, yet the government relied on their standing in rural areas, areas that they themselves had little purchase in, to deliver development programmes. Of course, such measures were never entirely benevolent; through funding to these groups, the government were also able to monitor their activities, a policy not too far removed from the colonial government's 1860 Registration of Societies Act. Sen (1999) describes this twofold approach to development organisations by the government as a "shadow state" - providing support to a parastatal apparatus while concurrently monitoring their activities for signs of opposition (1999: 329).

It can be observed that the College's programmes and early expansion largely reflect this uncertain and experimental terrain as they sought to complement their own initiatives with government policies and thus secure much needed funding. Indeed, such a pragmatic and analogous approach can be said to have dominated the structure and uptake of the College's programmes ever since. Archival materials from the early years of
the College indicate that throughout the 1970s, the College was formed and engaged in a number of programmes that reflected state development goals. Two themes that ran concurrently throughout the College's first decade were the 'professionalization' of development and 'integrated rural development', both of which aligned closely with state development programmes.

**Early Years: Experimentation and Professionalization**

The Barefoot College's founding narrative as it has come to be reified in recent years, would suggest that in its initial foray into development work, the fledgling SWRC was guided by neither philosophy nor ideology, but rather a pragmatic and flexible approach to development work. According to this narrative, those early years were dominated by a tentative trial-and-error-based approach reflecting their own faltering first steps as much as the changing development landscape itself. Such accounts are not wholly without foundation, with much of the early documentary evidence reflecting an informal and improvised developmental outlook. However, as the following documentary excerpts make clear, it can also be noted that such ad hoc manoeuvrings were likewise conducted to the backdrop of a market-driven approach to development that sought to commercialise developmental practice along a not-for-profit agenda. These early development notions correspond to dominant currents in contemporary development practice that push a consumer-oriented approach to development (see Craig & Porter 2006; Elyachar 2005), suggesting that the Barefoot College was perhaps one of the earliest forerunners to a market-driven approach to development.

Archival documents attest that the overarching objective of this new venture was "a move for closer harmony between Intellect (represented by the University and the urban population) and Labour (the rural community)" (Roy "The Social Work and Research Centre': N.D). In order to carry this off, it was proposed that volunteerism in the rural sector should be commercialised with rural farmers conceived of as 'consumers' who

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23 This was represented by the College's original emblem of two figures joined at the hands, one carrying a book, the other a small bundle of wheat.
would be offered the advice and technical skills of recently graduated students. One of the earliest documents states the following (it is worth quoting in full):

“If the Water Development, medical and Educational services are treated as consumer items – because they are absolutely essential to the rural community – and publicised accordingly then in due course of time the farmer will come to accept it. Not that these services are not being provided already. But what is conspicuously missing is the pampering, the feeling of importance that a farmer should feel to enable him to use these services; not make him feel obliged but make him feel like a ‘customer’ in all sense of the word. In other words if the farmer is expected to pay for the service, he naturally expects good service. The motivating factor in this case is not either exclusively philanthropic or social development but a mixture of both with an emphasis on economic development; providing a service on a business footing like selling soap for instance.” (Roy: ‘The Social Work and Research Centre’: N.D).

Such exhortations, however, should be seen in light of the Government’s fourth five-year plan (1969-1974) which launched the People’s Action for Development in India (PADI) programme in 1973, one year after the start of the Barefoot College. This programme, in recognition of the role that voluntary organisations played in providing welfare services, aimed to channel funds to these organisations and in turn improve their service delivery (Mohanty & Singh 2001: 48).

The fourth five-year plan on ‘Welfare and Development of Backward Classes’ makes clear the contribution that voluntary organisations were to make:

“Since voluntary organisations play an important role in extending welfare activities among the backward classes, assistance will be given to them for taking up projects like publicity and propaganda for removal of untouchability, running hostels and educational institutions, organising welfare and community centres, social education and conducting training and orientation courses.”24

The channelling of funds to voluntary organisations was not the only policy objective during this period, however. A further stream of thought that gained in popularity throughout the 1970s and continued into the 1980s concerned the ‘professionalization’

of development work. Such policies, as mentioned above, echoed the increasing number of disenfranchised young graduates attracted to work in the voluntary sector, but also a felt need on the part of the government to raise the bar in terms of a perceived need for higher-quality recruits. An early document from the College stating its initial guiding objectives reflects this policy goal more explicitly:

a) “Firstly, to bring the specialist and farmer closer together by making both aware of their usefulness to and dependence on each other. The various means picked at random by which one could achieve this are: 1) massive rural publicity programmes through notice boards, film shows, slides, puppet shows, photographs etc. 2) Making the specialist live and work in a rural environment and make them accessible to the rural community. 3) Provide basic services like water development, medical and education necessary for social and economic development. With this the initial personal contact could be established to publicise supporting services such as water management, nutrition and hygiene, adult literacy etc.

b) To illustrate and establish social work as a vocation, as a profession, as a job like any other but having more challenge, that young unemployed specialist could take to instead of hankering for jobs totally unconnected with their skills in the cities and thus wasting an investment. With this aim in mind the SWRC will be charging the farmer for the services rendered so that with the income generated the centre can be self-supporting.

c) To involve the youth, the school boy, college student and graduate to participate in rural development if not directly then indirectly at least. By indirectly one means participating in rural publicity competitions; help by contributing ideas on how best to stimulate the farmer’s mind to react in a progressive way, how to make him think differently on different topics concerning him” (Roy: ‘The Social Work and Research Centre’: N.D).

While all three objectives reflect and interlace with government development goals, the second point is perhaps the most pertinent objective, since it would involve the establishment and employment of recent graduates in social work as a professional vocation. Such appeals at this time acknowledged a surplus of skilled individuals on the margins of the economy who were unable to find employment either in private commerce or public bodies that matched their proficiencies. Drawing upon historical
data, Sen (1992) provides further support to this hypothesis, as he argues that the upsurge in NGOs\(^\text{25}\) in the late 1960s and early 1970s coincides with an eleven-per-cent unemployment rate for degree holders in 1971, estimated to rise to between fourteen and twenty-two per cent by 1975 (1992:183). Furthermore, even here in the early 1970s, it was recognised that the gap between services available in the villages and the urban areas was huge:

"The blind spot to social work in the villages for instance is a constant reminder of the youth's total isolation from over 80% of India's population. So far the Universities... and top level government officials have talked glibly on the dire need for doctors, engineers, nurses, nutritionists and teachers to go and work in the rural areas but so far no concrete steps have been taken to organise, coordinate or use their services for the benefit of the rural community. This is an alarming indication of the almost impregnable barrier between the urban and the rural, between the specialist and the farmer becoming a terrible reality" (Roy 'The Social Work and Research Centre': N.D).

As the above summary indicates, the College's policies during this period reflected a broad base of current development initiatives allowing them to attract government and international funding. As the Society for Participatory Research in India notes, the development landscape in India in the 1970s was marked by the growing trend of professionally trained social workers taking to voluntary work as a profession (1991). This was attributable to a number of factors, not least the increasing importance of international donors who demanded high quality, efficient and qualified staff, but also the holistic nature of the new development approaches that required specialists in the fields of forestry, health, geology, documentation and education (1991:73). Indeed, in 1973, documents show that a diverse array of professionally qualified individuals joined the College, including an education officer, a water specialist, a geologist, a psychiatrist, a plants and crops specialist, an accountant, an economist, and a medical doctor.

\(^{25}\) The Western term ‘NGO’ is comparatively new in India with no general consensus when the term first entered common usage. As Sen (1999) relates, many NGO officials in India dislike the term preferring instead Voluntary Agencies (VOLAGS), Social Action Groups (SAGs) or Community Based Organisations (CBO). In the Indian context, the term tends to refer to organisations formed by professionals from the middle or lower middle class and are generally non-membership organisations with salaried employees (Sen 1999:332).
An additional consequence of the recruitment of professionals to development organisations, however, was the legitimacy that they lent to the organisation by virtue of their role as experts in their respective fields. Such expertise helps validate the NGO and its work, for it provides an air of authority in the eyes of national government and international donors. Furthermore, as Ebrahim (2003) notes, the employment of professionals also helps to smooth communication channels between NGOs and donors. In the main, professionals tend to share with donors a common development vocabulary, terms such as participation, sustainability, up-scaling, impact etc. (2003: 99). These shared understandings help in the process of translating work carried out on the ground to development reports and executive summaries, thus facilitating the mobilisation of field-level knowledge and contributing to an overall 'interpretive community' (Mosse 2005).

Through these early propositions, it is possible to see the groundings of many of the subsequent approaches adopted by the College: an SWRC primary school in the grounds of the College campus and the night school programme, both of which lay an emphasis on education that relates and takes inspiration from the surrounding environment and social system. Furthermore, an early and pronounced emphasis on rural publicity campaigns that would help establish the SWRC and Barefoot College as one of the most recognisable development organisations in India and beyond. It is worth noting the importance of this fledgling proposal for publicity campaigns, for they subsequently formed the basis not only to the College's extensive exposure as a leading development agency, but simultaneously as a development brand not only in India but also increasingly beyond. One document spells this out explicitly:

"For the first time a project will be using students, graduates and unprofessionals for rural and urban publicity. This will involve picking the brains of the Youth to persuade them to use any agencies (posters, pamphlets, photographs, hand-outs, hoardings) for conveying their ideas on one vital topic which will have an impact on the rural community. The purpose of laying so much emphasis on publicity is to convince the farmer of the necessity of the different types of services that will be provided by the Centre. Rural publicity will be given much importance because of its involvement potential in the urban areas and its impact potential in the rural
areas. *This combination has never been exploited before.*” (Roy “The Social Work and Research Centre”: N.D., my emphasis).

Taken as a whole, these early documents charting the first couple of years of the then SWRCs formation, paint a picture of idealism and experimentalism tempered with a perceptive awareness of state development policies and the expanding role that market-oriented initiatives were taking in development in India and beyond. The official narrative of the College, however, suggests that founding members recognised a chasm between the privileged few residing in the urban areas and the vast majority of the country’s population residing in the rural heartlands. This ‘mini-campus’, it was proposed, was conceived to bring these two worlds together, both spatially and intellectually: to share and exchange ideas, views, methods and experiences, and hopefully engender an awareness and understanding of one another. Such aims are laudable, but they perhaps knowingly overlook the more pragmatic underlying objective of creating new markets for development services in rural India combined with a very keen attentiveness to national development agendas. The capacity of the College to accommodate itself to such agendas whilst simultaneously moderating its image in more benign terms is one that it has cultivated to ever-higher degrees of precision as the years have progressed.

**Integrated Development and the Rise of Participation**

By the late 1970s, the College had established itself as one of the leading development organisations in India and had enough experience now to recognise where its strengths lay, which initiatives worked and which did not. The College was also to experience its first real test of character in the period of 1977-1979 when it was subject to a Legislative Assembly inquiry when a former employee, now MLA (Member of the Legislative Assembly),[26] who had been dismissed for embezzling funds began a slander campaign on the conduct of the College.[27] Forced over the period of a year to defend itself, to open

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26 A Member of the Legislative Assembly is a democratically elected representative of an electoral district.

27 A visit to the College during this period in 1978, by the then World Bank President, Robert McNamara, and Ford Foundation President McGeorge Bundy, apparently helped the case of the College to hold on to their lease agreement.
up its books for inspection, and to undergo rigorous scrutiny including the very real threat of being forced to vacate their government-loaned premises, the crisis led to a period of introspection for the College.

From 1979-1980, the College subjected itself to a period of critical self-evaluation, reviewing its stated objectives and questioning its model of working. While the Legislative inquiry acted as the breaking point, in truth, a number of related episodes had led to such an outcome, including the simultaneous resignation of several specialists due to increased demand for greater accountability and awareness that some of the initiatives had not performed as well as first hoped.

From this self-evaluation, a number of changes were implemented, foremost of which was the inclusion of local people in the running of the College. Previously, only educated 'specialists' with degrees were employed to implement programmes and make decisions. Pay scales were structured hierarchically according to the designation of the employee as either 'specialist' (individual with college or technical degree), 'professional' (locally-sourced agriculture assistants, craft teachers, balwadis (pre-school teachers) etc.) or 'para-professional' (e.g. village health workers, dais (traditional birth attendants)) and 'helpers' in various programmes, plus an assortment of other support staff (Kale & Coombs 1978). By mid-1977, the centre employed fourteen specialists, twenty-six professionals and fifty-four para-professionals. Following the self-evaluation, these designations were abolished and pay scales were levelled down with the majority of individuals – both professional and local – finishing up on the same scale, and local people becoming more actively involved in the running and implementation of programmes. According to Bunker, the changes were justified due to the rising administrative costs, the growing divide between specialist staff and others, and perhaps most significantly, the wrong "image" of the organisation being projected. The change in policy prompted the majority of professional staff to leave the organisation. In subsequent years, the College has lauded the 'uneducated man' and praised his wisdom and experience while denigrating formal education and 'paper qualifications', despite - it might be added - relying on 'paper-qualified' individuals to head many of their sections, not least Bunker himself.
This period of self-reflection at the College is often portrayed in the Barefoot literature, whether through newspaper interviews of Bunker, pieces he has written himself, or their website, as a turning point in the evolution of the College's philosophy and outlook. It has been written into the narrative of the College's mythologizing founding years as one of steadfastness and perseverance against hostile external forces leading to the identification of the College's true purpose and reason for being.

Such overhauls, however, should not be seen in isolation, once again the shadow of the state and the surrounding development climate must be brought into consideration. Just as appeals to commercialise development work early on in the decade reflected wider developments, including new roles for voluntary organisations in the provision of services and rising unemployment among graduate students, so too did this new drive for people's participation coincide with new policies and approaches, namely with 'integrated rural development'. The government introduced its 'Integrated Rural Development Programme' (IRDP) in its fifth five-year plan in 1978 covering selected blocks, and by November 1980 all blocks in the country were covered (Paul 1998). The programme itself was intended to raise the income-generation capacity of target groups among the poor through self-employment programmes and an 'integrated' development approach that provided basic needs in health and education. As Ebrahim notes, at root, this 'integrated' approach was driven by increased agricultural production, rural employment programmes, technology, and better coordination between rural and urban areas, which in large part ignored the wider political economy and its effect on rural areas (2003: 37). The programme continued to be active until the late 1990s until it quietly faded away when it was merged into a single self-employment plan, the 'Swarnajyanati Gram Swarozgar Yojana' (SGSY) during the tenth five-year plan from 2002-2007 (Planning Commission of India).

Just as integrated rural development rose to prominence among development activists in the late 1960s and 1970s, becoming established practice by the 1980s, so too did 'participation' become the buzz word of the late 1970s and 1980s (Ebrahim 2003: 38). "Participation" implying the mutual planning and implementation of development programmes in conjunction with target beneficiaries rose to prominence during this
period for a number of reasons, most pressing of which was the failure of centrally-planned development initiatives to deliver. Instead, growing income disparities were observed to have emerged particularly among the class of individuals who benefitted from large-scale agriculture and industry efforts, while the landless poor grew increasingly marginalised. Secondly, alternatives to top-down planning were arising among development activists and academia at large. The radicalization of young scholars in the 1960s and 1970s and the replacement of positivist models of knowledge with more interpretive and politically self-conscious models led to the rise of 'Participatory Action Research' (PRA) models involving the active participation of local people. Robert Chambers (1993) cites the influence of Paulo Freire (1968) and his "participatory action research" school as one of several influences in the rise of PRA and subsequently participatory approaches.

Participation also necessitated more focused work among specific target groups e.g. women, dalits, landless labourers, scheduled castes and tribes and the disabled, leading to target-group programmes such as Small Farmers Development Agency (SFDA) (Mohanty and Singh 2001: 13) as opposed to regional or block development. Such changes were also mirrored by the College after their period of self-scrutiny as they moved from development efforts situated at the block level to exclusively targeting the rural poor. They also identified marginal farmers, landless peasants, rural artisans, women, children, and scheduled castes and tribes as their main target groups.

The abolishment of designations such as 'professional' and 'specialist' by the College and the levelling of pay scales, as mentioned above, can also be seen in light of the adoption of a participatory framework. A participatory approach, as Ebrahim notes, necessitates the reversal of conventional expert-trainee hierarchies with villagers themselves now seen as 'experts' in their own right (2003: 42). Robert Chambers is perhaps the most well-known advocate of a participative, 'bottom-up' approach to development. Such alternative approaches became popular, as it has been shown, during the late 1970s, and continued to gain momentum throughout the 1980s and 1990s primarily through NGO workers and activists. By the late 1990s, as Mosse and Lewis (2006) note, such 'alternative' methods were increasingly finding their way into the vocabularies of
agencies such as the World Bank where they have now become standard rhetorical devices, if not practices (2006: 3). Chambers describes a general participative approach as a ‘last-first’ paradigm that includes a veritable roll-call of development buzzwords from the last thirty years: “learning from the poor, decentralization, empowerment, local initiative, and diversity” (1993: 1). He further states in a rhetoric that is now standard in College publications that: “Professionals become not experts but learners, and poor people their teachers. Priorities are not those projected by professionals, but those perceived by the poor” (1993: 10). While it is difficult not to applaud such appeals, they have nevertheless been subject to sustained critique over the years (see Cooke & Kothari 2001; Kapoor 2005; Mohan & Stokke 2000; Williams 2004), not least for their unqualified celebration of indigenous knowledge.

Such changes to College personnel, however, can also be seen in a comparable light to earlier exhortations in the recruitment of professional staff to the College. While previous employment of certified specialists conferred legitimacy on the College through professionalism, this new round of recruitment conferred legitimacy through authenticity. Both from a governmental and international donor perspective, it was in the interests of the College to be seen as an organisation that was close to the ‘poorest of the poor’, the dalits, the scheduled castes and tribal peoples. Such populations bestow a ‘halo’ of authenticity on the College as an organisation that works with and seeks counsel from those whom it serves. In this regard, image is everything, the more ‘traditional’, the more rural, the more juxtaposed to modernity the more credible the College appears. Furthermore, while local people did indeed move into positions previously occupied by professional staff, the majority of sections continued to be headed by higher caste, educated individuals who could speak the language of international development. Thus, the interpretive community was maintained.

The first decade of the College’s operation can be seen as one dominated primarily by reaction to both state policy and developmental discourse. However, one should not discount the active role that NGOs play in shaping policy and discourse. It would be disingenuous to portray development organisations as merely passive recipients of development planning. Through their work, they are also involved in influencing and
reshaping the development landscape in myriad ways, from activists who carry field-level experience up to higher levels, to media exposure, to writers and academics whose work helps shape state-level policies and demonstrate the efficacy or not of particular development models. For example, it was through the College’s work with local people and solar photovoltaic technologies that persuaded the Indian Government to fund further forays into solar development projects in the remote and mountainous regions of Himachal Pradesh. Likewise, experiments with rooftop rainwater harvesting (RWH) structures led to policy changes at regional level to build RWH structures in hundreds of remote primary schools within several Indian states (Roy 2005). Development is always a messy, hybrid two-way street with “busy traffic” (Latour 1993) between these two divides.

The 1980s and Beyond

After the heady founding years of the 1970s, the 1980s witnessed a relative cooling of exposure for the College, as their various programmes and initiatives settled down to performing the everyday work of development. The second decade of the College’s operation witnessed the construction of a second campus, the ‘new campus’ as it is collectively known, on a private plot of land just outside the village of Tilonia. Following the threat to evict the College from their government loaned premises during the legislative inquiry, and also a felt need for more custom-built premises as their operation grew, a more secure base was sought out and duly constructed from 1984-1986. As the next chapter relates, however, such expansions were not without controversy.

This decade also witnessed the birth of the College’s solar programme after the donation of several photovoltaic panels in 1984 through a Danish aid agency; a development that was to have significant ramifications for the College’s future. The College also began a tentative domestic solar programme, installing solar home systems in several districts throughout Rajasthan and beyond, which will be explored in more detail in chapter four.
In terms of government contributions, the seventh five-year plan (1985-1990) recognised NGOs for the first time as development actors and earmarked funds for rural development organisations. This period also saw further moves to professionalize the voluntary sector, introducing measures such as managerial expertise and professional competence (Sooryamoorthy & Gangrade 2001: 49). The year 1986 also saw the formation of a new organisation CAPART (Council for Advancement of People’s Action of Rural Technology), formed through the merger of two earlier organisations: PADI (People’s Action for Development India) initiated after the severe Bihar famine of 1963-1967, and CART (Council for Advancement of Rural Technology). CAPART aimed to improve the rural situation by way of implementation of technological input for rural development through innovative and appropriate technologies.

For the College itself, the 1980s resumed in a similar fashion to the developments at the end of their first decade, namely with a continued emphasis on participatory approaches to development and the growth in funding from international donors and the Indian government. The diversification of funding from international agencies involved in the development sector in India perhaps also contributed to a policy climate that witnessed an overall increase in state control and monitoring of NGO activity during this period (Sen 1999: 341).

One such policy that reflected this general outlook was the proposal to establish National and State Councils for the monitoring of NGOs, a proposal that Bunker Roy is reputed to have been the originator (Sen 1999: 342). The projected policy, which provoked heated debate among many NGOs, resulting in a flurry of writings in journals, newspapers and popular magazines from NGOs opposing it (1999: 342), proposed that NGOs joining the councils abide by a Code of Ethics consisting of nineteen rules that would serve to standardise and regulate NGO practice in India. Bunker, who at this time was an advisor to the Planning Commission, a position he had held since 1982, was a prominent advocate of the policy, setting forth his views in a series of newspaper articles throughout the late-1980s and early 1990s. Bunker, who framed his argument in terms of binary opposites (“The division is between the affluent and the impoverished, the urban and the rural-based, the big and the small”), implies
the purity and authenticity of rural based groups such as his own, versus the corrupt, urban based organisations of the fast expanding development sector (Roy 1987a). In the same article, he goes on to state that: “the intellectual dishonesty of the bigger, affluent urban-based groups” [who may be obliged to] “declare their personal assets, move their base to a rural area, accept a sharp cut in salary and lead a simple life style” vs. the “rural-based, small groups which believe in a structure where discipline and accountability among themselves is given high priority” (Roy 1987). Such sentiments, as it will be shown below, were to prove a common theme throughout the development of the College’s narrative.

While the above episode would suggest that Bunker sustained a fairly agreeable stance towards state development goals, he proved to be unsympathetic to other strategies, which perhaps encroached upon his own objectives. While the development landscape in India in general sustained an approach geared towards the ‘professionalization’ of development with the continued employment of professionals in areas such as social work and agriculture, the College bucked this trend and instead railed against this new wave of professionalization. Having previously lauded the educated expert as bringing new levels of expertise to the rural environs, Bunker, in a series of comment pieces in the Indian press denounced the “educated man” as “responsible for destroying the will and confidence of the rural poor” (Roy 1984: 11).

In a comment piece titled ‘Beware of Educated Man’ (1984a), Bunker condemns those with formal qualifications “a person who claims to be a M.Sc. or Ph.d” as arrogant, blinkered, lacking in integrity and responsible for the general plight of the rural poor. Perhaps chastened by his earlier experience of the departure of many of the professionals working at the College, Bunker unleashes a bellicose onslaught on the ‘educated man’:

“At the last rung of every delivery system where the buck stops is a degree or diploma holder who personifies the worst combination of greed, selfishness, nepotism, caste feeling and ambition to get on in life at the expense of others” (1984: 12)

In the same piece, Bunker acknowledges the role that educated personnel have come to play in development, stating that by government reckoning “he is a ‘change’ agent”, but
that ultimately this new professionalised, managerial approach to development has led to the cessation of self-reliance for the poor.

“He monitors the impact and selects what should reach the outside world – for which he has explanations ready in advance. Between them, at the village level, by virtue of being so-called educated they presume to speak on behalf of the whole village” (1984: 11).

The irony of such statements, given Bunker’s own elitist background, needs scarcely pointing out. It might also be added, as it will be explored in further chapters, that the presumption to select what the outside world sees and to speak on behalf of others, is a trait shared not only by the “educated man”. Such episodes remind us, as Mosse (2005) has convincingly argued, how important interpretations of events through the control of particular narratives are to development success. For all his penetrating analysis, however, Mosse perhaps overlooks the importance of the medium and the resulting spectacle through which narratives are delivered and enacted, a point to which I will return at the conclusion of this chapter.

While Bunker’s exhortations may seem somewhat contradictory on the face of it, such denunciations reflect a now well-worn path that he has followed in his subsequent writings that sets his own organisation up as ‘David’, the small, but authentic voice of the rural poor, vs. the might of ‘Goliath’ represented by ill-informed, urban-based experts and the expanding development sector.

In a further comment piece from 1987 in The Hindustan Times, Bunker condemns the “intellectual dishonesty of the bigger, affluent urban-based groups” for starting “multi-lakh projects with a comfortable base in metropolitan cities”. He proceeds to highlight the austerity and simplicity of more rural-based organisations such as his own: “The division is between the affluent and the impoverished, the urban and the rural based, the big and the small” (Roy 1987).

In later years, this theme has taken on the form of condemnations of centrally planned electricity grids vs. the decentralised, “power to the people” solar home systems that the College has become famous for, and of general attacks on top-down approaches vs. indigenous self-help and self-sustainability.
One notable entry in recent years in this now tried-and-trusted formula, was an opinion piece in *The Indian Express* from 2005 in which Bunker criticizes the UN Millenium Development Goals, and Jeffrey Sachs in particular, for advocating top-down approaches to tackling extreme poverty that fail to acknowledge "the incredible knowledge, indigenous skills and practical wisdom that traditional communities everywhere possess". In a now well-rehearsed prescription, he further attacks their lack of credibility as experts in their field, for failing to have experienced poverty in their lives.

In a letter to the editor, one week later, Sachs replies, aghast at the "egregious falsehoods" claimed by Bunker, particularly so since he claims to have previously discussed these issues with Bunker in the past, and the latter was apparently in full-agreement with the solutions:

"A recent article of mine in *Time* shows that Mr. Roy's own article is wrong from beginning to end. This article makes it clear that the UN Millennium Project champions the low-cost, community-based interventions that Mr. Roy accuses our project of neglecting! Moreover, I have been outspoken precisely about the need to transform current development assistance into support for these community based investments" (Sachs 2005).

**Charismatic Authority**

As other authors have noted (e.g. Sheth & Sethi 1991; Edwards 2007), one of the special factors that distinguishes NGOs from other types of organisations, and which contribute markedly to their founding and functioning, is the charismatic personality and leadership of its founder. Indeed, such is the hold and influence that founding members tend to have over their organisations that they are often cited as one of the main reasons that NGOs have difficulty replicating their success or maintaining momentum after the founder departs. This was a common talking point in the Barefoot College. With no obvious "second-in-command", many individuals within the College were aware that much of the College's success depended upon Bunker and his extended social networks.
Notions of charismatic leadership in organisations can be traced back to Weber’s writings on ‘charismatic authority’, a leadership quality that emerges, Weber suggests, in times of socio-economic unrest to fill the vacuum caused by the failure of traditional forms of rational-legal authority to fulfil its societal functions (Graham 1991: 108). In response, a leader displaying charismatic forms of “exceptional sanctity, heroism or exemplary character” (Weber 1978: 215) emerges offering a visionary solution or programme of action with themselves at the helm (Tucker 1968: 738).

Bunker, as the founder and director of the Barefoot College, undoubtedly displays many such qualities. His presence on the stage, his use of rhetoric, his ability to appeal and tap into the imaginaries of his various audiences, are evident from the many conference addresses posted online28 and the reception he customarily receives. A big man, with a deep baritone voice, through dress, language and charisma, Bunker exudes an image of tradition and authenticity cloaked in modern development rhetoric.

While such character traits are subjective and open to interpretation, what is not debatable, however, is the breadth of social ties that Bunker himself has forged. As noted in chapter two, Bunker established many such social networks early on through his elite education in Doon School, where he was a contemporary of the late Indian Prime Minister Rajiv Gandhi, and latterly through St. Stephen’s College, New Delhi. As he has acknowledged in previous interviews, these early social ties have served him well; acknowledging that he has “excellent contacts”, Bunker states in one interview: “I trouble them at their offices and then later I call them up at their homes till I get what I want” (Roy 1989: 30).

It is not only such social networks that have aided in the establishment of the Barefoot College, however, an elite education and social background also enables Bunker to speak the language of development. An impeccable command of the English language, a deep understanding of the different levels of state bureaucracy (Bunker’s wife is Aruna Roy, one of the founders of the social activist group MKSS that spearheaded the Right to Information movement (RTI) in Rajasthan and subsequently India. She is also an ex-

28 E.g. TED Talks: Learning from a barefoot movement: http://www.ted.com/talks/bunker_roy.html
bureaucrat for the Indian Administrative Service (IAS)), and the social skills and confidence that comes with being from a particular social class all contribute to the ability and knowhow necessary for interacting with the different strata involved in development work, including the media, government and high-profile donors.

In short, Bunker constitutes a special factor in the College’s ability to enrol supporters and extend its influence. Through charisma, social capital, and tacit knowhow, much of the success of the Barefoot College can be traced to Bunker’s door. Quite how the College will replace such a personality and the social relationships embodied by him remains to be seen.

**A New Era: Liberalisation and the Birth of the Barefoot College**

In the wider arena of the Indian economy, the 1990s began with relative alarm. The collapse of the Soviet Union, India’s then major trading partner, and a spike in oil prices due to the first Gulf War led to high fiscal deficits and a major balance-of-payments crisis. A $1.8 billion bailout loan from the IMF followed, contingent on major economic reforms. 1991 is generally seen as the year of economic liberalisation for India leading to reduced state control of the economy, a reduction in tariffs and interest rates, and the approval of foreign direct investment in many sectors.

Economic liberalisation also led to changes in the development landscape of India, in particular, to an increasing awareness amongst the international aid community of the rise and impact of civil society organisations (Ebrahim 2003: 47). In 1998, the Council of Europe defined civil society as the third sector between the state and the market, occupied by non-government, non-commercial citizens, and organized and devoted to the public good (Dutta 2006: 190). It divided civil society groups into two types: firstly, people’s organizations, representing and accounting to the members of its groups, and secondly, NGOs operating on behalf of the people that they serve.

The rise and increasing prominence of civil society organisations, such as the Barefoot College, during the 1990s has been viewed ambivalently across different societal sectors.
Amongst the wider aid community and the public, they are generally perceived as being important actors in the spread of democratization, and as more efficient than governments in channelling funds and providing development services to the poor (Ebrahim 2003: 48). In this regard, they are seen as locally rooted, flexible, responsive and effective development delivery agents (Sheth & Sethi 1991: 65). Political parties, however, particularly those of the left, generally view the rise of civil society organisations with unease, since they detract from the goal of structural transformation of society as a whole. The increase in foreign funding to NGOs has further exacerbated these apprehensions (ibid).

Measures such as those outlined above, have had significant impact on the NGO sector in India, particularly with regard to the increase in funds channelled through NGOs to carry out government services, and further, to the rise in foreign funds routed through NGOs. As an indication of the proportion of foreign funds being directed through Indian NGOs in the early 1990s, the figure stood at US$ 0.52 billion (Ebrahim 2003: 48); by 2008, according to Home Ministry statistics, that figure had risen to US$ 2.15 billion, a rise of over 300 per cent.

Such increases in foreign funds to NGOs like the Barefoot College have also had other unforeseen consequences, most notable of which has been an increasing awareness on the part of NGOs that they are now in competition with other NGOs for funding. As such, the appearance and image of NGOs have come to play an increasingly important role in their sustainability and future. It is perhaps no coincidence then that in 1992, one year after the liberalisation of the Indian economy, the SWRC rebranded itself as the “Barefoot College”, a move that would augment and project the identity of the College in the public eye, and more importantly, the eyes of potential donors, for the foreseeable future.

The term “Barefoot” is of course more widely associated with China’s “barefoot doctors” of the 1950s and 1960s in which local people were trained in basic healthcare for the provision of their own rural communities. During fieldwork, Bunker repeatedly denied that the name was derived from the Chinese health workers; rather it developed organically and coincidentally through a trial and error approach with no conscious
decision on behalf of the staff to replicate this model of development. Another longstanding member of staff stated that the name is symbolic of the people who work with the College being without qualifications, pre-conditions, literacy, and in many cases without footwear. Today, the College’s website states the following:

“It is symbolic of the recognition, respect and importance the College gives to the collective knowledge and skill that the poor have. By calling it ‘barefoot’ we want to give its application a unique category of its own that is superior, sophisticated and enduring. Far more valuable than any other paper qualification.”

Whatever the truth may be, a document dated from 1978 (Kale and Coombs 1978) clearly states that the health strategy of the College was adapted from the Chinese concept of the “barefoot doctor” and subsequently applied to the conditions of rural Rajasthan. The ‘truth’, as we have seen, is always malleable, adapting itself to different narratives, for different rationales, during the course of an organisation’s development.

The Barefoot College now had a solid image from which to project itself to this new world of market-driven development. The old classifications of ‘professional’, ‘para-professional’ and ‘specialist’ were thrown out; now every worker at the College was a ‘barefoot professional’, a term that the College would increasingly utilise as they sought to redefine the work of its rural workforce (see Bunker’s speech in introduction).

In an article on image professionalism in management consulting, Kipping (2011) argues that consulting firms have, over the course of the twentieth century, created an image of professionalism in order to gain external legitimacy and credibility with their clients. Whereas traditional, ‘formal’ professions such as law required membership of an association that ‘vouched’ for the quality of the service rendered, the consulting industry which lacked this licensure instead sought to cultivate an appearance of professionalism through, amongst other things, brand building, high-exposure projects, novelty, strong symbols, and distinctive locations and buildings (2011: 534).

From the outset, these management firms worked hard to create and build a strong and unique brand that set themselves apart from the competition (2011: 537). In addition,

they also drew heavily upon the reputation of established professions, such as the engineering profession, referencing it in their literature and in the names of their firms (think ‘Barefoot solar engineer’ or ‘Barefoot College’. The Barefoot College is, of course, a registered voluntary organisation, and has no official capacity to confer professional certificates). Furthermore, as the industry grew and became more homogenised, leading firms had to increasingly differentiate themselves from the masses by appearing dynamic and competitive and in many ways unique to the glut of other firms offering similar services. As Kipping states, through these efforts, ‘professionalism’ increasingly became a hollowed out linguistic construct, with little to no basis in reality” (2011: 544).

Kipping demonstrates the importance of brand and reputation to management consultancy firms in a market-driven society, but the same notions can also be applied to modern-day NGOs having to compete for clients and donor funds amongst a saturated development market. The ‘Barefoot College’ in this instance, is a strong brand name, conjuring up images of poverty and want, but also flexibility and mobility. It invokes informality, casualness, a closer intimacy and understanding of the ground and its people, while also summoning the self-improvement ethos of the educational establishment, a strong pull in a country where education is seen as one of the few ways to move ahead in life.

The Solar Programme Comes of Age
The 1990s saw the coming of age of the solar programme, as it grew to become the largest section in the College’s programme through its expansion into states across India and the increase in funds from Government and external donors. The regions of Sikkim, Uttarakhand, Himachal Pradesh and Jammu-Kashmir all benefited from this escalation of funds and the expansion of training with grants and subsidies received from the MNRE (Ministry for Non-Renewable Energies), CAPART and the UNDP (United Nations Development Programme), which included the installation of over one thousand home solar systems across Leh and Kargill districts in the region of Ladakh.
The first years of the new millennium continued this trend with the installation and augmentation of further home systems across India. 2004 was a watershed moment for the College, marking the first year that the College began training individuals from overseas when they hosted two individuals from Ethiopia and two from Sierra Leone in the project, all of whom were funded by a Norwegian aid agency. This would mark the beginning of the College’s increasingly global profile as their domestic intake of trainees waned and they began focusing on the training of individual’s out-with India.

From 2005-2006, thirty-four individuals, a mix of men and women, arrived from Ethiopia, two from Sierra Leone and ten from Afghanistan, all of whom were funded by the NCA (Norwegian Church Aid). Numbers continued to rise year on year, with thirty-six trainees from Bhutan arriving in 2007 funded by the Bhutanese Government and the Asian Development Bank respectively, and approximately the same number from Cameroon, Mali, Bolivia, the Gambia and Afghanistan who were funded by different agencies in each case.

In 2007, following a visit from a Government of India representative, and convinced of the effectiveness of the training underway, the College was recommended for inclusion in the Government funded ITEC (International Technical Economic Cooperation) and SCAAP (Special Commonwealth African Assistance Programme) programmes as an official partner in their South-South development cooperation scheme. Established in 1964, the ITEC programme aims to provide relevant skills and capacity building to approximately five thousand participants each year from partner countries in fields where India has developed expertise. Over forty-five institutes from government and private sectors offer a choice of over 200 courses, both short-term and long-term, in areas of relevance to 156 ITEC/SCAAP partner countries.

Under the ITEC scheme, the Government of India provides funds for the “software”: air fares, accommodation, materials, food and training costs during the duration of foreign nationals’ stay in India. Partners and donors provide funds for the “hardware”: photovoltaic solar home systems, including batteries, lamps, and lanterns, plus six months of spare parts and equipment necessary for a Rural Electronic Workshop (REW). Since September 2008, the College has hosted groups of up to thirty-five
women from the Least Developed Countries index, predominantly Africa, for six months to be trained in the manufacture, installation and repair of solar photovoltaic home systems. I met this first “batch” of trainees from Malawi, Tanzania, Ethiopia, The Gambia, Rwanda, Uganda, and Bhutan four months into their training when I arrived in January 2009.

Since this first group of trainees, the College has hosted groups of women every six months thereafter, and has subsequently seen its profile expand exponentially as it became one of the few globally recognisable development ‘brands’, a process that I describe as the spectacle of development. The chapters that follow explore different aspects of this continued expansion as the College intensified its reach and prominence.

Conclusion

The College, as seen above, established itself during an era of upheaval and change as a new generation of young activists, emboldened by radical new ideas including ‘integrated development’, and encouraged by changes to government development policy, started to set up their own organisations in rural areas. Such efforts took place within wider discourses of economic improvement, technological innovation, and an increasing movement of individuals and ideas between the rural and urban areas. Nevertheless, it would be inaccurate to portray NGOs as mere passive recipients of wider developmental change. Through locally embedded practices and experiences, organisations also exert their own wider structural influences at national and international levels. Through the College’s work with solar and rainwater harvesting for example, The Indian Government has adopted many of their practices, often involving the up scaling of local activities to regional and national levels. Such practices have not gone unnoticed at the international level, which as later chapters demonstrate, have been extended to countries far beyond the borders of India.

I began this chapter, however, with reference to the spatially divided realms of the urban and the rural. Two spaces seemingly apart, yet intractably intertwined with one another. We have noted how the Barefoot College mobilized such imaginings in its construction
of itself as a voice of the forgotten and downtrodden of India in order to beget authority and influence in its operations. Such mobilising brings to mind Srivastava’s (1993) discursive analysis of Indian post-coloniality though the Doon School, a residential boys’ school in North India. Srivastava explores the construction of the post-colonial nation-state through the school via the fetishization of the metropolis, a sign that denotes progress, modernity, heterogeneity and co-operative existence between castes and religions - all characteristics of “modern, metropolitan, life” (1993: 173). This construction of a new and progressive post-colonial nation-state is contrasted with the backward “primitivisms” and static morality of the non-metropolitan ‘other’ India, one constrained by tradition and custom, and perhaps symbolised by the Khadi programme of Gandhi (1993: 166).

The Barefoot College, however, uniquely, employs both rural and urban signifiers at once; being both traditional and authentic: the castigation of corrupting urban influences, the exaltation of the common rural dweller, the acclaim of traditional working practices and wisdom; yet also modern, progressive and heterogeneous: caste hierarchies are flattened, social status indicators are abandoned, dissimilar religions work side-by-side. Its ability to seamlessly thread these two disparate worlds together constitutes, I suggest, its extraordinary success throughout decades of developmental policy change.

The above manoeuvrings echo Venkatesan’s (2009) study of traditional Indian craft in which people, things and materials are brought together in a social space by influential others and re-envisioned as “valued objects of attention” (2009: 78). In this heterotopic space, marginal people and things are partially objectified and mobilised, standing as emblems for nation building projects and the ‘real India’ (2009: 79-81). The Barefoot College might similarly be compared to such a space through its recruitment and objectification of marginalised people from within India and across the globe, and their transformation through an amorphous set of development practices from integrated development to participation, solar engineering and women empowerment. The impact and appeal of these mobilisations draw upon national projects of nation building, in this case an emerging national consciousness that no longer sees itself as receiver of aid, but
as a giver of aid, and more widespread development concerns relating to social change, empowerment, Otherness, authenticity and progress.

Moreover, its continued espousal of such traditional, self-reliant practices overlooks and ignores the extraordinary array of foreign donors and partners involved in its programmes in later years. This combination of globalised networking that draws upon traditional notions of custom, identity and practice (Castells 2010b) helps explain the College’s resilience in the face of fast moving developmental environs. Such heterotopic adjustments combined with strategic ‘light-footedness’ has aided the College’s progress as they navigated international development discourses, global economics and domestic policies. This interweaving of civil society, the market, and the state is channelled, concretised and woven together through notions of tradition, timelessness and steadfast custom, producing a sense of concreteness and dependability within the displaced spaces of a globalised world.

In the next chapter, I explore the contestations and negotiations involved in the translation of an architectural dispute involving the College and the architectural profession. In the process of this, I consider how a Barefoot narrative is employed and adapted within different material and discursive configurations.
Chapter 3

An Award Controversy: Anthropology, Architecture, and the Robustness of Knowledge

Introduction

In the previous chapter, I considered how the College cultivated its philosophy and programmes over time, and the ways in which it developed a coherent narrative that encompassed the fluctuating landscape of development. In this chapter, I turn to the base of operations of the College, to the buildings, walls and foundations of a global institution to consider how the College overcame a rival narrative that threatened its own story of unrivalled success. I tell the story of the Aga Khan Award saga, an architectural award controversy that enveloped the College in the early years of the new millennium and which concerned claims of authorship for the building of its new campus. This chapter throws light on the complex relations that evolve over time between various stakeholders, the role and agency of objects, documents, websites, written and verbal testaments, and the built project itself, as well as ways in which the College’s interpretive constructions, concealments, silences and mobilizations helped it to overcome rival knowledge systems. The power and flexibility of the Barefoot spectacle is thus laid bare as I explicate the various disputes and deliberations in the College’s attempt to supplant one professional discourse for another.

In what follows, I consider the manner in which the actors involved in the controversy define and construct the situation, in the process bringing to light normally overlooked aspects of development and architecture. In this conceptualisation, the built form is imagined as neither exclusively social nor material, but rather as processual, in which the currents and paths of myriad relationships turn static constructions into complex spaces of conflict and negotiation. Thus, only by paying attention to the material forms of such processes can we account for how certain narratives triumph over others. This chapter
also throws light on the ways in which the College, as a heterotopia of development, of Otherness, set itself against the hegemonic values of a dominant social institution, in this case the professional body of architecture. It also demonstrates how a heterotopia always presupposes a system of opening and closing. As the following will demonstrate, to get in, to be accorded recognition, one must have certain permissions, and must meet certain criteria before being acknowledged by the heterotopia. Through these diverse, yet complementary beginnings, I seek to uncover the ways in which a Barefoot spectacle is employed and adapted within different material and discursive configurations.

In the following, I first introduce the background to the award dispute conferred to the College in order to contribute to an emerging body of literature on an anthropology of architecture as process (Marchand 2003, 2009, Yaneva 2012). In this conceptualisation, traditional categorical divisions are dispensed with, and instead the generative movement of people, materials, concepts and designs take centre stage. Buildings are transformed from static objects with hidden meanings, to hybrid configurations of moving actors: materials, construction techniques, builders, designers, environmental forces, and events. Secondly, and in line with the thesis as a whole, I situate this case study in relation to recent works on the ‘translation’ of development projects (Mosse 2005, Mosse and Lewis 2006). This approach, which builds upon the hybrid networks and agential becomings of Callon (1986) and Latour (1996; 2005), amongst others, aims to trace the machinations and negotiations involved in the translation and stabilisation of large-scale projects, the ways in which common understandings and meanings are established and made robust. Lastly, I aim to resituate a materiality of forms to such an analysis in order to consider how different ‘things’ shape developmental outcomes and successes. The chapter concludes with reference to the discursive formations that material forms become entwined within, and suggests that the Barefoot College represents a movement towards modernity, but not in the way that we might first envision.
Background to the Controversy

The Aga Khan award for architecture is a prestigious triennial prize established by Aga Khan IV in 1977 given for outstanding contributions to architecture in areas of the world with a significant Muslim presence. The selection process namely emphasises architecture that not only addresses people’s physical and social needs, but also responds to their environment and culture. Particular attention is given to projects that utilise local resources and appropriate technology in innovative ways. The programme has a triennial prize of $500,000 awarded to multiple projects, making it the world’s largest architectural prize, and is unique among architectural awards for its recognition of projects and teams in addition to buildings and people (AKAA 2007). The ‘Barefoot Architects of Tilonia’ were one of the recipients of the award handed out in 2001 in Aleppo, Syria, for their “exceptional contributions in building rainwater harvesting structures, homes for the homeless and the Barefoot College campus” (Sebastian 2002). Little did they realise, however, that this historic day would become the first step in a controversy that would eventually lead to the award being handed back in a storm of recriminations and counter accusations.

The Barefoot College ‘new campus’, as it is known, was completed in 1986 on a plot of land 1-2 km outside the village of Tilonia, Ajmer District, Rajasthan. The campus itself is set within eight acres of fenced-off land comprising of residential blocks for staff and their families, a central stage area for music, dance and other performances, a guest accommodation area, a library, a refectory area, a communication centre for local radio broadcasting, an administration block, traditional communication, solar, medical, and rain water harvesting blocks, a post office, a telephone booth, and a craft centre. The residential blocks are formed around a central courtyard providing light and ventilation. The ‘roofs’ of each building in the campus are designed in such a way as to collect and channel rain water down through a piped water system and into a central holding area that helps to re-charge the surrounding groundwater. This is then pumped up using bore-well hand-pumps.

The ‘old campus’, as I have noted in previous chapters, was the original campus of the Barefoot College. It is housed in the grounds of an old tuberculosis sanatorium on the
edge of the village Tilonia and was previously leased from the Government of India for the token sum of one rupee per month. Due to a desire for expansion, and also for a secure base that did not rely on the vagaries of the government’s generosity, the College purchased a new plot of land just outside the village in order to build a custom built campus for the growing needs of the centre. For this, they hired a newly qualified young architect from New Delhi named Neehar Raina. Raina was introduced to the director of the Barefoot College, Bunker Roy, through a close friend of his who had previously worked in Tilonia. Raina has stated that he treated the project like any other: he met with the clients, discussed with them their needs for the project, visited the field site, researched locally available materials and local architectural styles, drew up blueprints for the project area, and then supervised the masons and craftsmen through to its completion. As one of his first assignments as a newly qualified architect, Nechar was proud of the completed project. In the following years, he went on to build up a successful architectural practice while intermittently keeping an eye on the progress of the College.

In 2002, fifteen years after the completion of the campus, he came to know that his previous client, the now world-famous Barefoot College, had been one of the recipients of the Aga Khan award for architecture, winning $50,000 and a citation that carried the names of an illiterate farmer from Tilonia (Bhanwarlal Jat) and twelve other ‘barefoot architects’. The text of the citation read: “The success of this approach is exemplified through the construction of the campus by an illiterate farmer from Tilonia along with 12 other barefoot architects, most of whom have no formal education.” Raina, aggrieved that his name was not present on the citation for the project that he had designed and supervised, immediately contacted the Aga Khan Foundation and the Council of Architecture to lodge a formal complaint. He also produced photographs and architectural drawings to confirm his role, as it is conventionally understood, as the architect in the project.

The complaint prompted the Foundation and the Delhi-based Council for Architecture to send Romi Khosla, a senior architect, to Tilonia to investigate. In April 2002, Khosla, accompanied by Raina, travelled to the campus in Tilonia where they held an open
meeting with Bunker Roy and other members associated with the project. At the meeting, which was recorded on video, Bunker offered Raina a place among his 'barefoot architects' in the award, Raina declined. After some discussion, a partial truce was eventually reached with an agreement to change the phrasing on the award citation - drawing a distinction between 'designer' and 'architect'. In June, the Foundation changed its citation on its website in accordance with the newly agreed phrasing; they also issued Raina a certificate testifying to his role in the project. The revised citation now read: "A young architect, Neehar Raina, prepared the architectural layout and an illiterate farmer from Tilonia, along with 12 other Barefoot Architects, constructed the buildings."

On 01 July 2002, The Indian Express carried a front-page story on the incident with a picture of Raina holding his new certificate. The story also carried the words of Bunker Roy who stated that: "It has been decided that Raina was the designer and not the architect. There's a difference between the two". Raina retorted: "I don't mind being called the designer. Who else designs but an architect?" (Jain 2002).

On 04 July 2002, it was reported by The Hindu that Bunker was returning the award (Sebastian 2002). Later that day, STAR News aired a report of the controversy where Bunker and other members stated that they felt insulted by the change in citation, since, according to them, the change implied that it was not possible for "traditional architects" to complete such a campus without the help of a 'paper architect'. In a subsequent report in Frontline magazine, Bunker stated:

"There was no question of accepting Raina as the architect since he was a beginner and was still learning from the elders in the village. When Romi Khosla and Raina came down to Tilonia to discuss the issue with the men and women here in April this year we had agreed to acknowledge Raina as a designer but of course not as an architect" (Sebastian 2002).

The subsequent return of the prize by Bunker was the first time in the Aga Khan Foundation's history that a recipient had returned an award.

Bunker is quoted in Frontline as denying that Raina had a role in the construction of the rainwater harvesting structures: "His contribution was only in helping prepare an
initial layout of the Barefoot College campus. In this too, he vastly benefited from the knowledge and wisdom of the local people, including women.” In the same article, Bunker further states:

“We have not made any false claims or taken credit for work done or contributions made by others. We still believe that the original work was designed and executed by the barefoot architects and that the professional architect made his contribution only as a member of the total team (my emphasis), by making the blueprint in order to be able to receive government funding for the campus... It is an established practice in our society to ignore or leave unacknowledged the extraordinary contributions often made by ordinary people. The whole class of people have thus remained invisible throughout history in spite of their brilliant creativity just because they were poor and illiterate” (Sebastian 2002).

Raina, who it was reported, never made any claim for the cash award, only for recognition, stated:

“Not that I don’t recognise Tilonia’s work. But they should have recognised mine as well.” In one of his letters to the Aga Khan Foundation’s office, Raina further stated: “By calling SWRC New Campus designed by me a ‘Barefoot College’ and attributing designs, ideas, concepts, implementation and supervision to supervisors and masons who merely executed (my emphasis) the design, Roy has made a mockery of not only the architectural profession but of the prestigious Aga Khan award for Architecture” (Jain 2002).

The Aga Khan Foundation’s website makes no mention of the controversy, and the Barefoot College does not currently feature as previous recipients of the award. The whole embarrassing incident, it would appear, has been airbrushed from history. The Barefoot College’s website (as of 2012) still maintains that the campus was “designed by a team of rural Barefoot architects”, and further: “As no one had any formal training, no architectural drawings were referred to for building, all plans of the campus were drawn and re-drawn on the ground, as the design evolved and changed” (Barefoot College website 2012).
Anthropology and Architecture

Anthropology and architecture, on the face of it, are unusual allies. Their relationship in the past has customarily been confined to the margins of more established fields with the built environment relegated to a secondary role, supporting the trials and tribulations of their more prominent human masters. While previously it might rightly have been claimed that architecture as a serious subject of academic enquiry, had been somewhat overlooked by the discipline at large (Humphreys 1988), at least in comparison to other equally pervasive social forms such as kinship or religion (Vellinga 2011: 173), its stature has in recent years grown to occupy a viable sub-field in its own right.

In former times, as Vellinga (2011: 173) notes, the anthropology of architecture has typically focused on descriptions and typologies of indigenous building types and techniques, often from a comparative perspective (e.g. Horowitz 1967; Mauss 1979). In the latter part of the twentieth century, symbolic analyses of architecture came to prominence, concentrating on the interpretation of architectural sites as symbolic systems of meaning (e.g. Bourdieu 1973; Forth 1981; Kis-Jovak et al 1988). Similarly, more recent studies of architecture and anthropology have drawn upon analyses of the underlying meaning of the built environment to structure social interactions (e.g. 'house societies' in Carsten and Hugh-Jones 1995; Joyce and Gillespie 2000). Issues relating to space and place have further added to the canon of works connected to the built environment (e.g. Bender 2001; Feld and Basso 1996; Hirsch & O'Hanlon 1995; Ingold 2000).

Perhaps the most profound and thoughtful contribution to an anthropology of architecture in recent years has come by way of Trevor Marchand (2001, 2003, 2009, 2010), a trained architect turned anthropologist. Marchand, who has written extensively on building-craft knowledge and apprenticeship among minaret builders and masons in Yemen, Mali and Nigeria, advances an understanding of the built environment “away from static symbolic/semiotic analyses toward one of ‘process’, and studies architecture and urban space in its making” (2001: X).
Recent works that have attempted to reappraise how the architectural process is conceived include Till (2009), who argues for the uncertainty and contingency of architecture to be taken into account, and Yaneva (2012) who focuses on the mapping of “controversies in architecture”. Yaneva in particular takes up the theme of the rather limited literature on architecture noting that in the past, architecture has traditionally fallen either side of a society/material culture bifurcation with the architectural community typically focussing on the materiality and technologies of forms, while the humanities focussed on perceptions and symbolic interpretations of forms (2012: 1). Drawing upon Science and Technology Studies (STS) (see Callon 1986; Latour 1987, 1996; Latour and Yaneva 2008), Yaneva proposes instead that following these actors in their fluid states as they criss-cross multiple ontological boundaries, helps to grasp the simultaneously social and technical aspects of an architecture (planning, designing, building, dwelling) as process.

Despite commencing from a rather different subject field, Mosse (2005) also employs insights derived from ANT, this time, however, utilising Latour’s application of a sociology of translation (1996, see also Callon 1986) to analyse how ‘success’ is generated in a large-scale development project. Through the employment of the concept of translation, Mosse charts local processes of patterning, from project design to the implementation of a project, through to field practices and evaluative outcomes. In this way, by “following the actors”, he is able to map how a particular narrative is mobilised, stabilised and held together via the enrolment and continued support of an ‘interpretive community’.

In the following account, I draw upon an anthropology of architecture as process and the attempted ‘translation’ of rival narratives, to describe one particular architectural controversy as it unfolded between rival network builders: the Barefoot College, and the architectural community. Tracing the different actors involved in a controversy, however, allows not only a consideration of the agency of things and their effects on relational outcomes, but also how different material orders contribute to the witnessing of knowledge production. Thus, I also explore how different things contribute to the establishment of matters of fact.
Architecture: the Making of a Profession

The controversy raised more than just issues of recognition for the work done; it also brought into focus the differing knowledge claims of each group associated with the project and demonstrated how each group, or network, marshalled its resources as they fought for the authority to speak on its behalf. Namely, each network associated with the saga – the architect, the client, and the architectural profession – brought to bear a different perspective on proceedings. Let me begin with the architectural profession.

Immediately after the media coverage of the event, a group of Delhi-based architects met at the School of Planning and Architecture in Delhi to issue a joint statement in response to remarks made by Bunker Roy, with a view to opening up a dialogue about the issue in professional forums. Their statement comprises six points, which principally relate to claims to authorship and the status of architecture as a demarcated and professionalised body of knowledge. In brief, the six points cover: 1.) The definition of an architect as “defined by the Architect’s Act which specifies the education-training-certification-registration process for becoming an architect”; 2.) The professional role of the architect as governed by agreements between the client and the architect that spell out the scope of architectural services: “it is not for anyone to dismiss these as mere ‘paper architecture’ or anything else”; 3.) The professional basis of architecture and its opposition to “folk wisdom”, apprenticeship, etc.”: “it is not for anyone to dismiss a duly qualified architect commissioned to work on a project as one just ‘learning from wise village men’, etc.”; 4.) The role of the client or institutional client (such as an NGO) to act justly and honestly; 5.) An acknowledgement that inputs from “co-producers in design, construction, fabrication, crafting, finishing, etc.” are involved in the architectural product, but that claims to authorship cannot be granted arbitrarily by anyone; and finally, 6.) The role of the Council of Architecture as a statutory body that provides a platform for redress of any grievance relating to the architectural profession: “To bypass the Council and dramatically air ill-informed and unfounded grievances about the architectural profession publicly on national media is hardly civil behaviour” (Architexturez 2002).
The points raised by the group deal with a number of interrelated issues connected to the responsibilities of the architect, the client, and the architectural profession as a whole. They also reveal the processes by which one group mobilises its forces against the other by drawing upon established and hence durable practices and procedures, such as professional education, architect-client agreements, contracts, statutory bodies, and certification. The Council of Architecture contrasts these reputable and time-honoured traditions against the transitory 'folk wisdom' and apprenticeship, the uncivil and unprofessional, and hence unreliable behaviour of the Barefoot College. Thus, through the definition of the situation, the attempt to lock down the roles of others, and finally to act as spokesperson for their collective efforts, the architects acted to translate the situation in their favour. Delving more deeply into some of the points, specifically the first and third points regarding the authority of the architect and the architectural profession today, I would like to explore the historical antecedents that preceded the modern architect in India to demonstrate the transience of expertise and knowledge.

The modern architect as he is known in India today is a relative newcomer, more a product of imperial import than historical evolution. As Tillotson (1989) notes, the Indian craftsman was traditionally part of a co-operative group of craftsmen who shared responsibility for design and construction, working out both in situ (1989: 60). The Indian craftsman (known as Mistri or sometimes Mistry) was a collective member of a guild (Srem), which despite containing internal hierarchies based on experience drew no formal distinction between designer and builder (1989: 60). The two processes were coterminous with one another, the design often taking shape in the process of the construction itself. These methods were still exclusively used across much of India up until the arrival of the various European powers at the end of the seventeenth century: the Portuguese and the Dutch on the West coast ports of Surat and Cochin, the Danes on the Coromandel Coast, and the French in Pondicherry. It was the arrival of the British, however, who founded Fort St. George (modern day Chennai) in 1644 that would have the most lasting influence (1989: 3).

As British trade and commerce expanded across India, a new desire for prominent buildings that would solidify and reflect their growing influence in the region gained in
popularity. Mistrustful of local craftsmen, they brought with them foreign architects to
design their buildings and residences. In the course of their negotiations with the
princely state maharajas, the new style, symbolic of the growing power of the
colonialists, came to influence the style and tastes of the regional rulers. This led not
only to new palaces built along classical lines, but also to the disenfranchisement of the
local mason; in effect, the whole process of design and construction underwent a radical
overhaul. The professional architect of post-renaissance Europe acted as a singular
entity, determining the design in an act of individual creativity, which was then worked
out on paper and handed over to workmen with instructions on how to execute. Every
aspect of the design process was pre-determined by the architect leaving little for the
traditional craftsman to do but follow instructions. The Indian Mistri was thus reduced
to the role of labourer as the separation of design and construction took root. These
changes coupled with the introduction of government schools of art in every
administrative town in 1853, the Westernization of India's educated classes, and the
advent of new tastes and patronage among the princely maharajas, all of which served to
put the traditional crafts of India in danger of extinction (Tillotson 1989: 60).

The expansion of architecture as a profession continued apace and in 1917, the
‘Architectural Students Association’ made up of former students of the Government
School of Art in Bombay (known as the J.J. School of Art today) was established. This
society, formed to promote architecture as a profession, became ‘The Indian Institute of
Architects’ in 1929 when it affiliated itself with the most powerful body of architects -
the Royal Institute of British Architects. In post-independence India, the Parliament of
India enacted the Architects Act of 1972 provisioning for standards of education,
recognized qualifications, and standards of practice. The ‘Council of Architecture’
oversees the act, regulating the education and practice of the profession throughout
India, and ensuring that any person carrying out work under the title of ‘Architect’ is
registered with the Council and possesses the requisite qualifications and education in
accordance with the Council of Architecture. Furthermore, the actual practice of the
profession of architecture is governed by the Architects Regulations Act of 1989, which
deals with professional ethics and etiquette, conditions of engagement, scale of charges, and professional conduct (Council of Architecture 2002).

From an occupation wholly maintained by guilds and craftsmen, the art of building became a consolidated profession with codes of conduct and standards of expertise. The result was a standardization of skills through professional formation ensuring that the client received a guarantee of a certain level of service delivery. The outcome, in effect, is rather a case of a displacement in power rather than a substantive change in method. One group came to monopolise a particular network through the marshalling efforts of its various actors, yet the guild system essentially remained in place, only the rules changed. Once common understandings and meanings are established, or in this case supplanted, the network is assumed to be reliable and stable. The Architects Act of 1972 acted as the seal that black-boxed the network (Callon 1986). Katz’ (1969) description of the nursing profession applies equally well to the present case:

The caste-like system puts an unscalable wall between the physician and the semi-professional in the hospital. The legitimacy of the professional guardianship of a body of knowledge depends not only on having a distinct body of knowledge, but also an acceptance of that guardianship by those beyond as well as those within the ranks (1969: 69).

Interestingly, however, this network has been somewhat eroded in recent years, as the modernist view of the all-presiding architect taking responsibility for the entire project and employing other professionals such as surveyors and builders, has given way, in some quarters at least, to the increasing financial power of development companies. In these cases, developers have redefined working practices; the architect’s authority has subsequently been eroded, and they have become, like the mistri, just another works package (Winch and Schneider 1993: 928).

In the next section, I turn to material enactments of knowledge claims and suggest that despite such strong exhortations by the Council of Architecture, words carry little weight. More durable are the material enactments of these words in bricks, mortar, paper and drawings.
The Architect: Design and Building

Neehar Raina has his offices in North Delhi, in a gated compound off one of the busy highways that ring New Delhi. After a tour of the local area trying to find his residence and with the aid of one of his staff members, I finally alighted from the hot and dusty streets outside to a sleek air-conditioned inside of polished wood, glass and brick. Neehar, an amiable but serious sort in his late forties with a neatly trimmed greying beard, black polo neck and brown linen trousers met me in his reception area. We shook hands warmly. I apologised for being late but he brushed my apologies aside and led me through to a softly lit office area of brick lined walls, a sofa and coffee table, a desk and a large table and chairs. We sat down at the end of the table, facing each other. While waiting for tea to be served, we made small talk about the traffic and the mini heat wave Delhi was currently experiencing.

Neehar came to the project as a newly qualified young architect having been introduced to Bunker by a mutual friend. The project, he stated, was like any other he had worked on and proceeded in a typical architectural fashion. As Willis et al (1974) describe, in the early days of an architectural project, the design sequence is much like the preparation of a cake – the ingredients are collected, weighed and mixed together, and only after a period of time will the finished product emerge (1974: 7). In the architectural case, the elements to be considered include the location of the site, the nature of the proposed building, the schedule of accommodation and, most importantly, the cost. Each component has to be carefully weighed and analysed before they are incorporated into the whole, the test of the architect’s mettle being how successfully they assimilate these many disparate elements into a unified design (1974: 7). Once a design has been approved by the client, tenders will be invited for the work. In the Tilonia case, however, owing to the rural location and ideological underpinnings of the College, only local masons and labourers were approached for the building work. Working drawings were then prepared for the head mason whose role it was to interpret the drawings and assign jobs to the masons and labourers for their execution. Throughout, the architect supervises the work in progress, but is not expected to give
constant supervision, only that which is required to ensure that the work is in accordance with the drawings and contract.

As in any building project, the link that enables the architect to communicate their ideas to the mason is crucial to ensuring a transparent transition from design to construction. In an architectural project, a package of documents are presented to the foreman to guide the work in progress, which include, but are not limited to: a schedule of materials to be used, and if applicable, the manner in which they are to be used, if for example, construction techniques that are not standard practice are to be employed; statutory consents for the work to be undertaken; contract documents; specific building code regulations; in some cases, a schedule of works, detailing the timeline of how the site should proceed; and finally, and perhaps most importantly, a series of working drawings, which act to convey to the foreman all the information required for the erection of the building, these including a full set of plans incorporating larger-scale details of complex sections that the architect may wish to have constructed in a particular way, schedules of windows, doors, staircases and other internal finishings (Willis et al 1974: 7).

Working drawings or architectural drawings act as the main conduits by which the ideas and designs of the architect are transmitted to the foreman or 'site in-charge' who then administers jobs to the work force accordingly. As Turnbull (1993) states in an absorbing account of the building of the gothic masterpiece Chartres Cathedral, from our modern vantage point, the role of drawings in the construction of large and seemingly complicated architectural projects appears self-evident. Just as science is held to be the product of great thinkers and designers, so is technology popularly held to follow science, and all large buildings therefore are the product of a great designer requiring detailed plans, so that the intentions of the architect may be passed on to the builder (1993: 319). There is still considerable debate, however, among art and architectural historians as to the role played by drawings and plans in the construction of the great religious buildings of the past, namely the early medieval period, with their relative absence in the historical record often cited as evidence that they were not necessary. What is clear, however, is that the introduction of site drawings occurred gradually and may in fact have resulted from more sophisticated construction techniques
being developed that required detailed modes of representation (Kostoff 1977: 74). As Turnbull states further, however, “absence of evidence is not evidence of absence” (1993: 319). Other authors (e.g. Harvey 1972, Andrews 1976, Kostoff 1977) have argued that the absence of drawings can be explained by the fact that their perceived usefulness was confined only to the task at hand; they were discarded when the job was over. In a similar vein, Kostof (1977: 75) has suggested that the parchment used for drawings was of such value that they were frequently cleaned off and their skins re-used.

Turnbull (1993) makes a convincing argument that designs, rules and plans explain too little and too much in not only the construction of Chartres, but in any architectural project. This overemphasis on the role of theory at the expense of practice, he argues, serves to conceal the local and ‘messy’ practices characterising the production of techno-scientific knowledge in all eras (1993: 317). The only difference between science and technology, Turnbull argues, now and in the past, are the ways in which this local and tacit knowledge is made consistent and mobile across groups of workers and different locations.

Transportation of ‘messy’ and tacit knowledge between workers and locations was also a pressing issue in the construction of the College campus. In an architectural building project, the key link in the chain of communication between architect and builders is ascribed to the foreman, a position in most cases filled by a qualified civil engineer. In the Tilonia case, Neehar had initially insisted on the employment of a professionally qualified civil engineer to act as site in-charge, but had difficulties persuading anyone to spend a significant period of time at the rural location of the campus. The one engineer that they did persuade left in the early months of the project due to the rural conditions.

The site in-charge, or the site engineer, not only plays a crucial role in the management and day-to-day running of the project, but more importantly, acts in a literal sense as the principle interpreter of the drawings to the workers. During the period of the building of the campus, from 1984-6, most construction workers, both skilled masons
and unskilled labour, were illiterate\textsuperscript{30}. Despite the fact that some of the workers may have been able to read and write in Hindi having completed primary levels of education, the medium of communication in the architectural drawings were, and are English. In most cases, it is therefore the responsibility of the site engineer to not only act on the drawings, but to translate the measurements and other dimensions to the workers on-site. Some workers, Neehar stated, are trained to read the dimensions and interpret a drawing at a basic level, but in general, the responsibility lies with the site engineer to pass on instructions. In the absence of the site engineer, several routines were developed to overcome this obstacle in communication. First of all, Neehar found himself spending more and more time at the campus filling the role of the site engineer himself. Once a design is accepted and all contracts and arrangements have been concluded, an architect, in general terms, will only supervise a project over the course of its completion. Two or three visits a month is usual. The actual day-to-day management of the project is left in the hands of the site engineer. Secondly, Neehar began to translate the drawing dimensions and instructions from English into the Hindi Devangari script for the benefit of those who were able to read. Thirdly, and tied to the second point, Neehar found two individuals in the Tilonia campus who were able and willing to act as his ‘bridge’, so to speak. The first, a local individual called Satyen, then the head of administration at the College campus, helped to source local materials for Neehar, introduced him to the right people, and to generally handle the logistics of the project; in short, to carry out the basic functions of a site engineer. In a secondary capacity, this individual also learned how to ‘read’ the architectural drawings, which he then translated to the head mason Ghisa Ram. Ghisa, a local mason from Tilonia village, acted as the next link in the chain. As a local man, Ghisa had the advantage of knowing many of the masons and labourers already; he had an idea of their strengths and weaknesses, and the approach to building best suited to their capabilities. In his role as head mason, Ghisa had the responsibility of administering the jobs and overseeing the work being completed. Together, Satyen and Ghisa acted in their respective capacities to pull their combined local, tacit and ‘messy’ knowledge together in the construction of the campus.

\textsuperscript{30}According to the 1981 Government of India census, the literacy rate in Rajasthan excluding the 0-4 age group stood at 42.03 percent. No figures are available for particular social groups. In the latest, 2011 census, the literacy rate in Rajasthan had risen to 67.06 per cent.
The blue prints, far from acting as a master code or algorithm explaining the whole and its parts, might better be considered a guide. A guide can explain what is desired, the dimensions and designs, but crucially leaves the how – the on-site machinations – to the experience, traditions, and trial and error of the builders.

In a wide-ranging discussion on creativity and improvisation, Ingold and Hallam (2007) argue against a schematic view of creativity as something that is designed in advance; that is, against the belief that something is created only when it is new, without precedent. Rather, they argue for a view of design and building as an “ongoing alignment of observation of the model with action in the world” (2007: 5). In this view, action is not merely the mechanical process of replication, but instead entails a whole-body engagement with the task at hand, a skilled performative dance between design and outcome. As Stewart Brand writes in relation to the architect and the built environment, “The idea is crystalline, the fact fluid” (1994: 2).

In the transition from drawing to building, the Barefoot Campus underwent a process of becoming; a generative process shaped and wrought by a diversity of forces and inputs. As I have shown, to describe the building process as merely the execution of a pre-formulated design is to deny the creativity and skill involved in transforming a diagram into something solid and enduring. Moreover, such perception also fails to acknowledge the many actors involved in the construction of the campus, both human and non-human.

The Translation of an Architectural Project

Once we had our tea and made the preliminary small talk, Nechar talked me through the story of the affair from the beginning. He brought out his original correspondence with the Aga Khan Foundation and also, more importantly, his original drawings of the campus. Having spent a considerable period of time at the campus, the drawings quite clearly matched the existing buildings of the current new campus in Tilonia, down to design motifs and the disputed rainwater harvesting structures. If we were operating from a causative form of knowledge reporting in this saga, then the obvious conclusion
to be drawn would perhaps be a claim as to who was right and who was wrong. By following a descriptive framework, however, in effect, “tracing the actors” we are led down the more interesting route of trying to account for how one group of actors overcame another in their claims to knowledge. In another sense, how each spokesperson for the respective groups associated with the project – Neehar, of the architectural community; Bunker, of the Barefoot College – marshal and translate their respective knowledge claims. We already know that the design of the campus was eventually – after some protracted discussions – attributed to Neehar, and the role of the ‘barefoot architects’ was downgraded to that of builders, but the question remains, how this was achieved, how and what actors were mobilized?

Bunker’s objections to the role of architect being attributed to Neehar centres primarily on three points: firstly, that Neehar was only the ‘designer’ of the project and not the architect, since the architects were the local people, labourers and masons who constructed the campus; secondly, Neehar came to the village as a ‘beginner’ and only subsequently learned traditional techniques and local building styles from the village elders; lastly, that the efforts and contributions of local people, the labourers and unseen multitudes are rarely acknowledged in such awards, the Barefoot College thus attempts to reverse this trend.

With regard to Bunker’s first point regarding his distinction between ‘designer’ and ‘architect’, he is quoted as saying: “His contribution was only in helping prepare an initial layout of the Barefoot College campus” (Sebastian 2002). Bunker is further quoted as referring to Neehar as merely a “paper architect” far removed from “traditional” architectural practices (Architexturez 2002). The distinction that Bunker makes between ‘design’ on one hand and ‘architecture’ on the other alludes to, as I have shown, a rich heritage of vernacular building techniques characterised by generational knowledge, trial-and-error based work, and an absence of professional drawings that was, and in many parts still is, predominant across much of the sub-continent. It also, of course, chimes rather well with the College’s ideology of anti-intellectualism, of demonstrating that uneducated persons have as much capability as educated ones. The veracity of these claims is of no real concern in the present discussion; rather I am
interested in how certain knowledge claims affect particular outcomes - in this instance the investigating committee remained unswayed by Bunker’s claims. Instead, confronted with the blueprints of the campus drawn up by the architect, they were forced to conclude that Neehar had carried out the role of ‘architect’ as it is conventionally understood by the Council of Architecture. The architectural drawings prepared by Neehar acted as an inscription device (Latour and Woolgar 1986) that mobilised and made robust a particular point in time.

The blueprint, much like the map, classifies and orders aspects of the world that are deemed significant. As Hooper-Greenhill (2000) argues in a discussion of the map, the museum, and the census as technologies of power in the modern period, the map constructs values and designates power relations, draws boundaries and constructs a particular mode of seeing the world that is rooted in particular relations of power (2000: 17). The blueprint shares many of the underlying functions of the map: both act as instruments of power and as textual devices, and both fit a name and a shape to a place. The blueprint makes mobile knowledge about the world while simultaneously excluding certain others from access to that knowledge. The blueprint, in a sense, could be described as a “metonym of modernism” (Ray 2002) through the fact that it orders, classifies, and defines reality while simultaneously denying and hiding from view the ‘messy’ inputs that contributed to its creation.

During the course of our meeting, Neehar made extensive use of the blueprints to demonstrate the central part that he played in the project. Despite the episode having occurred more than twenty-five years previous to our meeting, the textual device of the blueprint ensured that his place in the network remained robust. Bunker’s claims to the negligible contribution of Neehar, however, remained rooted to the local (Law 1986). He was limited to words and gestures. His power to shape the network, to speak on its behalf, and to convince and enrol other actors was limited without the use of material objects that could traverse the network both temporally and spatially. In contrast, the blueprints allowed Neehar a measure of long distance, as well as immediate social control, which led to the subsequent acceptance and mobilisation of his version of events.
Bunker's second claim that Neehar was merely a novice when he came to the village and subsequently learned everything he knew from village elders, is a persuasive and not wholly inaccurate point. People learn. They learn as individuals, and in groups, through observation, through listening, through touching, tasting and smelling. Most importantly, however, they learn by doing, through a synergy of practice in action that involves a whole-body engagement with the world whether that be through discussions with village elders or running a hand down the surface of a piece of stone. Knowledge, then, like learning, is an active and dynamic process, always on the move, always generating new and unexpected outcomes, never inert. Architecture likewise is an active process involving research of the local area and building styles, investigation of the proposed site, listening to the client, accommodating their desires within the projected cost, designing blueprints of the site, and supervising and handling the infrastructure of the project. The architect, then, like Latour's characterisation of Pasteur (Latour 1988), is a spokesperson and strategist for a network of heterogeneous elements. They pull these many elements together into a coherent and stable whole and make them durable. A network that is striving to become stabilised does so by way of trials of strength, through which more powerful actors become established. When a network does become stable, the actor who manages to enrol and mobilise other actors in a network can be described as the primary actor, while other actors become simple intermediaries once the primary actor is established.

To the issue, then, of the novice architect attributed by Bunker to Neehar, Bunker, in defence of the College's position not to attribute the role of architect to Neehar, claims that: "he made his contribution only as a member of the total team". He further claims that: "In this too, he vastly benefited from the knowledge and wisdom of the local people, including women." In my discussions with Neehar, he never denied the external inputs that went into the Tilonia project, or any architectural project for that matter:

"I learned a lot from Tilonia, I learned a lot from masons there, I learned a lot from... I don't deny that at all. But then, I was very hurt, because it was mine, I had input from everywhere, an architect has input, in fact a designer of a hangar or an aircraft company or whatever, and when I'd meet the engineers, I'd say how much
does the whole way function... what is the weight ratio, how does it go, let me sit in an aircraft, that is the only hint that I have”.

Further:

“So you know, any time I've ever been in a restaurant, I'll meet the cooks, I'll meet the... you know, I'll meet the people and learn from them and then design, it's important, that's how you design”

In reference to the disputed rain water harvesting structures:

“The thing is, I did design it as an architect. Anything you do, it’s not that... your own idea... ideas on rainwater harvesting may or may not have been ready, I don’t remember how it happened, maybe Bunker knew, or maybe someone else gave me it, then finally, the designer, the architect, takes it and copies it, ok, and so let’s do it, OK ya, let’s do it, rainwater harvesting, good idea, it’s not a new idea, rainwater harvesting used to be done in the villages, into these stepped wells, OK, so we said fine, good idea, let’s do it, but nobody owns this idea”.

These passages demonstrate the many elements that contribute to an architectural project. The architect, far from denying the mediating roles of others, fully embraces them. Intermediaries, however, come in many shapes and forms, not just human; they are the “missing masses” (Latour 1992) of the architectural project. The look and feel of a piece of stone, the weight bearing load of a timber beam, the strength of the midday sun in summer, the availability of local resources, both human and non-human, and of course the ideas and wisdom of others, all contribute to the network and subsequent durability of a design project. The creation of a building, or a design, or an idea, is never an isolated act of innovation then, but always, as Ingold and Hallam (2007) observe, an act of improvisation. To read creativity as innovation, as breaking with the old, is to define it by its end product; to read creativity, however, as improvisation is to characterise it by its processes, by the generative movements giving rise to it (Ingold and Hallam 2007: 2). Marchand (2009) similarly notes that innovatory transformations in work procedures are typically the result of a multitude of different processes and may just as easily be incorporated into daily practice without formal recognition of its novel quality (2009: 82). This is not to say, however, that instances of innovation do not occur, but only that they must be recognised and validated by the social community either ‘strategically’ for the purposes of public consumption, or as an intentional act, in
which case, its innovatory power rests with the recognition accorded to it by the community at large (2009a: 82). In either case, innovation is never an isolated act, but always a social as much as a technical accomplishment.

When village elders therefore give the architect the benefit of their local knowledge and wisdom, they do so only as contributing elements of a wider network made up of many other causal actors, including, of course, the architect. Bunker’s claim then that Neehar acted only “as a member of the total team” is accurate to a point; yet, the architect as primary actor and spokesperson for the network also assumes responsibility for the success or failure of the network. If a project fails, the architect takes responsibility, not village elders or masons, or inadequate cement, or the midday sun; likewise, if it is a success, they also take responsibility. This is the price that must be paid when an “obligatory passage point” (Callon 1986) is appointed to a project, even if, as Bunker claimed, it is only carried out as a necessary precondition for government funding. It is an act of black-boxing (Latour 1992) the network, of concealing its inner workings and positioning a single actor as its author. It is a political act, an act of power conciliation, for the same reason that ‘heads must roll’ during a political crisis: anything less may expose the inner workings of the network and bring to light the precarious and fragile nature of the structures underwriting our existence. Therefore, when questions were raised at the inquiry stage about what went on during the project, the lid to the box was prised off. Neehar may indeed have acted ‘only’ as a member of the ‘total team’, but ‘his’ network ultimately proved more enduring, not because it was more ‘true’ than Bunker’s, but because it was more durable.

Bunker’s last point concerning the unsung contributions of labourers and local people in architectural awards is tied up with the second claim of unacknowledged inputs and, also, of failed network building. The current website for the College states the following:

“Since rural people have been building their own houses for generations, without consulting any urban architects, the College utilized the knowledge and skills that the locals already possessed to conceptualise and design a campus that was comfortable and acceptable to its rural staff. As no one had any formal training, no architectural drawings were referred to for building, all plans of the campus
were drawn and re-drawn on the ground, as the design evolved and changed" (Barefoot College website accessed 17.2.13).

Bunker’s network is made up of rural men and women with no formal training. Their knowledge of architecture is derived from generational knowledge and practical know-how based on their situated experience of living in rural environs. This network does not consist of urban educated professionals, nor does it consist of blueprints, hierarchies or formal plans. In this network, the ‘author’ was deemed not to be an architect or an individual, but a way of life, an ideology, an idea. When the architect or ‘designer’ of the project was overlooked in the original application to the Aga Khan award, a new network was created. This network, however, was fragile and prone to be easily broken. When the inquiry was staged, local women and labourers who worked on the site of the campus testified loudly to having never seen the other network builder (Neehar). Bhanwarlal Jat, the local man cited in the original award as having constructed the campus along with twelve other ‘barefoot architects’, stated:

“So he said that he claimed that he was the designer. This man only came once or twice a month, it’s not like he stayed here and was part of the whole building process”.

Further:

“Other people, the masons, the people who constructed it, they helped a lot, everybody helped, it was not a one man job. Everyone helps, the engineer only comes and tells you what you have to do and then the mason carries it out”.

In an answer to the question of whether the finished buildings were faithful to the original design:

“There were about fifty percent changes. The boy (Neehar) considered me like a teacher. He said I will learn from you. We used to be on good terms”.

The other heterogeneous engineer (Neehar) in this saga commented:

“The truth is, the mason, I don’t know his name... he lives outside the village, Gisa Ramm, he was the chief mason of the whole complex, the head mason, or the chief mason rather, he was not included in the award because he did not belong to their community, he did not belong to the Tilonia fraternity. Bhanwarlal Jat, he got offended, I said, Gisa Ramm... I wouldn’t expect the number one guy to be overlooked, but because he wasn’t part of the social work, at that time it was the
Social Work and Research Centre (the original name of the Barefoot College), now he's not part of the barefoot architects, he's not part of the campus, and I think that's why, and there were a lot of those guys who were actually the guys who built the campus. And Bhanwarlal Jat was nothing, believe me, he was nothing, he's a sweet guy, he was not even a mason".

Such exhortations, however, carry little weight. As Law notes: “Thoughts are cheap but they don’t last long, and speech lasts very little longer” (Law 1992: 385). The durability of the Barefoot network was shown to be lacking precisely because it was embedded in speech, in gesture, and in thought. It lacked the resilience of its rival network, which was inscribed in inanimate materials, such as blueprints and buildings.

However, this is not the end of the saga. I was recently in contact with Neehar to check a few facts and fill in some gaps when I happened to mention the new website that the College had recently put on-line. Perhaps a little mischievously, I pointed him in the direction of the ‘campus’ section and its description of the campus design and construction (as highlighted above) by unlettered ‘barefoot architects’, with no mention of his own contribution. Neehar, understandably, was somewhat perturbed, signing off with a promise of getting justice and due acknowledgement:

“After I intervened, Tilonia was asked to change its website and include my name as ‘designer’. Aga Khan took the award back from Tilonia. I got the citation. Aga Khan then erases the award from its website. Now Tilonia follows suit and does a complete turn around and even lies to the whole world. I do not exist anymore as an architect or a designer. I am left stranded with only a citation now. A strange irony, won’t you agree?” (Raina, N, personal communication, May 7th, 2010).

We can see here an example of the performative nature of networks and their tendency to break down, if not routinely attended to. Neehar, despite originally being accorded a citation by the Aga Khan Foundation acknowledging him as the designer of the campus, and his pre-eminent role as the primary network builder safe-guarded, now finds himself relegated to an intermediary role, at best. His work has been airbrushed from the Aga Khan website, keen, one must assume, to forget about the whole embarrassing affair, and his contribution has been erased from the Barefoot College’s new website, ousted by a team of uneducated villagers and age-old wisdom. It is indeed an irony, as Neehar notes, for one of the main reasons that he was bestowed the original citation as designer
was due to his robust and mobile blueprints, held aloft proudly as evidence of his role as primary actor during the inquiry stage. Bhanwarlal, meanwhile, the illiterate village ‘coordinator’ who maintained that all his plans were drafted in the sand and discarded when their use came to an end, could not produce anything as tangible to prove his own and others’ role in the construction. As we all know, however, in the information age, paper hard copies are no match for the durability and ultra-mobility of electronic copies that can, at the press of a key, be downloaded, copied, shared and circulated around the world. Through a combination of erasure, selective emphasis and information technology, once again a new network builder prevails; an irony, yes, but perhaps not so strange, after all.

As Shapin and Schaffer (1985) suggest in their seminal text on the production of scientific knowledge, matters of fact are established not only epistemologically, but also socially, that is, through the witnessing of knowledge production by viewing audiences. Matters of fact are therefore established and made more robust through the collective beliefs of individuals, its relative robustness being contingent on the number of individuals who witness it. In the establishment of making knowledge known, different material devices thus have different effects on the diffusion of knowledge. Raina cemented his role and contribution in the project through his access to blueprints and drawings, which, through their mobility and durability, could be circulated and witnessed by the investigative committee. The Barefoot College, however, which relied on verbal and gestural claims, could not provide anything nearly as tangible. Yet, with the conclusion of the investigation, the investigative committee’s role in the witnessing of knowledge production was temporary, limited to a point in time. What mattered subsequently was how the controversy was witnessed by donors and supporters whose contributions hinge on the College’s reputation, that is, its mobilisation of events. Thus, some time later, these claims were surpassed by the circulatory power of website inscriptions, which again omitted Raina’s role in the project, instead substituting him for the efforts of uneducated rural individuals. Raina’s inscription device, which served its purpose in its day, remains locked away in an office drawer, its powers of circulation surpassed by modern technology. As noted earlier, this is augmented by the omission of
the entire episode from the Aga Khan website. In addition, many of the original website stories on the episode have long since expired, and those that are still available are not readily apparent. The Barefoot College meanwhile goes from strength to strength, increasing its web traffic by the day as its reputation grows, expanding the numbers of individuals who witness its claims, and in the process strengthening its position.

The Barefoot network, then, like the Neehar network, was selectively highlighted. Each chose to conceal certain working parts of their network, but for different network-building reasons; the Barefoot College because its network is underwritten by a philosophy of inclusivity: that uneducated, rural people deserve recognition and respect for the work done; Neehar and the architectural profession because its network is predicated on exclusivity: that individuals create buildings in a solitary act of innovation. Both networks, however, as has been seen, are selectively ‘authored’; in the end, it matters less which network reflects ‘reality’ more accurately, and more which one stands the test of time.

Conclusion

In this chapter, I have explored the ways and means by which the Barefoot College adapted its interpretive narrative to the theme of architecture. Through the employment of developmental discourses that positioned the Barefoot College as spokesperson for the poor and oppressed against the might of the architectural profession, the College in effect reproduced a discourse it has been playing upon since it first began. As we saw, however, such interpretations were called into doubt when a key actor in the drama challenged the narrative put forth by the College, and thus threw into doubt the College’s authority. By tracing the claims advanced by each side, following the dispute as it criss-crossed multiple ontological domains, it has been possible to elucidate how such knowledge claims were applied and managed as each party wrestled for dominance.

Within such tracings, I also advocated a study of architecture as process, as a means of uncovering the different kinds of knowledge claims associated with the built environment and the material practices through which they are enacted. An architecture
as process helps allay the antagonistic divisions inherent to common accounts of architecture as either overly material in their conceptualisations, or as unduly social and symbolic without recourse to their substantive foundations. Only by paying attention to a materiality of forms can we better appreciate the narrative complexities of how some constructions endure, and others fail.

In Chandigarh’s Le Corbusier, Prakash (2002) explores the ways in which the construction of the city of Chandigarh, the capital of the states Haryana and Punjab, and the first planned city in post-independence India, was appended to a vision of the future, a new dawn of modernity, unfettered by traditions of the past. In this conceptualisation, the sleek lines and stark geometries of this new metropolis were envisaged as a break from the colonial past, of an India rendered weak, superstitious, ancient and disordered (2002: 11). In its place, Nehru, the architect of this new sovereign state and an admirer of both the United States and the Soviet Union, wished to send out a clear signal that this new nation was a modern nation, an enlightened nation, throwing off the shackles of colonization, poverty and primitivism. As has been well-documented, however, Nehru’s grand vision was roundly criticised by scholars (e.g. Evenson 1966; Sarin 1977; Kalia 1999) who saw it as an importation of a modernism from the West, disassociated from its socio-political and historical context, and without thought to the particularities of the Indian climate and culture (2002: 21).

Nehru’s vision for Chandigarh drew upon a binary division of the modern and the past, Western and Eastern, vernacular and innovative, that which was old and out-of-date, versus that which was new and progressive. Chandigarh was a city built on Otherness. It was a reflection of all that Nehru aspired for India to be, standing against all that he wished to leave behind. Chandigarh was Nehru’s heterotopia. In the above analysis, Bunker also drew upon classificatory divisions, but contrary to Nehru’s position, he situated the Barefoot College firmly in the past, representing tradition, time-honoured customs, inclusivity and indigenous knowledge. This was set against a profession deemed modern, elitist, top-down, exclusive, and removed from the concerns of everyday people.
In this reversal of positions, Bunker was employing several discourses at once. Whereas Chandigarh reflected an attempt to overcome the inferiority and insecurity felt by a young nation-state through the projection of modernism and renewal, Bunker’s Barefoot College represented a rejection of these ideals. Rather, the College advanced the anti-thesis to Nehru’s vision, celebrating local knowledge, skills, tradition and rural living. If Chandigarh represented Nehru’s vision for post-Independence India, then the Barefoot College embodied Gandhi’s: an assertion of locality and belonging within rapid advancements of modernisation. Thus, despite embodying the Otherness of the heterotopia, setting itself against accepted norms and dominant understandings, the College as a heterotopic space was also an amorphous space. As the previous chapter made clear, and as the following chapters will demonstrate, the College monitored and adjusted its position by drawing upon different images and ideals, tilting its mirror-like spectacle to suit the circumstances.

In the next chapter, I look to the domestic use of solar energy in India, including government policies relating to rural electrification and off-grid solar PV. I illustrate this with a case study of a Barefoot solar project in Himachal Pradesh, in the process shedding light on the silences afforded NGO work, which goes unacknowledged in their exaltation.
Chapter 4

India is Shining

Introduction

In 2004, the then ruling government of India, the National Democratic Alliance, a coalition group led by the Bharatiya Janata Party (BJP), popularised the slogan ‘India Shining’ to promote India internationally and highlight a general mood of economic optimism and prosperity. The slogan was roundly criticised by opposition parties who claimed that the stated “feel good” factor catered only to a small elite who reaped the benefits of economic growth while the majority of the population continued to suffer from a lack of basic service provision including healthcare, education, water, and electricity access. The ruling alliance famously lost the subsequent general election with the glossy ad campaign widely estimated to have cost in the region of USD20 million (Perry 2004), attributed part blame.

Despite the ill-advised nature of the campaign, it is perhaps an apt introduction for this chapter, for it highlights a country not only on the verge of achieving unprecedented levels of economic development, but one still beset by major social disparities, not least, and in contrast to an India ‘shining’, by access to reliable forms of electricity. Of the estimated 1.3 billion people worldwide lacking access to electricity, 400 million live in India, comprising 47 per cent of the population (IEA 2009). Much of the rural population in India are afflicted by extreme poverty, including high levels of illiteracy, lack of access to financial resources, inadequate healthcare, low agriculture yields, insecure incomes, and limited access to essential services, such as potable water, education, energy access, and adequate infrastructure.

Access to electricity is one of the primary drivers in a country's development, contributing to increased agricultural, industrial and socio-economic development (Nouni et al 2008: 1188). In rural areas, as Chaurey notes, non-access to electricity goes hand-in-hand with poverty, since it contributes to better living standards and provides a crucial stimulus to productive and economic activities (2004: 1693). Positive effects of electricity access in rural areas include basic activities, such as pumping water for drinking and irrigation, lighting for increased working and learning hours after dark, and running small-scale industries (2004: 1693).

In its 11th five-year plan (2007-2012), the Indian government declared an ambitious 'Power for all by 2012' policy with the expansion of the regional transmission network and electrification of all villages (Ministry of Power website). Providing that access, however, has proven problematic, with high transmission and distribution losses, frequent grid disruptions, a widely dispersed population and the financial unviability of extending the grid to remote and inaccessible areas (Nouni 2008: 1189), 'Power for all by 2012' remains an unfulfilled ambition. Inclusive of this strategy, however, is the allowance of stand-alone systems, "independent of the regulatory regime" (Ministry of Power website 2007), including biomass, hydro and solar energy systems at the village level. Nonetheless, such strategies are not without their own difficulties, particularly in the case of solar, which includes high up-front costs and lack of follow-up servicing and maintenance support.

In light of this, the following chapter aims to discuss the domestic rural solar photovoltaic (PV) situation in India, its history, development and current status, including state-led policies governing rural solar electrification and macro-economic issues of energy production. I consider the commonplace issues associated with the electrification of rural areas using solar PV, its challenges and contests, yet also its rewards and returns. Furthermore, I explore how material aspects of technology and energy have become embedded within notions of development, enlightenment, and the formation of the state. Slogans and policies such as 'India is Shining' and 'Power for all' are intimately entwined with ideas of development and advancement, helping to project and give shape to national and international imaginaries of modernity and progress. The
provision of light in this instance is concerned not just with improved living standards and economic production, but also with the transformation of national identity and selfhood. Furthermore, as Cross (2012) has suggested, the extension of the 'grid' and the provision of alternative forms of energy, such as solar photovoltaics is concerned not just with the production of power, but also with the production of modern states and ways of 'seeing' (Scott 1998). Energy grids, then, are composed of overlapping grids of power and knowledge, helping states not only to govern, but also to shape, map and make visible productive consumers and emerging new markets (Cross 2012).

Development and light, one might argue, act as powerful transformative metaphors with the power to illuminate and transmute, as well as obscure and to cloak. Such ambiguities will be highlighted via a case-study analysis of a Barefoot solar electrification programme of several hamlets and villages in Himachal Pradesh region, an ostensibly successful programme, but one let down by poor infrastructural support, lack of accountability, corruption and mismanagement. Successful solar development projects depend not only on robust networks of skills and knowledge, but also on the construction of acceptable narratives and interpretations helping to translate the messy and often conflicting realities of development work (Mosse 2005). Such interpretations, I suggest, are aided by spectacles of development, which help to conceal the inherent disorder and disruption of development work. Thus, development projects, such as those discussed below, require not just functioning technical networks and materials to 'work', but also the conceptual work of interpretation, translation and spectacle. I suggest however, that far from being distinct, such processes are intimately entangled, the material properties of development giving shape to its conceptual representation and vice versa. Further, I also consider the flip side of such network-building activities and look to the silences and concealments involved in producing decentralized development projects. Off-grid solar networks, I argue, are sustained not only through active building, but also through the suppression and silence of certain network-sustaining processes, the denial of which is paramount to their success.
Solar Energy

Solar energy, involving the conversion of sunlight into electricity, occupies one of the viable renewable energy technologies currently touted as a potential alternative to mainstay fossil fuel consumption, the others being: hydro (from water), tidal (from tidal currents), geothermal (from heat stored in the earth), wind (from the existing winds), and biomass (from plants) (Miller 2009: xv). Solar energy technologies, as Miller (2009) notes, were introduced into many emerging markets in the early 1980s, often with great fanfare and hope for a newly accessible and inclusive energy regime (2009: 3). Such hopes were largely instigated by the 1973 and 1979 energy crises, out of which alternatives to fossil fuels were explored and developed.

Of the currently available renewable energy sources, solar is generally regarded as the most abundant and ‘cleanest’, with the amount of solar energy that hits the earth’s surface in one hour about the same as that consumed by all human activities in one year (IEA 2010). Direct conversion of sunlight to electricity via photovoltaic cells is one of three main solar technologies, the other two being: concentrated solar power (CSP), a system using mirrors or lenses to concentrate a large area of sunlight onto a small area for conversion into electricity, and solar thermal collectors (STC) in which solar heat is used to generate electricity. In 2010, solar PV provided approximately 0.1 per cent of the world’s electricity supply, projected to rise to five per cent in 2030, and eleven per cent by 2050 due to effective supporting policies and cost reductions (IEA 2010).

The basic building block of a PV system is the solar cell, a semiconductor device that converts direct sunlight into direct-current (DC) electricity. Assemblies of solar cells, when grouped together, are used to make solar panels, or solar ‘modules’, which together with a solar system, typically including an array of solar modules, an inverter, and battery, is used to generate electricity. A diagram of a basic ‘stand-alone’ solar system can be seen below (figure 8).

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32 The 1973 oil crisis was initiated by an oil embargo by the OAPEC (Organization of Arab Petroleum Exporting Countries) members. The embargo by OAPEC, the leading supplier of crude oil to the West, led to the pursuit of alternative energy sources, which were less dependent on one source. The 1979 oil crisis occurred in the wake of the Iranian Revolution, which led to disruptions in the production and distribution of oil.
PV systems can be used as stand-alone, off-grid systems, as they are in many rural and inaccessible areas, or else they can be grid-connected systems, sometimes known as a ‘solar park’, or ‘solar farm’ housing thousands of connected modules feeding energy directly into a central electricity grid. India itself has vast solar potential, with most parts of the country endowed with 250-300 sunny days per year (Bhargava 2001: 639), making solar a very viable source of renewable energy.

**Solar as Signifier**

In *Another Reason: Science and the Imagination of Modern India* (1999), Gyan Prakash explores the ways in which an Independent India defined itself through science, the ultimate symbol of modernity, to stake its place among the leading ‘developed’ nations of the world. India’s modern history, Prakash argues, is the story of a newly emerging nation reconfigured under the sign of science, which acted as a metaphor for modernity that leaked beyond the walls of the laboratory: “as the legitimating sign of rationality and progress” (1999: 7). Science, Prakash suggests, was not just the systematic pursuit of knowledge, but was a sign, its power resting in its ambiguity and ability to traverse different practices, fields and environments (1999: 7). Such adaptability and applicability, Prakash argues, helps conceal the many societal factors.
from politics to religion to economics that spill over and run into one another in the creation of different knowledge systems.

Prakash reminds us of the central role that science has played in the creation of the modern Indian nation-state and the ways in which it has been co-opted and adapted within different spheres and discourses. The Indian Government’s pursuit of ‘Power for All’, to provide electricity to every corner of the country, from urban slum to remote village, shares many of the characteristics, I suggest, of a post-Independence push towards perceived forms of ‘progress’ via the sign of science. Access to electricity for all represents not just as an economic measure of improving socio-economic development, but acts also as a powerful metaphorical measure re-defining a national consciousness and projecting India on to the world stage as it moves towards becoming a leading international player. Such measures are projected through images, materialities, and narratives producing a heterotopic spectacle of economic progress and development that helps allay uncertainties and ambiguities. The extension of the grid, then, to all corners of a country provides a metaphorical tether to the nation as a whole, affording not only notions of progress and modernity, but also inclusivity and belonging.

However, as noted above, not all corners of the country are accessible to the grid. Remote rural areas with widely dispersed populations have in some cases proven a bridge too far for central-grid connection. Alternatives have been sought in the form of stand-alone systems that operate independently to national energy grids, including biomass, hydro, and solar energy systems. Such systems, however, are not without their own problems. Stand-alone systems, much like large-scale electricity systems, also require a host of differential factors to align, including technology, people, economics and environmental conditions, if they are to succeed.

Such alignments recall Hughes’ (1983) notion of the sociotechnical system to describe his analysis of large-scale modern electrical power systems the success of which rests on the alignment of social, economic, technological and political actors. Hughes provides an account of how Thomas Edison sought to engineer the spread of large power systems across the United States at a scale never before seen. In the process, he charts how Edison had to align a host of heterogeneous elements including the triumph of AC
voltage over DC, the development of a bulb filament capable of sufficiently high resistance, the support of key politicians, favourable geographical conditions, and the growth of new laboratories and electrical engineering courses to service this new industry, all of which contributed to the success of the systems. Thus, technology transfer is always a fraught affair, contingent on a host of variable factors. A successful sociotechnical system, then, is one where the “web is seamless”, that is, the social, the technical and the economic, coalesce as one, an entirety working together in the act of producing the power system.

Hughes’ ‘seamless web’ reminds us that large, successful technological systems are produced through a host of diverse cooperating elements, from the material to the social, and the environmental. In the narratives of success often put forth by agencies such as the Barefoot College, such networks are often suppressed in their promotion of themselves as unique and unparalleled providers of developmental change.

Development, as Mosse (2005) has convincingly argued, requires not only the alignment of sociotechnical systems, but also the strategic manipulation and translation of disparate elements into a stabilised narrative of success (2005: 8). Development efforts, particularly so in the case of India, which relies for the most part on Government funding to deliver state services, must be aligned closely with political policies and interests to produce a coherent system of representation. Despite the fact that on the ground realities routinely diverge and contradict policy models, development efforts such as those outlined below, must be fashioned to fit the view that they are a result of official policy (2005: 17). This is achieved through the suppression and concealment of conflicting accounts, voices and networks, and through the promotion and staging of preferred spectacles and interpretations needed to stabilise the messy practices of development (2005: 17). Such practices, however, are not just the result of conceptual representations, but as is the case with solar light, are shaped through their own particular material properties. As I will explore in later chapters, the light of solar, brings to bear its own particular characteristics, entangled as it is in discourses of modernity, change and progress.
In the following section, I firstly begin by discussing rural electrification in India, to consider the many policies and programmes that have been tried and tested in efforts to electrify a nation. I then move on to consider the history and current status of solar electrification in India before briefly outlining the development of solar at the Barefoot College.

**Rural Electrification in India**

In chapter two I discussed how relations between NGOs and government at the state level are shaped by a host of institutional, political and social factors. Moreover, the multitude of different stakeholders at different levels has led to a lack of a common vision in the shaping, implementation and monitoring of policy. Such deficiencies in planning and implementation can also be distinguished in policies relating to the electrification of rural areas in India.

As noted above, access to electricity is generally considered a pre-requisite to modern development, providing the means to improved living standards, and increased productive and economic activities. However, access to electricity is also variable and uneven, particularly in remote and rural areas where extension of a central grid may be physically and economically unviable. In the Indian case, many areas fall into this latter category. In the last Government census (2011), sixty nine per cent of the populace in India live in rural areas\(^3\), comprising villages, hamlets and sparsely populated communities, forty-four per cent of whom suffer from a lack of access to electricity. However, even in villages that are 'electrified', many householders are ill-equipped to afford the connection fees, typically 1500-3000 Rs (US$30-60), or tariffs averaging 110-150 Rs (US$2.80-3.80) per month for a rural household (Chaurey et al. 2004: 1697). Where electricity services do exist, they are far from satisfactory, characterised by blackouts and brownouts to the tune of 16-20 hours per twenty days in a month (ibid).

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The Government’s policy for rural electrification over the years has in general been ad hoc and without a central strategy. Different programmes have been implemented with varying degrees of success, including Kutir Jyoti launched in 1988-89, a single-point connection scheme to the central grid provided free to those living below the poverty line, which benefitted some 5.8 million households; the ‘Prime Minister’s Village Development Programme’ (Pradhan Mantri Gramodaya Yojana) launched in 2000-2001 offered financing for basic services through loans and grants with the state, giving the flexibility to decide on allocation from six services including rural electrification; and the ‘Minimum Needs Programme’ providing 100-per-cent loans from the central government for last mile connectivity for rural electrification projects in less electrified states (Bhattacharyya 2006: 3393). However, as Bhattacharyya (2006) notes, a lack of adequate funding, and poor management and coordination meant that many public utilities showed little interest in promoting the schemes, thus many targets were not met (2006: 3393).

Such programmes have been given more impetus in recent years with the ‘political goal’ of ‘Power for All by 2012’ announced in 2001 under the REST (Rural Electricity Supply Technology) Act. This was further augmented two years later with changes to the legal framework relating to the provision of electricity, paving the way for The Electricity Act 2003, a national policy that obligated the government to electrify all villages and hamlets. Further, in 2005, the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) programme was launched with the aim of providing electricity access to thirty-two million households living below the poverty line. However, as Palit & Chaurey (2011) note, the timescale applied to electrification is highly infeasible at current electrification rates, with 2020 a more realistic target date (2011: 268). In addition, a large poor population with low paying capacity, and an electrical industry seeking financial viability and short-term returns, many rural areas continue to be left out of the electrical loop (Chaurey et al 2004: 1694). As such, the Indian Government has explored alternatives to central grid electrification, in particular, decentralised solar photovoltaics (PV) which I will explore below.
Solar in India

As Radulovic notes, off-grid markets require different institutions and strategies to grid-based power systems, if they are to find viable and productive uses (2005: 1883), and this has certainly been the case, as I will show, with India's experience of promoting off-grid solar PV systems on a large-scale. Solar in India began in the mid-1970s through a government-led research and development programme to explore the potential of photovoltaic solar technologies (Sastry 1997). Initial projects were small-scale, designing and fabricating solar cells at the laboratory level, with a view to scaling-up as knowledge and expertise increased. In 1980, this policy was accelerated when the Government launched the National Solar Photovoltaic Energy Demonstration Programme, a five-year programme designed to bring these fledgling research initiatives to a state of commercial production including demonstration of a variety of applications (1997: 63).

At the time, the Government's programme, was run by the Ministry for Non-Conventional Energy Resources (MNES), now renamed the Ministry of New and Renewable Energy (MNRE), which was responsible for the development and production of PV devices in India (1997: 64). In 1992, a policy for the deployment of PV devices was included in the eighth five-year plan, which included a new initiative on water pumping systems and the commercialisation of PV lighting devices by way of special incentives (ibid). With the growing recognition of the need to provide electricity to rural areas for economic development, the bulk of government-led energy policies since the mid-nineties have focussed on the deployment of PV systems in rural areas (Bhargava 2001: 640).

Solar PV implementation policies tend to vary by state and are limited by funds and distribution networks, with few integrated policy measures between state level ministries and rural development initiatives (Radulovic 2005). At the broadest level, however, the MNES and the Indian Renewable Energy Development Agency Limited (IREDA) implements various programmes at the state level through agencies set up to promote renewable energy schemes in which the central and state government meets the majority cost of the total system (Bhargava 2001: 641). However, central subsidy policies relating to PV have changed frequently, as such, consumers are often operating in an
environment of uncertainty and ambiguity, thus hampering the potential uptake of solar PV.

In 2008, the rather unplanned nature of previous MNES policies on solar was consolidated as a National Action Plan on Climate Change (NAPCC) identifying the development of solar technologies as a National Mission (Sharma et al 2012: 934). This was approved as a national policy in the “Jawaharlal Nehru National Solar Mission” (JNNSM) in 2009, which aims for the deployment of solar energy technologies in the country to achieve parity with grid-power tariff by 2022 (Sharma et al 2012: 934). The JNNSM Mission will be implemented in three phases with the first phase spanning the remainder of the 11th five-year plan (2007-2012) and the remainder two phases leading up to 2022, the immediate aim of which is to ensure large-scale deployment of solar technology at centralised and decentralised levels (Sharma et al 2012: 937).

The advantages of decentralised forms of electricity production, in particular solar, are numerous and include: avoidance of dependence on state utilities that are often-times unable to provide reliable supply and access, less transmission and distribution losses, proven technology, no fuel costs after initial purchase, low maintenance cost, easy transportation and installation, and environmentally friendly appliances (Kamalapur 2011: 596).

Despite these advantages, however, there are a number of drawbacks, including: high initial purchase costs, systems not suitable for meeting large energy needs, and limited number of devices that can be operated using PV (Kamalapur 2011: 596). In addition, households that have purchased SHS tend to suffer from a lack of aftercare due to inadequate servicing infrastructure of trained technicians; despite most of the faults being minor in nature, users have to wait for the infrequent visits of maintenance contractors for simple procedures.

In summary, in order to fully grasp how NGOs operate within state and local levels of governance, a host of different organizational complexities, political and social realities, and human agencies must be considered. Just as solar lighting devices, through their material properties, exert their own character on proceedings, shaping particular
technical networks and discursive formations, so politics, history, and institutional behaviour shape how NGOs operate within local conditions. The NGO community, as Sen states, is not a homogenous entity, but is rather shaped by myriad historical and institutional variations, each contributing to particular configurations within different localities (1999: 353).

India, today, has one of the largest government-supported and subsidized SHS programmes in the world accounting for 363,399 (MNRE 2008) systems distributed by 2007. However, it continues to suffer from inadequate field-level infrastructure for the repair and maintenance of systems in rural areas, a point that some NGOs, such as the Barefoot College, have made in-roads to in recent years.

**Solar at the Barefoot College**

The College’s solar section emerged as a small, experimental programme to solar electrify the Barefoot health centre through a donation of a mini-power plant by the Danish corporate group, Danfoss in 1984. The power plant was intended as an integrated renewable energy project, which included biogas, solar, water heating systems, and wind. When the project was complete, solar was one of the few technologies that remained in use. Prior to this, lighting was provided, like in much of rural India, by way of kerosene lamps. Further grants and donations led to the extension of the solar programme to thirty schools in the ‘night school’ programme allowing children, who graze cattle and help their families during the day, to study at night under the light of solar lanterns. When a donation of a seven kilowatt solar system was made by the French government in 1988, lacking the skills or knowledge to implement it itself, the College enlisted the help of a young, professionally qualified engineer, who at the time was managing the electronics division of Danfoss India, in Faridabad, near Delhi. Once the system had been installed, and due to the exasperation of finding help from outside suppliers to make periodic repairs, Bunker requested, if several members of his own staff might be trained in the maintenance of the systems, one of whom was Bhagwat Nandan.
Bhagwat, known affectionately in the College as ‘Guruji’ meaning ‘teacher’, has been the head of the solar section since the mid-eighties. A tall, rangy individual with closely cropped grey hair and a taut, probing expression, his upright frame and plain white kurtas lend him a dignified, almost regal air. Today, Bhagwat coordinates the solar section. He can usually be found behind one of the distinctive low desks crafted by the College, the glass desktop inlaid with old solar cells, sitting cross-legged on the floor of the solar office, fielding calls, delegating tasks, and meeting clients. Solar power today provides forty-five kilowatts of energy, enough to run thirty computers, 500 tube lights, photocopying machines, a pathology lab, a dental surgery, milk booth, and radio broadcast equipment.

Following their established tradition of working with “appropriate technologies”, that is, using technology that can be understood, operated and maintained by uneducated populations without the need for external assistance, a process they have termed the ‘demystification’ of technology, the College moved to becoming a village-level capacity builder in the manufacture, installation and maintenance of solar PV systems. On-campus proficiency in solar PV and an increasingly visible national profile through the efforts of the Director, Bunker Roy, led to grants and awards from government and development agencies for the solar electrification of further villages in remote areas of Rajasthan. These small-scale projects acted largely as demonstration projects for the viability of using solar photovoltaics for the electrification of remote communities. Feedback from differing user experiences and environments led to continued improvements in lantern circuit design and efficiency of system use. Over the next ten years, increasing experience, improvements in design and decreasing costs led to a snowballing movement as further government grants provided funds for projects in Jammu-Kashmir, Sikkim, and Himachal Pradesh. Projects in collaboration with the United Nations Development Programme (UNDP), the European Commission (as it was then), and the Asian Development Bank followed.

The solar section today is by far the largest section at the College, both in size and income, and employs the most workers. It is split between the new campus and the old - the new campus housing the main administration block and a workshop, the old
campus comprising the storage blocks and training centre. Today, both are busy hubs of activity. In the old campus training centre, groups of women from the Least Developed Country list (LDC)34 churn out dozens of circuits by the day; in the new campus, orders are placed, shipments arranged, and the inescapable Indian bureaucratic system attended to. During the cooler winter months, large bus parties of school children and tourists on educational visits are a common sight; independent travellers in 'local' clothing seek answers, journalists and academics seek interviews, while donors, government ministers, and the odd celebrity seek to be wowed.

As the College's profile expanded and the use of solar became more widespread, the Director stepped up his efforts as a spokesperson for the uniquely decentralised, community-centred approach to solar promoted by the College. Relationships and links were established with international NGOs, a process amplified and made easier through the then novel, yet growing, use of internet-based communication networks. The College eventually became host to participants from partner NGOs, acting as a demonstration project itself in sustainable, community led development, providing training and know-how to individuals from, among other countries: Afghanistan, Costa Rica, Uruguay, Tanzania, and Kenya.

This informal, trial-and-error, understanding-in-practice approach to learning was a characteristic seen across the College. Whether by design or accident, a general philosophy of tinkering, fiddling, throwing things together in the belief that it will be all right in the end, and if not, well, we'll know better next time, was pervasive. These once off events progressed to month-long, and then four-month, training camps with various nationals courtesy of NGO donor support. The learning curve for hosting diverse groups of individuals, however, was steep and not without incident. The Ethiopian group, the first group to spend six months at the College, almost ended prematurely in failure after a full-scale fight erupted between Muslim and Christian trainees. Eventually, the two groups had to be trained separately to avoid further fall-out.

34 Least Developed Country (LDC) is a term given to a country, which, according to the UN, displays the lowest indicators of socioeconomic development of all countries in the world. The current criteria utilised by the UN for the identification of LDCs are: a low income criterion; a human resource weakness criterion; and an economic vulnerability criterion. http://www.un.org/special-rep/ohrlls/lde/lde%20criteria.htm (Accessed: 30/09/10).
Spectacles of solar are not just concerned with the kind of nation-building projects that I touched upon in the introduction to this chapter, but are also intimately connected to the kinds of discourses and narratives that the College itself propagates in relation to its own development policies and practices. In the introduction to this thesis, Bunker proclaims that the College’s solar power system “was installed by a priest, a Hindu priest, who has only done eight years of primary schooling, never been to school, never been to college. He knows more about solar than anyone I know, anywhere in the world, guaranteed.” The official narrative espoused by the College, seen in countless conference addresses, videos, media pieces and reports states that Bhagwat Nandan, a local Hindu priest was recruited by the College and during the course of a ‘learning-by-doing’ approach to the maintenance of the solar equipment, learned everything there was to know about solar photovoltaic systems: its maintenance, repair, and installation. With the passing on of his knowledge and experience to a new generation of solar engineers, the College’s solar programme was born.

Bhagwat’s story is certainly impressive and lends the College the spectacle of social transformation that it so relies upon, confirming its philosophy and narrative that uneducated individuals have the capacity to learn about sophisticated technologies without recourse to external, professional help. Thus, the sustainability of the venture is confirmed, and the resourcefulness of uneducated rural persons is demonstrated through impressive and spectacular feats. In the College’s words: “What the College has effectively demonstrated is how sustainable the combination of traditional knowledge (barefoot) and demystified modern skills can be, when the tools are in the hands of those who are considered ‘very ordinary’ and are written off by urban society” (Barefoot College website, accessed 19 January 2013).

Thus, while not wholly inaccurate, the College’s official narrative selectively omits (the help received by professionally qualified engineers to electrify the College and train individuals) and highlights parts of a narrative that serve to reify its own brand of development work: that poor, uneducated individuals can lift themselves out of poverty without “paper qualified” professional help. As noted in chapters one and three, such discourses have become an abiding staple of Bunker’s promotion of the methods and
philosophy of the College. However, as this chapter will proceed to highlight, and as seen in the previous chapter on the construction of the College campus, the selective ignorance of key personnel, relationships, and infrastructural support is an essential component of the Barefoot success story.

In the remainder of this chapter, I explore how the provision of energy via stand-alone solar energy systems has become implicated in discourses of development and progress. In the process, I chart some of the common constraints and problems associated with decentralised solar electrification through a case-study analysis of a Barefoot initiated solar programme in the valleys of Himachal Pradesh.

A Plea for Help

It began with a plea for help. July, in Rajasthan, is one of the hottest months of the year. With temperatures reaching for the high forties, and a widespread drought, the first in seven years, I began to find the gruelling summer heat not only a daily challenge to my health, but also to my fieldwork. My two closest friends at the College, 'non-locals' like me, from the North-East of India, were also finding the high temperatures taxing. It was with somewhat favourable fortune then that an urgent letter of appeal from the coordinator of one of the College’s most northerly outposts in Himachal Pradesh was received, requesting financial aid and assistance for solar work to continue.

In the letter, the coordinator of the field centre had asked for clarification regarding the future of the project, emphasising that without assurance of financial assistance for house and workshop rent, staff salaries, maintenance and travel expenses, the project would likely cease to operate in the near future. This plea for help followed another letter from the previous year requesting one lakh, eighty thousand rupees (approximately USD3200) for replacement batteries for fixed solar systems and lanterns, a plea that had gone unanswered.

The field centre, formally situated in the village of Tingrat, but now re-located to the nearby hamlet of Urgose, Lahul and Spiti district, was the site of operations for a solar
PV electrification programme of nearby villages and hamlets in 1997-2001. One-hundred and ninety solar systems had been installed in total: one-hundred systems in Tingrat Panchayat\(^\text{35}\) (38W modules, 40AH battery, three lamps (one lamp was for substitution only), and one charge controller), seventy-five systems were installed in Chimrat Panchayat, and a further fifteen systems in Tindi Panchayat. An additional 125 solar lanterns were also distributed throughout the electrified villages. Initially, each household wishing to receive the solar devices deposited a fixed sum of 3000 INR (approximately 50USD), with monthly contributions thereafter. This would guarantee, according to the original contract, a ten-year period of maintenance from the BSEs.

The project had run successfully, it seems, for the first decade or so, but had recently experienced difficulties with the appointment of a new coordinator and financial shortcomings. Aware of our difficulties with the rising temperature, Bunker summarily despatched the three of us to its cooler climes with the remit to: 1.) assess the need for repairs to the field centre and estimate the amount needed, 2.) visit the solar electrified villages, speak to the users, assess the functioning status of the solar units, and verify whether BSEs were maintaining the units adequately, 3.) select two "middle-aged" women BSEs from the village of Tindi Nala and bring them back to Tilonia for training.

We spent several weeks in Lahul and Spiti district evaluating and assessing the status of the solar projects. While I was there in an unofficial capacity as assistant, I situated myself as an observer to proceedings: to the ways in which the College gathered information, which aspects it deemed important, and those that it did not. In the following, I share the limits of what the College wanted to know and reflect upon the kinds of information that the College sought in the course of its discursive constructions.

\(^{35}\) Village Panchayats or 'Gram Panchayats' are local self-governments in the villages of India.
Not Much Happens Up Here: Apathy and Neglect

The Barefoot College has been operating a domestic solar PV programme since 1984. Starting first with the solar electrification of its campus buildings, increasing numbers of contracts and awards from government and donor agencies led it to gradually expand outwards to neighbouring districts in Rajasthan, and eventually multiply to states throughout India. As of 2010, it had implemented solar PV programmes in sixteen states across India\(^36\), in the process installing 9,833 fixed off-grid PV systems, 5,220 solar lanterns and the training of 383 BSEs (See Figure 5 for a map of all solar installation in India).

As with other development projects, the College competes for government contracts, tendering proposals to government agencies in areas and programmes in which it has experience and a proven track record. As mentioned previously, the solar electrification of villages and hamlets in Himachal Pradesh began in 1997, and was funded through CAPART (Council for Advancement of People’s Action of Rural Technology), and the UNDP. CAPART is a nodal agency of the Government of India formed in 1986 for catalysing and coordinating partnerships between voluntary organisations and the Government for sustainable development of rural areas. As an autonomous body registered under the Societies Registration Act 1860, it functions under the aegis of the Ministry of Rural Development and helps fund and implement a wide range of development initiatives across India.

Following the receipt of the letter from the coordinator of the Tingrat field centre, the three of us made the long journey north, a fourteen-hour bus journey to the regional centre of Manali where we were met by the husband of the coordinator, followed by a twelve-hour journey by jeep across the Rohtang pass, a traffic-clogged trade route of steep winding gravel roads connecting the Kullu Valley in the south, which is primarily Hindu, with the Lahaul and Spiti valleys on the northern side, a largely Buddhist culture.

\(^{36}\) In 2013, there were 28 states in total in India.
The pass, which means 'pile of corpses' in Tibetan, is infamous for its unpredictable snowstorms and blizzards, regularly leading to the deaths of countless trekkers annually. A precarious descent down the other side of the pass, zigzagging through rivers of ice run-off and past miserable bands of seasonal workers cracking stones by the roadside,

![Barefoot College India: Solar Electrification for Lighting as on September 2010](image)

**Figure 6.** Barefoot College solar PV installations in India as of September, 2010

eventually led us to the small town of Udaipur. From here, it was a further one-hour drive to the hamlet of Urgose, a small settlement of stone built houses nestled between snow-capped mountains where the field centre was located.

The field centre, previously located in the nearby village of Tingrat, had re-located to an ex-Government owned agricultural outpost, a ten-minute hike from the village, for reasons, as of yet, undisclosed. Such opacities, as we were to find, were to prove a foretaste of the current status of the solar project. Despite the rugged beauty of the field-centre site set in a valley between soaring mountains and bordered by small streams giving an impression of a manicured rock garden, the building was suffering from years
of neglect. We were the first representatives from the College to visit the field centre since 2003, a period of time that had left the field centre largely to its own devices.

Over the next two weeks, the team trekked to fifteen villages and hamlets in the Lahaul Spiti Valley, in the process interviewing thirty-five households who made use of the solar PV devices installed by the College. In addition, the coordinator and the two remaining BSEs who acted as our guides throughout our stay were also interviewed. The story of the project’s status unravelled slowly, the more people that were interviewed and spoken to, either through formal arrangements or roadside gossip at chai shops as we caught our breath, the more the picture became clearer.

The beneficiary communities of the solar devices, hamlets of just a few clustered houses or villages of several hundred people, were scattered throughout Tindi Valley. Some clung precariously to steep valleys, others were nestled beside streams and gravel roads, but all were remote and fairly inaccessible except to walkers and hardy vehicles. We were guided on our travels by the two remaining BSEs of the solar project, young men in their mid-twenties who had grown up in the valley and knew every short-cut and every passer-by by name, greeting them warmly and exchanging pleasantries along the way.

The landscape itself was in every way imposing and majestic, towering mountains, furious rivers, lofty pine-filled forests and sleepy villages, a world away from the feverish towns and dry desert heat of Rajasthan. One villager described living in Garhi, a small, archetypal village in the valley, as: “Just like that, time passes, no cars come up, the bus only comes once a day. If you want to go to Udaipur in the morning time, you have to climb down for two and a half hours. Not much happens up here” (Interview 6.7.09).

The houses were a mixture of loose stone-built and cement structures intercut with long horizontal timbers for strength. The main room of the dwelling, where cooking and eating were conducted, was typically on the first floor, navigated by a ladder or steep steps with the ground floor often reserved for housing cattle during the harsh winter months. It was here that the fixed solar lamps were used in the evening time during the winter, or when grid electricity went off in the summer. They were used exclusively for lighting purposes, to illuminate the tasks of cooking, craft making, conversation, and
school work. This main room also ordinarily housed a television set, a now common addition to rural lives since the advent of grid-supplied electricity.

The solar modules were mostly secured to the flat roofs of the dwellings, accessed via steep logs with narrow steps cut into the side, set against the outside of the building. The majority of villagers were farmers by trade, harvesting plots of nearby land. Having

Figure 7. A view of the typical terrain encountered in the Lahaul Spiti Valley of Himachal Pradesh

been introduced to the householders by our two companion BSEs, the team and I were ushered into the main public room of each dwelling, hot chai was brewed and biscuits were served on low tables, while small talk was made. Public service posters displaying the characteristics of the “ideal boy and girl” were often displayed alongside pictures of religious deities and political sloganeering on soot-stained stone walls.

Once the tea had been served, the team settled down to the interview proper. While each household differed in the composition of those interviewed – sometimes a whole family would be present, other times only a wife or husband depending on who was available, the format remained the same. Each interview took place in the main room of
the house and was video recorded for record keeping purposes. A series of formal questions were then administered (name, age, caste, occupation etc.), followed by questions relating to the solar devices. Afterwards, the team were usually led to the rooms containing the solar devices and the roof of the dwelling where the panels were mounted for inspection.

Following the team's initial enquiries, the first, and perhaps most surprising revelation to emerge, was the fact that since the solar units were first installed between 1997 and 2001, the majority of the villages had subsequently been connected to the central grid. For six months of the year, however, between September and March, the whole valley is blocked off with snow. Roads become impassable; any movement must be made either by foot or helicopter, which the Government provides for medical emergencies only. During this time, electricity from the central grid is at best sporadic, at worst completely cut off, with transmission lines collapsing under the weight of snow and ice. Villagers rely on either the increasingly ageing solar units or kerosene lamps to provide light, forcing users to walk for hours to Udaipur, the nearest well-equipped town for fuel. Therefore, communication between villages in the valley during this period becomes difficult and dangerous. Surprisingly, however, the team found that after twelve years, the fixed solar units were still largely functioning, albeit at a significantly reduced level (entirely consistent with their age), but functioning nonetheless. Every last solar lantern, however, was long out of order, in many cases since the first year they were distributed.

Many villagers were relatively unfazed about the importance the solar units played: "They give light, so what" (with a shrug of the shoulders) was a common response. However, the majority were quite positive about its impact, particularly in the winter months when grid supplied electricity went down. One respondent, when asked (rather leadingly) about his preference for grid supplied electricity or solar, replied: "Both are good, but in snow, light goes off, solar doesn't go off, sometimes if doesn't get charged for five to six days, only then it goes off" (Interview 01.7.09). Another respondent also noted the benefits of the solar units in winter: "If this becomes bad (the solar unit), then we want to get it again... because the winter has to come, the snow will fall, and the guarantee (for the solar system) is finishing in one year's time. Grid electricity is
unreliable especially in winters, in winters we get cut off, it’s difficult to even go to Udaipur” (Interview 4.7.12). Another villager upon being asked the same question replied:

“Solar, there’s more advantages in solar, in solar you already pay a one-time bill, in light you have to keep paying bills. The government provided us with CFL tubes to reduce our bills – as opposed to standard tubes. Everybody got it. We got it for free” (Interview 8.7.09).

From the team’s observations, however, and as these excerpts suggest, solar was generally regarded as a back-up energy source only when grid-supplied electricity was not available. Grid-based power supplies were favoured as the main power source due to its increased capacity to power television sets and multiple appliances without any diminishment in voltage, a factor that off-grid solar PV could not compete with.

Respondents were also positive about the aftercare maintenance programme put in place to repair the solar systems, a perennial problem noted by previous authors (see Chaurey 2001).

“It is very important, we’ve seen that the government gives solar systems as well but nobody comes to take care of these systems, at least the lights that you give, there is somebody there to repair them, somebody’s present, even though they are private systems they are still repaired” (Interview 10.7.09).

Despite such enthusiasms for the solar units, it soon became apparent that many of the villagers also held a rather apathetic view of the solar programme, an uninterest due in large part, it was to emerge, from a lack of communication and oversight between the College in Tilonia and the field centre in Tingrat. As there had been no representatives to visit the area in six years, it appeared that they had largely been forgotten about, leaving the solar programme and the field centre without any kind of accountability in place. An exchange with a local farmer and solar beneficiary captures this indifference strikingly:

Q: how many lights are working in your house?
A: I am using it in one room, one is spoiled.
Q: Haven’t they repaired it? (the BSEs)
A: No, I told the solar wallahs but they didn’t make it, they said it wouldn’t be possible to repair it.

Q: Why wouldn’t it be repaired?

A: I told that boy to come here, it’s been a year or two that it’s been spoiled.

Q: Are you aware of the situation that they don’t have things to repair it with?

A: I didn’t really ask.

Q: Why haven’t you asked, the villagers have given money, it’s your right? They gave you an assurance that they will repair it for 10 years, do you not feel any sense of anger about this?

A: [shrugs]

(Interview 4.7.09)

Upon being asked by the team whether they wanted to say something to the Barefoot College in Tilonia, if they wished to pass along any kind of message, he replied: “No, what will I say? It won’t make a difference.” “Q: Do you think people care in Tilonia?

A: “No, they don’t pay attention.”

**Corruption and Mismanagement**

The lack of oversight that contributed towards a general malaise also led to a further cause for concern: the non-payment of BSE wages. When the systems were first installed, originally ten BSEs had been trained to oversee their maintenance: three women and seven men. Now only two remained. The three women engineers left the programme upon marriage, five others departed due to non-payment of wages and disagreements with the coordinator, instead returning to farming on a full-time basis. The two remaining BSEs who acted as our guides everyday on the long treks, had also not been paid in over one year, but continued with the work for the sense of purpose it afforded them and the hope that one day they would be rewarded for their efforts. Several of the inactive BSEs continue to maintain the systems in their villages in an informal capacity when needed, and were keen to return to their role if the coordinator, who they found interfering and discouraging, was replaced.

In areas where almost everyone either farmed, or worked in small tea shops and grocery stores, most of the villagers we spoke to regarded the BSEs as a peculiar career
path. They were referred to as “solar wallahs” by almost everyone. A ‘wallah’ in Hindi refers to a service trade such as a cobbler, or teashop worker, anyone that provides a service or is involved in an activity. Upon being asked about the role of the BSEs and their position in society, one respondent stated:

Figure 8. A father and son being interviewed about their solar usage

“People here usually work in farming and services so this is an off-beat profession, initially they used to think, what are they for, what they do, but now they know what their work is, they come and clean the battery and take care of the system” (Interview 4.7.09).

The BSEs themselves generally found their position an enjoyable one. It provided extra income to their main farming activities and provided them a role from which they could meet and greet a wide range of friends and relatives, bestowing a sense of respect and status as someone with ‘technical knowledge’. One BSE Rishi had this to say about his work:

“There’s a lot of benefits, you get to know a lot of people, in the villages, outside people, being a BSE, you get recognised by people, people know that I’m a BSE, that I belong in the workshop, we feel happy, people get very impressed when they
see us, some people give blessings, by being a BSE you get to hear blessings as well as curses” (Interview 2.7.09).

Skills wise, the two BSEs were both competent in their ability to fix most of the common problems in the field experienced by users of the solar systems, such as changing fuses and making minor repairs to wires and casings. However, only one of the BSEs had the required knowledge to diagnose faults using multi-meters and power supplies back at the workshop, a gap in knowledge attributed to his interruption in training due to illness, and compounded by poor literacy.

The users of the systems in general left any repairs to the systems to the BSEs, with several reporting a sense of “intimidation” towards technical objects: “They try not and fiddle around with it in case something happens. If it shuts down, they wait for the BSE to come” (Interview 4.7.09). However, both BSEs reported a continued lack of essential items to maintain the sustainability of the solar systems, citing capacitors, condensers, fuse holders, small components, solar batteries, and functioning tools as their most pressing needs. A lack of infrastructural support and communication between the Himachal field centre and Tilonia prevented the BSEs from maintaining the solar units properly. Monthly contributions from beneficiaries were similarly not enough to replace expensive batteries, while supply lines for smaller components were not in place to ensure prompt replacement. As a result, many of the solar units suffered from failing battering, and as noted, a complete breakdown of all solar lanterns.

In the workshops themselves, used by the BSEs to maintain the solar units, repairs could not be made in the winter months due to insufficient power to heat the soldering irons. Power supply for the workshop was being supplied by grid supplied electricity, as opposed to solar PV power; as a result, when transmission lines went down in the winter months, repairs could not be made during the time when they were needed most. In addition to the technical and infrastructural problems experienced by the BSEs, they were also operating a makeshift workshop out of a room in one of their households, having been ejected from their original workshop by the coordinator, who then proceeded to rent out the rooms for her own gain in the now empty building. Following a theft in the building, which was attached to a village shop, they were asked to vacate
the building and find lodgings elsewhere, hence the move of the field centre to the nearby hamlet of Urgose.

It further emerged during interviews that in addition to the non-payment of salaries to BSEs and sub-letting the workshop out for profit, the coordinator had also used her position to promise solar electrification of households in exchange for votes in the local panchayats. Having been elected, of course, no such installations took place. Interviewed at her roadside café, one respondent had this to say about the solar projects and the coordinator:

“The villagers are quite dispirited towards the whole project, they only care about the light and the solar, but they don’t act like a community, a proactive community. If she’s not even sitting there (the coordinator), what’s the point in continuing the project? Before the election, she promised this, that and the other, but once she had our votes, nothing happened” (Interview 5.7.09).

Indeed, during interviews with householders, much of each interview was taken up with complaints about the coordinator, including, in no particular order: she spends very little time attending to the solar projects having started her own NGO in a different district; her dealings are secretive with little consultation with the solar committee put in place to oversee the solar units; she was known to have issued notices to individuals threatening to remove their systems when the monthly payments were not received on time; she sends the BSEs to work only in places where she has good relations and sees a profit for her political motives and intentions; a general unhappiness with her attitude and treatment of BSEs and villagers.

It was shown in the introduction to this chapter, how energy grids act not only as providers of electricity, but further as grids of power and knowledge, shaping and mapping subjects for their governance by the state and market. In the instance above, it is also possible to see how subjects utilise such webs of power for their own gain. The coordinator drew upon the power of the grid, of the desirability of being ‘connected’, to garner votes and gain entry to office. These overlapping networks of power and knowledge thus materialise in politics, desire, and development, shedding light on the different ways in which energy provision becomes intertwined within diverse discourses.
With regard to the committee put in place to oversee the solar projects, the committee members themselves had no idea, if the committee was still functional or had indeed been dissolved, with no meeting having taken place since 2005. They also had no knowledge regarding the current status of the accounts relating to monthly contributions, claiming that there has been no openness on the part of the coordinator. One committee member who received the solar system summed up the general mood of opacity surrounding the project:

"They didn't say anything, we had to give 3000 Rs. Without telling you, our systems were taken away. It's been eight years since we've deposited the money in the community, but we don't know anything about it. Without the committee, we can't take the money out."

Further:

"I can't remember, in the beginning it was good, after that no one knew what was happening, we don't know where the money is kept. From my village, at least 1.5 lakhs (approximately 2,600USD) was collected. Each family gave 3000 Rs. to begin with" (Interview 7.7.12).

Despite the above issues, users were generally happy with the service provided by the remaining BSEs, with almost all fixed solar units, as was noted earlier, still working to some degree or other after twelve years. This was in spite of the fact that the workshop used to make repairs had not been replenished since the time it was first established, leading to a shortage of replacement parts and lack of available power. The actions of the coordinator and the lack of oversight provided by the College, however, had compounded a general attitude of apathy and neglect towards the solar projects, leading to a negative view of the Barefoot College and its projects.

Towards the last couple of days of the field-trip, the team, exasperated and under severe stress at the goings-on of the project, and aware that their original remit to undertake surveys of potential villages for future electrification was simply not feasible due to the current management problems, the team hesitantly decided to telephone Bunker to express their concerns. Bunker accepted the team's findings and requested them to take back one of the BSEs for refresher training. While not present, Bunker's presence could still be felt in the remote hills of Tindi valley, Himachal Pradesh. One team member,
who I observed sobbing at the thought of breaking the news of failure to Bunker, embodied a feature common across the board in the College: that of fear. While universally revered and praised at the College, Bunker was also resolutely feared by all staff members.

My close friends on the campus, those who I would chat with in the evenings behind the closed doors of my room, would often whisper their grievances and thoughts about Bunker and the College, while furtively checking over their shoulders for prying eyes and ears. Such was the fear that Bunker provoked even within long-standing senior members of staff, that they rarely voiced any problems with the programmes nor disagreed with anything that Bunker proposed. One close friend, a trainer in the solar programme, ventured one night that the people in the campus “Think Bunker is like a god”.

In the subsequent report by the team members presented to Bunker on the status of the project, they noted several failings that contributed towards the lack of sustainability of the project, the majority of which focused on the human failings of the coordinator (as noted above), and by extension, the absence of after care and guidance by the College. Ever the optimist, Bunker, looked over our findings and zeroed in on the observation that most of the fixed solar systems (bar the lanterns) were still working, twelve years after being installed. He asked the team to prepare a slideshow of the trip to be shown at his next international conference address to the ‘Sierra Club’\(^37\) in Mumbai highlighting this fact.

Thus, through the construction and mobilization of a strong narrative that ultimately concealed and overlooked the messy dramas of on-the-ground development work, Bunker helped translate the project into a notable success story through skillful public relations. Contradictions and conflicting accounts were screened out, and instead a spectacle of progress, enlightenment and change was assembled and marshaled to an adoring public.

\(^37\) The Sierra Club is one of the largest and most influential grassroots environmental organizations in the United States and advocate investment in wind, solar, and other renewable energy sources. Bunker Roy was a co-winner of the inaugural Green Energy & Green Livelihood’s Achievement Award in India in 2009.
NGOs and Civil Society

In its construction of subject and subjects through the kinds of data gathering described above, the College sought to produce a particular heterotopic spectacle, one shaped by technological and developmental change. Subjects were constructed through the limited collection of basic background information, which served not only to check their voices, but also to order and fashion them as productive consumers. The technics of solar, constructed as it was as heralding a new age of energy production further forged a link, in Prakash's words "between space and state" (1999: 160).

As noted earlier, Prakash writes in terms of the forging of a modern Indian state by way of science - through railways, telegraphs, and irrigation works. State power, Prakash suggests, came to reside in the technical configuration of the territory and its people, which became inseparable from the engineering of a modern India (1999: 160). The two went hand-in-hand, thus as Indian nationalism staked its claim of authority over the engineered colonial territory, demands for political representation increased. Such demands, however, called for more than just political and state power, but also the 'reinscription' of the modern colonial state as an expression of a newly independent nation (1999: 160-1).

The shaping and reinscription of a nation through technological means of governance might equally be seen in the extension of state power via civil society and electricity networks including solar PV systems, both of which, one might argue, actively construct spaces of modernity and belonging. Prakash describes the newly-built railways, one of the primary measures of the unification of Colonial India, as providing the means of "knitting together its vast and disjointed territory and people ... compressing time and distance between far flung regions" (1999: 166). Electricity grids, I suggest, similarly provide a sense of belonging and connection for dispersed rural populations, enfolding them within the vast network of an 'imagined community' (Anderson 1983).

As was noted in chapter two, India has a long history of dependence on NGOs and other charitable organisations to deliver services (traditionally deployed by the state e.g. education, water, energy) to areas it has little penetration in. Sen (1999) adopts Wolch's
(1990) term of a “shadow state” to characterise the relationship between the state and NGOs in India. In this conceptualisation, economic liberalisation and structural adjustment programmes require reduced spending on public services. As the state withdraws from these services, the voluntary sector steps in to ‘sell’ their services to donor organisations and governments, forming a ‘parastatal’ apparatus. However, as Sen notes, such NGOs are typically driven by market logic, rather than ‘values’ and ‘motives’ traditionally associated with NGOs (1999: 329).

The Barefoot College is a striking example of such strategies, adapting its programmes to match government and donor-led policy, particularly in the case of off-grid solar systems that appeals to both donors and government agencies alike. However, as the above case study illustrates, the purported strength of NGOs such as the Barefoot College in reaching the poor and meeting their needs can, without strong state support, monitoring of services delivered and accountability, also lead to the breakdown of service delivery, putting in doubt the reputed deliverability of the voluntary sector.

Voluntary organisations and NGOs as extensions of state services must, however, actively suppress such discordances in order to construct a narrative of success which helps to stabilise and mobilise particular interpretations (Mosse 2005: 8). Subjects are constructed, voices are silenced, and spectacles are mobilised in the on-going pursuit of developmental change and progress. Similarly, just as the power of science in the Colonial era rested on its ambiguity and ability to negotiate different fields and environments, in the process concealing the many social factors it relied upon to do so, so the NGO sector and the Barefoot College must also mask the diverse networks it relies upon in order to continue in its role as service providers uniquely positioned to deliver support and change. To not do so would be to risk a break in its authorised interpretation of success - as a uniquely positioned provider of solar training and developmental change.

When such programmes are examined more closely, however, as I have done so above, claims that NGOs and the voluntary sector are more efficient, and perform better than government institutions at reaching the poor, are often found to be erroneous (see also Hulme and Mosley 1996). As Edwards notes, the multitude of dissimilar NGOs
providing services entails a "patchwork quilt" of service quality and coverage with no overarching quality assurances or national guidelines and regulations in place (Edwards 2007: 509). Quality and coverage are also necessarily impacted by insecure funding and non-accountability (Edwards 2007: 509), the absence of which (accountability) Lehmann calls "extraordinary" (1990: 201). Further, NGOs such as the Barefoot College depend on subsidies and external donors, the sustainability of which cannot be guaranteed. Such ephemeral working practices are further exacerbated by the "special factors" that lie behind many such NGOs, such as charismatic leadership, committed staff and locally contingent relationships with beneficiaries (Edwards 2007: 509). This has led some to suggest that NGOs are increasingly attractive to donors and governments as they seek to retrench the activities of the state and replace them with voluntary service provisions that can be discarded at will (Edwards & Hulme 1998: 9).

As Harvey (2010) notes in relation to the construction of public spaces using concrete in provincial Peru, an ethnographic focus on construction processes reveals the ways in which the social and the material are intertwined (2010: 43). Rural solar home systems, much like the building of public infrastructures, reveal the different dimensionalities by which objects and things are used to scale new social orders. Like concrete, attention to the management of rural energy production "also reveals fractures in the social order of the state, specifically, the conflicting domains of national, regional, and local government, as well as the limits to state sovereignty" (2010: 43). When communities are deemed too remote to connect to central energy grids, or where the cost is not economical, solar stand-alone systems are employed to traverse these terrains in an effort to maintain systems of governance and scales of modernity. However, as my ethnographic portrait has demonstrated, such efforts are easily disrupted. Solar home systems are subject to extremes of temperature and weather, poor maintenance and care, local disputes, politics, and corruption.

A host of different actors must therefore be aligned, if large-scale projects of the kind outlined above are to succeed, including public infrastructural services, such as roads, communication channels and electricity lines; functioning technical objects, such as solar panels, batteries and charge controllers; social actors with requisite skills and
to repair and maintain the technical objects; committees to oversee the work done, collect fees for payment of aftercare and replacement components; maintenance of coordination at the project level to ensure communication between central and local levels, and finally, trust between all actors, including, but not limited to: trust between the consumers and the devices that the latter are of sound function, trust between consumers and those coordinating the project that it is being managed well, and trust between markets and the state to sustain a market for solar PV devices.

The kinds of misalignments in sociotechnical systems mentioned above echoes Hughes’ (1983) description of ‘reverse salients’: “A reverse salient appears in an expanding system when a component of the system does not march along harmoniously with other components” (1983: 79). Reverse salients can arise, Hughes suggests, as a result of accidents or unforeseen complications, often due to environmental or contextual issues (e.g. the scallops refuse to anchor themselves to the collectors, and the fisherman disobey the orders of the researcher and fish the bay (Callon 1986); In Latour’s (1996) study of Aramis, a personal rapid transit system proposed for Paris, the couplings did not work, politicians are not on board, and Parisians did not want to ride on it).

Misalignments in some cases, however, as has been shown, are not necessarily determinants of project failure. Project success, as Mosse (2005) suggests, is also sustained by strong and robust narratives cultivated through the recruitment of supporters and translated into different discourses (2005: 8). Thus, the provision of solar light is rendered at once a national project of nation building and belonging, a political project of decentralised living and self-reliance, a developmental project of progress and enlightenment, and an environmental project of clean energy and sustainability. A focus on the ‘scale-making’ processes involved in providing energy to rural communities reveals “the promises and the limits of modernity; the potentialities of material and social arrangements and the actualities that they produce; the surfaces and appearances of things and the underlying conditions that sustain or disrupt them” (Harvey 2010:43). The College’s ability to negotiate these discourses through the concealment and translation of messy realities is paramount to its success as a continued provider of developmental change.
Concluding Remarks: Silences of Success

NGOs and civil society at large are popularly regarded as being at the forefront of basic service delivery in India and beyond. Often compared alongside a slow acting, centralised, bureaucracy-heavy state system, their decentralised organisational make-up are held to be flexible and adaptable, able to react quickly and efficiently to changes on the ground, changes that a sluggish state system would otherwise be unable to accommodate to. Moreover, they are widely held to be transparent and more accountable to the people whom they serve, in contrast to the perceived opaqueness and corruption of state departments.

Such claims often form a significant part of NGOs’ own mythologizing, which acts to raise their status as service providers, and at the same time stabilise chaotic on-the-ground practices, in the process constructing an interpretation of events that matches policy models and wider developmental discourses. Both civil society organisations and the state are invested in such projects being perceived as success stories. For the NGO, it reifies its status and helps it garner further funding and grants; for the state, it justifies the retrenchment of state services and structural adjustment programmes.

Furthermore, NGOs are increasingly operating as extensions of the state, providing not only a range of services traditionally associated with the state, such as electricity provision, but also as networks of governance. When the state is unable to penetrate certain areas, particularly remote and rural areas, as is the case in many parts of India, NGOs, through their reach and access can, in many respects, act to map and make visible individuals and communities deemed ‘off-grid’. As noted in the opening introduction, the physical grid is also a metaphor for overlapping grids of knowledge and power helping make visible spaces and populations for the production of modern government. As Cross (2012) argues, attempts to increase energy access for the world’s poorest regions brings to light the ways in which grids of power and knowledge help make people knowable and understood, and furthermore, how they overlap with the creation of new markets for the continued flow of global capital. Through the mapping of populations, through data gathering exercises of the kind outlined above, the Barefoot College, and many other NGOs, are at the vanguard of such exercises in power and
knowledge. A narrative of ‘empowerment’, decentralisation and unqualified success helps mask such discourses for the continued expansion (of governance) and retreat (of services) of the state.

Such narratives not only help conceal overlapping grids of governance and market creation, but also help allay certain failures in material delivery. In the solar project above, an assortment of technical and social issues afflicted it from failing battering and finance, to an absence of proper infrastructure, trust, coordination and communication. Such absences, however, do not necessarily mean the failure of system building, as Hughes, Callon and others suggest, but in some cases are at the very root of ‘success’, for the active building of sociotechnical systems also entails the exercising of power: the power to manage and manipulate demands so that not only are some elements enabled, but also, that others are silenced.

Silence as a term of reference, Loeb suggests, implies absence. The power of silence resides in its inherent ambiguity as part of a process of veiling that accompanies the wielding of power (2006: 3). Moreover, silence as an effective form of power manipulation works because it allows the wielder to make believe that the unspoken is not only absent, but non-existent, suppressing variation and complexity “at the service of hegemonic forces of domination and resistance that skew this or that aspect of signification to attain their goals” (2006: 11-12).

In the case of NGO-directed development initiatives, such as the Barefoot solar project seen above, or in the decentralization of government services, such silences are inherent. I would argue, to their success. Projects, as Mosse (2005) states: “do not work because they turn policy into reality, but because they sustain policy models offering a significant interpretation of events” (2005: 17). Inherent to such interpretations, I suggest, is the silencing and shaping of voices, narratives, bodies, and technologies. Silence, as I will show in the remaining chapters of this thesis, is a recurring theme in the network building capacities of the Barefoot College.
In the next chapter, I consider the material means by which the College produces its spectacles and subsequently enrolls its donors and supporters through the act of 'witnessing'.
Chapter 5

Solar Spectating: The Witnessing of Development Success

The story begins in 1989, when Minkailu Bah, the then education minister for Sierra Leone, was driving back to Freetown following a meeting:

“As he passed through Kambia, a district about 180 km from the capital, the twinkling of lights in the distance broke the darkness. Bah instructed his driver to turn off the main road and drive into the village where he saw people sitting talking by the light of solar lanterns. Surprised, he asked how this had come about and was introduced to three women, who were described as the village engineers. He asked them where they had learned their skills. They replied, "India." Bah couldn’t believe what they’d said.

"You went to India and back?" he asked. The women told him that they had. Bah got back in his car and returned to Freetown, where he met President Ernest Bai Koroma and told him what he had seen and heard from the women. Although there were a number of solar electrification projects being developed in Sierra Leone, the men were unaware of the project in Konta, and were startled to learn that the engineering work had been done by a group of middle-aged grandmothers. The next day several members of the cabinet interrupted their business and made the journey to see the women, who explained how they came to have their skills. This prompted President Koroma to summon Roy, whom he asked to train 150 female engineers by the end of 2010” (Williams 2011).

The above story is an oft-repeated anecdote related by Bunker to journalists to illustrate the power and reach of his Barefoot solar programme. The episode, on the face of it, tells a story of almost biblical proportions: miraculous twinkling lights breaking the dusk of rural settlements; a far off place delivering skills and enlightenment to the darkness of Africa; a fabled messenger summoned to convey his wisdom to the many. Peering underneath the hyperbole, however, also makes it
possible to discern a few more significant themes, foremost of which is the importance of witnessing to the solar programme.

I concluded the last chapter with the suggestion that silence and ignorance are integral components to the success of development projects, helping to conceal and translate the messy realities of aid work. In this chapter, I consider the flip side of such silence through a consideration of the material means by which the College disseminates its heterotopic spectacles of development and enrolls donors and supporters like Minkailu Bah above. Drawing upon Shapin and Schaffer's (1985) concept of the virtual witness, I argue that the College's success depends largely on the visual spectacle of its lamps and solar training to enrol supporters worldwide. It achieves this firstly through the limited capacity of first-hand witnessing in the solar training workshop, and secondly (and more significantly), through the virtual witnessing of solar projects by partners and donors worldwide via multi-media activities including literary technologies, but also short films and presentations made available on video-sharing websites and DVD.

Through this witnessing, "interpretive communities" are formed that function to enrol supporters and maintain a network of consensus through the public spectacle of development change and social transformation (Mosse 2005: 18). The Barefoot College, however, maintains multiple interpretive communities at once; both public communities and closed development communities. Nevertheless, each community serves to validate the other: by sustaining key development discourses and by enrolling a wider network of supporters that help to validate the knowledge claims produced by the College. Moreover, the diversity of this network ensures that it is robust and flexible enough to accommodate changes in development discourses, moving swiftly from issues related to global warming and CO2 reductions to empowerment and village entrepreneurs.

As the episode above infers, however, some witnesses are more pertinent than others, this chapter also considers the value of certain witnesses over others in providing credibility and validation to the solar project. Concomitantly, I also take into consideration the reach and limitation that particular communication technologies
exude, and the ways in which some technologies not only enhance knowledge transfer and sharing, but also create zones of exclusivity in the process.

**Virtual Witnesses**

In the highly acclaimed book *Leviathan and the Airpump: Hobbes, Boyle and the Experimental Life* (1985), Shapin and Schaffer set themselves the historical task of exploring how and why the experimental method usurped other knowledge-making practices, namely natural philosophy, to become the standard method by which reliable knowledge is produced today. To achieve this, they state, they wish to avoid the “self-evident method” (1985: 4) employed by historians where the presuppositions of our own present day cultural practices are taken as unproblematic and without recourse to questioning. Instead, they adopt the anthropological lens of the “strangers” viewpoint where the ‘self-evident’ practices of modern day society are suspended and designated questionable topics of inquiry (1985: 6). Thus, the authors wish to situate the experimental method in its social context and to demonstrate not only its connections with wider society, but as a product of an “immense amount of labour” (1985: 22) that crystallised certain forms of social organisation.

Boyle proposed that matters of fact be established through the collective assent of individual’s beliefs by way of empirical experience (1985: 25). Matters of fact were generated through the process of having an empirical experience, which was sustained and made more robust through the multiplication of witnessing. Thus, the witnessing of even the most rigorously controlled experiment by one person was not adequate to generate a matter of fact. However, if that experience could be extended to many, then its status as fact could be hardened and made more durable and hence more acceptable (1985: 25). The ways in which this knowledge was first of all generated, and then extended and communicated, is what I discuss below.

Shapin and Schaffer identify three technologies that were involved in the production and validation of experimental matters of fact: a material, a literary, and a social technology. These technologies necessarily overlapped with one another, each being
contingent on the next. In the following sections, however, I begin by introducing each of these technologies separately and then explore the parallel ways in which the College also utilised certain technologies of communication to produce a consensus of knowledge validated through these technological practices. In this way, the spaces through which knowledge is enacted are of thoroughly hybrid character, being neither natural nor social, but rather constituted by a confluence of disparate elements.

**Material Technologies**

As one of the leading players on discussions and debates surrounding the vacuum and the nature of gaseous pressure in the mid-seventeenth century, Boyle made numerous pneumatic devices to demonstrate the latest theories. His most famous and well-known was the air-pump, a machine consisting of two main parts: a glass-globe (or “receiver”) and the pumping apparatus itself, which removed the air from the glass-globe (1985: 26). The glass-globe narrowed at its base so as to fit into a brass device containing a stopcock, which was in turn connected to a hollow brass cylinder, the upper lip of which contained a small hole into which a brass valve could be inserted. Within the cylinder was a wooden piston, which when worked up and down by means of an iron rack and pinion device resting on a wooden frame, removed the air – so it was argued – from the glass-globe (1985: 28).

The air-pump, Shapin and Schaffer suggest, acted not just as an ontological metaphor, but more crucially as a means of intellectual production (1985: 26). The capacity of the machine to produce matters of fact thus rested on its physical integrity, and the collective agreement that it was airtight. The air-pump acted as more than a device for removing air, however, more crucially perhaps, it acted as an emblem for a new age of experimental practice. The air-pump acted as a visual spectacle for the experimental method, demonstrating clearly and viscerally – often through the suffocation of small birds – how a vacuum worked.

In many ways, solar photovoltaics at the Barefoot College, share the same characteristics with Boyle’s air-pump device. In the following passages, I describe in detail the
operation of the solar devices and suggest that their unique physical characteristics, both as emitters of light and as emblems of modernity, also serve to help reify the knowledge claims made by the College. I look to how such signs and symbols are mobilised through various material devices. Starting with the material assemblages of the solar components themselves and working outward from the spatial arrangements of the College’s solar workshop to texts and digital technologies, I explore how their various properties afford certain spectacles in the valorisation of technology for progress and development. Echoing Venkatesan’s study of traditional Indian craft (2009), I suggest that in the bringing together of these material things with marginalised persons, they are reconstituted as emblems of social change.

Rural Solar Home Systems

Photovoltaic solar home systems (SHS) have become the dominant decentralised technology deployed and advocated in rural developing areas for the supply of energy where grid-based electrification is either unavailable or financially unviable (Wamukonya 2007). SHS offers a viable niche in the supply of energy to rural and sparsely populated areas, generally being seen as safer, cleaner and more convenient than either kerosene lanterns or automotive batteries, which are widely used in developing countries for lighting and small appliances (Cabral et al 1996). Likewise, the use of micro-grid diesel gensets is largely considered unworkable due to the dearth of spare parts in rural areas and the cost entailed in transporting fuel (Lovejoy 1992).

The World Bank and other agencies generally regard solar home systems as the least costly alternative to conventional grid extension for remote rural electrification (Martinot et al 2002). Decentralized home systems where participating households are provided with solar panels to generate their own energy supply, as opposed to a centralised distribution system or solar ‘mini-grid’38, is the favoured method of

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38 Solar ‘mini-grid’ arrangements deploy solar panels in the centre or on the outskirts of a village, with distribution wires for solar generated electricity strung to each home. After early enthusiasm in the rural development energy sector, high up-front costs and question marks over who is responsible at the village level for maintenance, led the approach to fall out of favour (Miller 2009: 11).
deployment on the basis of cost-effectiveness (Chapman and Erikson 1995). Such an approach places the ownership and responsibility for the system’s upkeep at the household or local level. Typically, a solar panel, or ‘module’ is mounted on the roof, or nearby pole of the dwelling at a 45-degree angle to the sun. The modules are composed of a number of solar cells that act to convert solar radiation hitting the cells into direct current electricity. This ‘charge’ of electricity is then conducted from the module through wires either directly to an appliance or to a storage device, such as a battery, for later use. Sometimes a ‘charge-controller’ is deployed that controls the flow of electricity and helps extend the lifetime of the battery. An ‘inverter’ is also occasionally used when the need arises to convert direct current (DC) into alternating current (AC).

A ‘typical’ solar home system of 40 or 50 watts can generally provide enough electricity to power several energy-efficient compact fluorescent lights (CFLs) with enough outstanding power to charge a mobile telephone, a small radio or a black and white television (Miller 2009: 15). The systems generally provide convenient and clean white light, far brighter than commonly used kerosene lanterns.

The home lighting systems supplied by the Barefoot College to participating communities in Africa and beyond generally\(^39\) consist of two solar fixed lamps (12V, 9W); one photovoltaic module (or ‘panel’) (12V, 40W); one solar lantern (12V, 7W) complete with its own photovoltaic module (10W, 12V); a charge controller (12V, 8amp); one tubular battery (12V 40Ah); and seventeen metres of wire. Each home system, excluding transport and customs duties, costs in the region of US$300. In addition to the individual household systems, each community is provided with a Rural Electronic Workshop (REW) for the continued maintenance and repair of the systems. The REWs, housed in agreed communal buildings provided for by the community, afford an area for the Barefoot Solar Engineer (BSE) to diagnose problems, make repairs, and fabricate new circuits and lamps. The workshop itself is complemented with its own 300W solar system complete with power supply, inverter, tools and spares for 100

\(^{39}\) Different configurations of solar system are sometimes ordered depending on funds available and the needs of participating households. The configuration described however is the most common and most widespread.
household systems (see appendix A for a full list of parts). Each REW costs approximately US$5,000.

The solar modules are by far the most reliable and maintenance-free elements of solar home systems. PV modules have an average life-span of twenty-five years during which they must withstand rain, hail, wind, cold, and heat. They are robust, and dependable, and once connected and securely installed, require little to no maintenance. Minor provisions, however, are recommended for optimal performance: the positioning of the module itself for example should be fixed at an angle where it receives direct sunlight. In dusty areas, regular polishing of the panel surface is also recommended to ensure maximum exposure to sunlight, likewise in cold conditions, ice or snow must be regularly cleared off.

Figure 9. Displaying clock-wise from left: The battery, solar lantern, solar modules, LED solar lamp, charge-controller, CFL solar lamp and circuit boards

Secure installation of the module against the elements is pre-given, if even one solar cell is damaged; the module itself is irreparably spoiled. Solar modules tend to be the most prominent feature of PV systems to the casual observer, often depicted in vast and
gleaming ranks, their clean lines and advanced appearance contrasting with the inhospitable terrains that they often find themselves in. As a point of note, the conversion of ‘raw’ solar radiation into electricity for modern appliances could also be considered an allegory for the kinds of transformations underway at the College, whereby the ‘underdeveloped’ become the ‘developed’ via technological innovation.

The solar lantern is a portable lighting unit suitable for indoor and outdoor use. It comes with its own solar module for charging; the battery is contained within the housing of the lantern casing. Lanterns can be used for three to four hours at a time, after which they must be charged for between six and eight hours. During cloudy days when charging capacity is limited, it is recommended that lantern use is limited to between one and one hour and a half.

![Figure 10. The progressive changes to the solar lantern from left to right](image)

The current solar lantern produced by the College consists of a plastic outer body, within which the battery, circuit board and C.F.L lighting tube are contained. It is relatively robust and light weight, sealed to the elements, and corrosion resistant. The current model is the latest in an evolving line of solar lanterns that made its first
appearance in the College's workshop in 1996. The first lantern body that the College used was manufactured by the Barefoot College itself in its own workshop (See figure 10).

With user feedback, however, the College soon became aware that the first model, a lantern consisting of a heavy metal body attached to an open tube light was not fit for purpose. The main problem that came to light was the lack of covering for the tube light leading to blow-outs when insects burnt themselves on the tube light; secondly, the metal body of the lantern led to short-circuits when loose wires came into contact with the casing; thirdly, the body itself was not sufficiently sealed, allowing water to seep in and insects to crawl inside, thus leading to corrosion and damage.

Taking such experiences into consideration, the second model incorporated a glass 'chute' to protect the tube light from insects and the elements. The metal body, however, was still susceptible to water and insects, while also being relatively heavy to use. As such, for the third model, the College opted to buy-in plastic polycarbonate and acrylic casings from external suppliers. These new casings were lighter and more robust than the previous metal models. They were also sealed to the elements, and being plastic, free from the risk of short-circuiting.

These new modern lanterns, however, also had their problems: in time, users found that the plastic became susceptible to wear and tear, leading to breakage and fading of colour, plus the luminescence given off faded after the first year. With the latest model of solar lantern, the fourth generation, a new stronger polycarbonate body was procured, which was again lighter and more robust than the previous model. The new lantern design has a subdued and serious-looking dark blue base giving a sense of professionalism and sound design, with a strong and transparent 'chute' for extra luminosity. In addition to these aesthetic changes, a slightly modified circuit was also introduced for the first time.

The previous circuit, common to the last three lantern models, required the voltage setting to be set by the Barefoot Solar Engineer (BSE) manually. With a little know-how, however, this could also be adjusted by the user, allowing them to open the lantern and alter the pre-set, thus temporarily giving more illumination, but ultimately causing the premature failure of the battery. The new circuit was designed to be set
automatically by the resistance of the circuit, thus precluding human interference, switching the charge off when under or over-charged, and hence enhancing the life of the battery. Solar lanterns were designed in a way that prevented active human intervention in its operation. The designer, aware of the particular human attributes to ‘meddle’ to ‘tinker’ and to ‘explore’, all attributes that have served human actors so well, purposively sought to curtail such qualities by designing the lantern in such a way that it could not be tampered with.

**Solar Light as Emblems of Modernity**

The material elements of solar photovoltaics, as described above, act not only in a functional sense, but also as symbols of wider knowledge systems. In the following, I reflect upon how solar, in the space of the Barefoot College, acts as an emblem for modernity, progress and development.

In an exploration of the social contexts of technological objects and how certain objects induce a sense of awe and wonder in viewing publics, David Nye (1994) considers the role that electric lighting has played in the public consciousness from early to more recent times. As the author states, for most of human history, people have confronted darkness as an inescapable force. Darkness, as the polar opposite to light, the absence of brightness, was perhaps our earliest and greatest fear, that which could not be known or discerned. Edmund Burke described utter darkness as filled with fear and anxiety:

“In utter darkness, it is impossible to know in what degree of safety we stand; we are ignorant of the objects that surround us; we may every moment strike against some dangerous obstruction; we may fall down a precipice the first step we take; and if an enemy approach, we know not in what quarter to defend ourselves” (1990: 130).

The discovery of early forms of lighting from fire to oil lamps, Nye states (1994: 144), provided only a temporary reprieve from the inescapable and all-enveloping force of darkness. With the advent of modern forms of electric lighting, however, in the nineteenth century, human mastery and control over darkness has taken on new dimensions. Noting that spectacular illuminations using torches, oil lamps, and bonfires
had long been a feature of public ceremonies since ancient times, the dramatic and constant spectacle that new forms of electric lighting made possible in modern times, induced new forms of enhanced sensory experience. An important point, as Burke again notes, in this spectacle of the "sublime" was the "quick transition from light to darkness, or from darkness to light" (1990: 73), producing a powerful sense of control, mastery and wonder.

Light, and concomitantly darkness, also act as powerful metaphors. Thus, the Middle Ages, a period in history commonly referred to as the "Dark Ages", is characterised by cultural and economic decline. Similarly, the Enlightenment, a period of great scientific and intellectual mobilisation, is characterised by the luminosity of reason revealing the 'truth' of nature. Across the world, light and darkness play important roles in various religions and cultures, e.g. for Hindus, the festival of Diwali40 ("Festival of lights") is a celebration of good over evil, knowledge over ignorance. In art, painters such as Caravaggio and Rembrandt utilised light and shadow for dramatic purposes to emphasise particular themes, as well as frame compositions and accentuate atmosphere and mood. Likewise, film noir employs light and dark tones to suggest cynicism, ambiguity, moral corruption and disenchantment. Closer to home, the new Scottish Parliament building employs design motifs on the exterior of the building to suggest a curtain being drawn aside to let in the 'light' of democracy. Light and darkness are thus both utilised across a wide range of mediums and spaces to suggest particular metaphorical themes and ideas.

It should come as no surprise, then, that solar photovoltaics act not just as devices of illumination, but also as powerful metaphors for progress and modernity, 'truth' and knowledge. As discussed above, Shapin and Schaffer (1985) explored the production of the air-pump in the context of Restoration society and its interaction with modern science; solar photovoltaics in this instance, are being produced in the context of development, a very particular social context that has important consequences for the way in which the solar devices are received.

40 It should be noted that different regions of India celebrate Diwali on different dates (usually between September and October), with different emphases of the six principal stories associated with the festival. The 'essence', however, remains generally the same.
The lanterns and lamps provided by the College to participating communities are routinely contrasted with the antiquated and inefficient kerosene lamps, which they aim to replace. On the one hand, kerosene lamps, the most common form of illumination used in receiving communities participating in the ITEC programme, are cited in Barefoot College reports as antiquated artefacts not fit for this day and age, respectively causing chest infections from inhaled smoke, home fires from careless use, and eye strain from poor light. Photovoltaic lanterns and lamps on the other hand, are held up as paragons of modern technology. They provide better and longer lasting light, being constructed from polycarbonate plastic the devices are stronger and thus less likely to break, and they are safer, for they contain no inflammable materials.

Kerosene lamps provide light via fire, the oldest form of controlled illumination known to humans; while effective, providing both heat and light, in contexts of development, it is also associated with underdevelopment. ‘Development’ thus necessarily hinges on and takes its meaning from its opposite: underdevelopment. As Kothari (2005) notes in relation to the professionalisation of development, development is often predicated upon unspoken assumptions regarding who is ‘developed’:

“The forms of expertise produced are developed in part by reasserting (colonial) dichotomies that distinguish between the “modern” and the “traditional”, whereby the “traditional” culture, forms of social organisation, production and beliefs of the Third World are seen as outmoded and in need of being succeeded by more “modern”, inevitably Western, attitudes and practices” (2005: 427).

The solar devices therefore provide more than just practical, utilitarian benefits - they also act as signifiers of modernity. As recipients of these appliances, the communities in question receive a metaphorical tether to perceived forms of progress and advanced forms of energy production. Analogous to the material benefits noted above, the use of photovoltaics also ties into discourses of sustainability and environmental concern: helping to prevent harmful carbon emissions from polluting the atmosphere, conserving trees from being cut down for fuel, and providing employment opportunities for after-dark work. In this way, it is not just material things that are being transferred and constructed, but discourses of modernity and progress also.
The World Bank proclaims that “Knowledge is like light. Weightless and intangible, it can easily travel the world, enlightening the lives of people everywhere” (World Bank 1999:16. Cited in Ong 2007: 5). In this sense, knowledge is envisioned, much like the solar lanterns the women are constructing, as an emitter of light, leading the women towards a future of reason and luminosity. In such a way, solar acts as metaphor, for it is not only solar photovoltaic systems that are transported, but also the light of modernity, illuminating the darkness of an imagined premodern continent. As Ferguson (2006) suggests, historically, “Africa” has served Western societies as the radical Other of Western constructions of civilisation, enlightenment, progress and modernity (2006: 2). Africa in this sense, Ferguson states, “has served as a metaphor of absence – a “dark continent” against which the lightness and whiteness of “Western civilisation” can be pictured” (2006: 2).

Such images act as powerful motivating factors for the visibility and standing of the College as it seeks to attract donors and partners. They also give an indication of the kinds of imaginings that are drawn upon by the College in their construction of heterotopic ideals. However, metaphors and symbols achieve nothing on their own; they must be mobilised through assorted technologies of reproduction so as to extend their reach and influence.

**The Solar Workshop as Disciplined Space**

I briefly looked at the solar workshop in the previous chapter, describing its function and role as a teaching and work space for the many women arriving at the College to be trained as BSEs. In this section, I would like to re-visit this space, not as a site of material and bodily construction, but rather as a “disciplined space” (Shapin and Schaffer 1985) of visuality (Escobar 1995), turning the women and the technologies into *spectacles* of modernity and developmental change.

Shapin and Schaffer (1985) describe how the spaces in which Boyle’s air-pump operated were restricted spaces that produced authenticated knowledge by way of controlled access to a viewing public. In this disciplined environment, Boyle could control not only
the working environment of the air-pump, ensuring that it functioned as he anticipated, but also the quality of witnesses who viewed his experiments. As a natural philosopher who relied on the testimony of his witnesses to authenticate his knowledge claims, some witnesses were more credible than others. Thus, Oxford professors were deemed more reliable witnesses than Oxford peasants (1985: 58). In this way, the moral constitution of witnesses, as well as their knowledge of the operations underway, leant credence and assurance to the wider philosophical community, that the knowledge being produced was true and credible. I would now like to draw upon this notion of witnessing to describe how the College utilises its solar workspace to produce credible and authenticated knowledge by way of its material make-up and the particularity of the witnesses who visit this space.

As was previously noted, participating trainees of the College’s ITEC funded solar programme, spend six continuous months being trained in the maintenance and assembly of solar PV devices, from learning how to construct circuit boards, to testing, repair and installation. During these six months, however, the workshop also plays host to many of the groups and individuals visiting the College for educational tours (in the case of visits from local schools, colleges and visiting academics), touristic tours (in the case of individuals and groups of environmentally conscious tourists), media tours (for the many visiting news agencies reporting on the College’s solar programme), and lastly, foreign and domestic dignitaries visiting the workshop to view the progress of their aid disbursements.

As a trainee myself for six months, I was present during many of these visits, a process, which at the time felt not unlike being on the other side of the bars of a zoo. While I was not the most exotic species on display, I was regarded with not a little curiosity, perhaps even disdain, for intruding upon the pristine display of Otherness so graciously on display.

When school or College classes visited, the WBSEs sat quietly going about their business, soldering and assembling circuit boards, as all around them students snapped away with cameras, often kneeling down and posing beside them, as their friends took
their photograph. Visits from tourists played out along similar lines, but with added reverence - hushed tones and discreet photographs were the norm.

While the College welcomed these visits for the exposure they provided, they were not the highest profile of visitors and certainly did not warrant the attendance of section heads, or indeed Bunker himself. Rather, such appearances by senior staff were reserved for media appointments, or more rarely, visits from foreign and domestic dignitaries, such as the wife of the Bhutanese Prime Minister, Prince Charles of the UK or latterly the Dalai Lama.

![Figure 11. A party of college students having their photograph taken alongside the trainees](image)

During these engagements, the WBSEs were encouraged to dress in their best outfits; hair, make-up and accessories were assembled, the workshop space was tidied and swept, and the women were on their best behaviour, sitting quietly and serenely by their workbenches, models of femininity and developmental change.
Just as Oxford Professors imbued the witnessing of the air-pump experiments with higher levels of credibility than Oxford peasants, so too did different visitors and media outlets provide differential levels of authority in their witnessing and media coverage. Thus, the Dalai Lama and Prince Charles could be guaranteed to provide more extensive media exposure across a wider spectrum of news agencies than the wife of the Bhutanese Prime Minister. Similarly, international news crews from CNN and the BBC were provided with more care and attention, including personal interviews with Bunker himself and guided tours of the campus and surroundings, than domestic reporters or individuals with affiliation to smaller media outlets such as magazines and blogs. Media outlets, like the witnessing individuals of the air-pump, are imbued by their audiences with certain assurances of authority and credence. This combination of media reach, moral authority, and assurances of quality and objectivity serve to reify and extend the knowledge claims being produced by the College.

I will come back to the significance of these high-profile visits shortly, for now however it is possible to recognise that the solar workspace acted as a public space, but a controlled public space, where authenticated knowledge production was played out to a variety of individuals and groups. Visitors were largely reliant on their hosts to explain the effectiveness of the knowledge being produced in their midst, with either language barriers or respectful silence preventing the women from elucidating their actions. Thus, if one wanted to see this new, experimental method of communicating knowledge to illiterate women, one had to visit this place in person, the occurrences were not on show anywhere else (Shapin and Schaffer 1985: 39). The solar work space was consequently a disciplined work space providing credible evidence to a witnessing public that developmental change was actually occurring.

Moreover, in this particular space, knowledge was generated from a predominantly visual perspective, whereby the gaze of visitors produced an “objectifying regime of visuality” (Escobar 1995: 155). In this disciplined arena, it was easier for the College to police the activities and perceptions underway. Looking back upon my field notes during the first time I encountered the women in the workshop, I was struck by the sense of awe and astonishment that I recorded: describing respectively the brightly
coloured saris of the women, the clutter of the workspace, and my admiration for these out-of-place women manipulating circuit boards and soldering irons. My own sense of wonder foreshadowed similar reactions to those who would come after. The solar workspace then, acted as spectacle providing an overwhelming visual image of the transformations underway. However, despite their potency, such images were restricted to the local, to the immediate surroundings of the workshop space and those contained within. If the College was to amplify the reach of this space, to validate its efforts further, then it had to multiply the number of witnesses capable of seeing it. To do this, they facilitated what Shapin and Schaffer refer to as “virtual witnesses” (1985: 60).

**Virtual Witnessing: The Validation of Experimental Facts**

Shapin and Schaffer describe ‘virtual witnessing’ as the production, in an individual’s mind, of an image of an experimental scene that precludes the necessity for direct witnessing (1985: 60). In the seventeenth century, Boyle relied on certain linguistic practices including a functional (yet convoluted) style of writing designed to convey authority in the text, and pictorial representations of the experiments displayed in scientific journals. These literary technologies, in essence, acted to validate the experiments via their witnessing in a virtual space out-with the first-hand arena of the laboratory. They were therefore the most powerful technologies for producing and consolidating matters of fact since the potential number of witnesses was unlimited.

In the seventeenth century, Boyle was restricted to particular communication technologies for validating experimental facts, namely literary technologies in the form of scientific journals, which were further restricted to certain educated classes and professions. With the advent of the information age\(^4\) in the twentieth and twenty-first centuries and the potential ability to transfer and have instant access to information

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\(^4\) Although there is no definitive definition of the information age, also commonly referred to as the ‘digital age’ and ‘computer age’, it is generally accepted that it refers to the rise of networked computer technologies, in particular the internet, from the 1970s onwards. Castells (2010a) draws a distinction between “information society” and “informational society”, with the latter referring to a specific form of social organisation in which information generation, processing, and transmission become the fundamental sources of productivity and power due to new technological conditions arising in this period (2010a:21).
anywhere in the world, the ways and means of producing validated claims of fact has risen exponentially. These technologies similarly act as powerful tools for producing knowledge claims due to their ability to be instantly accessible across vast distances and at simultaneous times. However, despite the ubiquity of these digital forms of communication, their reach, as Castells reminds us, is also spatially and culturally discontinuous, with differential access existing in American inner cities as much as the favelas of Brazil or shanty towns of South Africa (2010a: 33).

The Barefoot College is one such actor that has taken advantage of this revolution in digital communication to enhance its profile globally through the spectacle that such digital spaces provide, and to reify its claims of producing a “Barefoot revolution” through the uplifting of illiterate individuals and turning them into solar engineers, architects, and doctors. For the remainder of this chapter, I would like to explore these technologies, the kinds of representations that they propagate, and the ways in which they act to consolidate the knowledge claims made by the College. Such technologies derive their potency from the variety of material forms through which they take shape, with different forms conjuring up differing levels of reach, authority, mood and message. I would like to begin by exploring the literary outputs produced by the College and the particular ways in which they act to enrol virtual witnesses, thus helping validate the claims made by the College.

**Literary Technologies of the Spectacle**

While the witnessing of the solar training is restricted largely to those present in the workshop, the same cannot be said for the vast output of textual technologies produced by Bunker and the media at large, in relation to the College’s activities.

Since the College began, Bunker has been a prodigious writer of media pieces, highlighting the various development programmes of the College or offering his opinion as a social activist on Indian development policies in the national press and increasingly beyond. Although his output has slowed in recent years, with most articles about the College now coming by way of external news agencies, from 1973 to 2002, Bunker had
written over one hundred and fifty articles about the College and rural development in spaces such as *The Hindu*, the *Times of India*, the *Indian Express*, the *Earth Times*, and *Resurgence* magazine to name but a few.

The majority of his articles from the 1970s deal with issues related to rural development strategies, particularly integrated development and the College’s early plan to bring professionals to the village (e.g. 1973, 1974, 1976, 1977, 1978). From the 1980s, programmes such as traditional communication through puppetry (1982a, 1984b) and the “de-mystification” of technology (1984c, 1985, 1986) took centre stage as the number of Barefoot development programmes grew. Also prominent during these times is a strong rejection of the previous policy of recruiting professionals to the village, with a now clear emphasis on the apparent dangers that professionals pose to the development process and the need to return to a more voluntary spirit of service to the communities (e.g. 1980, 1982b, 1987b, 1987c).

A further theme that arises during this period, perhaps in conjunction with Bunker’s role during his time as government advisor, was a call for a “code of conduct” for NGOs operating in India (e.g. 1986a, 1987, 1987a). The 1990s continues in a similar vein with more calls for a voluntary code of conduct (1993, 1994), and further papers on technology and technology transfer (e.g. 1991, 1991a, 1994). The 1990s and into the early 2000s stand out, however, as the first decade that the College’s fledgling solar programme begins to make an impact, not only in terms of developmental impact, but also in terms of the global recognition of the College beyond the borders of India, with titles such as “India’s First Global Village” (1995) and “India’s Self-Help Solar Villages” (1995a). This period also coincided with the growing use of the internet to publish news stories. The majority of articles in the rest of this decade, and into the next, are taken up by this growing programme (e.g. 1996, 1998, 2002).

Though Bunker’s personal media output slowed down in the first decade of the millennium, the growing attention that the solar programme began to receive ensured that the College would not want in terms of media exposure. Indeed, since the solar programme took off, in particular its ITEC funded programme of “Solar grannies” hailing from all corners of Africa in 2007, the number of media stories relating to the
College has exploded beyond all expectations. A quick web search of “Barefoot College India Solar” turned up over two million results, a sample of which appears to show the majority emerging in the last five years.

During my time at the College, the presence of media teams and journalists from news agencies such as the BBC, CNN and the Guardian to name but a few, was pervasive. Staff members who were tasked with escorting the journalists and explaining the various programmes became confident, even savvy in their dealings with the press. They knew which images and programmes had the most impact with the “barefoot grannies” first on the list, closely followed by the children’s “night school”, a programme designed to provide evening based forms of education to children who were often unable to attend government classes during the day due to family chores, such as tending cattle. On one such occasion, when the schedule of a particular press team clashed with the night school timetable, the children and their teacher were nevertheless instructed to attend class for the benefit of the assembled journalists.

Reports and Proposals
While mass-media stories about the College’s activities be it in print or through the internet, make up the majority of textual ‘traffic’ about the College a further, and no less important strand is constituted by the endless assembly of reports and proposals produced by the College for its various donors and potential prize-givers. Part of my own role as resident researcher was fulfilled through helping to write such reports, including reports for the Bhutanese government on the solar electrification programme, a report for the French NGO Foundation Ensemble on the funding of a solar electrification programme in Mali, and various proposals for awards and funding to donor agencies and institutions. In fact, the scale of the latter led one senior Barefoot staff member to remark that “this organisation is run on award money” (field notes 2.10.09).

The College has been awarded over twenty-five awards since 1995 ranging from the Nuclear Free Future Solutions award in 2000 (€10,000), the St Andrews Prize for the
Environment in 2003 ($30,000), the Skoll Award for Social Entrepreneurship in 2005 ($400,000), and the Blue Planet Prize from the Asahi Glass Foundation in Japan in 2011 ($625,000). Award money is an integral part of the College’s annual budget, which in 2009 stood at over $2.8 million, contributing to everything from rainwater harvesting projects and the children’s night schools, to solar projects and training. The conferring of the award itself, however, arguably bestows more currency to the College than its monetary return. Awards impart not only prestige, credibility, authority and standing to the College among the international development community, but further affords it exposure and recognition in the international press. Such recognition serves to help validate its knowledge claims and reify its approach among particular witnessing audiences.

The development reports themselves which the College produces for its various donors, tend to follow a standard format with only individual and country-wise details changed. An introduction outlining the philosophy of the Barefoot College is followed by a list of its achievements describing how many poor, illiterate individuals it has trained, and the scope of its operation worldwide. These two indicators suggest both efficacy of training and the scale of the operation, which of course also implies replicable success in different contexts, a sign of validation that it works. The reports then follow a tried and trusted formula that starts with background to the current project, followed by selection and profiles of the women trained; these are accompanied by profile shots of the women themselves with a small biography relating to literacy levels and socio-economic status; in later reports, these were complemented with ‘quotes’\footnote{See Chapter 6, p. 231 for further detail.} from the women themselves enthusing about the College. Profiles of the villages the women are to electrify follow, including income sources and the typical monthly cost of kerosene per family. A month-by-month review of the training imparted ensues complemented by photographs of the women at their training stations and installing the systems in practice. The reports conclude with an impact and assessment section outlining the work completed on their return to their respective communities, and the amount of kerosene and CO2 saved as a result of their endeavours. The report sections are further interweaved with prominent
maps and tables displaying numbers of countries and villages electrified, plus BSEs trained (see figure 12 for an example). In addition, several reports also highlight the various news stories (including website links) about the College and its solar programme, providing further validation of its efficacy.

The importance that such textual outputs play in the continuing success of the Barefoot College cannot be over-emphasised. Through these literary productions (yet not exclusively), the College maintains particular interpretations of its development trajectory helping to sustain and stabilise authoritative accounts of its project model, what Mosse describes as an ‘interpretive community’ (2005). While Mosse describes the failure of a particular development project due to an interpretive disarticulation between project evaluation and donor policy (chapter seven), the Barefoot case is marked by a fluid and flexible interpretive trajectory that seemingly navigates a course through the

![Barefoot map displaying recipient countries worldwide of solar programme](image)
muddy waters of development discourse, a point to which I will return in the concluding section of this chapter.

Thus, the College maintains two distinct, yet necessarily contingent, interpretive communities at once. On the one hand, a public community is sustained through vast amounts of media coverage highlighting the extraordinary activities that the College is undertaking, helping to put the organisation on the global map and cement its place in the public consciousness. On the other hand, the College maintains a closed development community to the donors and aid givers that help sustain its project efforts. This is buttressed and validated, however, by the large volumes of media coverage, which the College helpfully underlines through their inclusion in reports. In this way, the interpretive communities are self-sustaining: increased media coverage leads to more witnessing, which further contributes to the continued enrolment and validation of its efforts.

Mosse perceptively notes the over-emphasis that is often placed on texts as conclusive representations of development discourse (2005: 15). To counteract this face value reading, he advocates reading texts backwards to reveal the social processes, divergent points of view, and negotiations that produced them. Texts in this way are re-conceptualised as sites of struggle and contestation, rather than fixed symbolic entities. Thus, textual documents are never merely symbolic worlds of practice to be read as fixed entities, nor are they merely social constructions; their hidden depths to be teased apart and revealed as reflections of wider developmental practice. Documents interweave people, ideas, events and objects (paper, printers, computers, light, internet connections, and electricity networks) to produce seemingly fixed products of development policy and design. While Mosse is right to call attention to the social processes that they encode, he perhaps overlooks to an extent the material roles that they play, and the practices that they engender as artefacts mobilising or restricting certain forms of knowledge making.

In The Network Inside Out (2001), Annelise Riles argues that the artefacts of modern institutional life - documents, funding proposals, organisational charts, media reports and websites, are such ubiquitous aspects of the “information age” that they have ceased
to be objects of enquiry for most observers of the modern age. In fact, they have become such pervasive aspects of contemporary knowledge making, that they are, to a large extent, almost resistant to investigation, for they form the very worlds that the researcher is part of. What if, however, the documents themselves, the material enactments of these symbols, became the source of enquiry in itself?

Through participation with a group of Fijian activists preparing and participating in the United Nations Fourth World Conference on Women in 1995 – drafting documents, writing and preparing the layout of newsletters, transcribing, collecting survey materials (2001: XV), Riles examines the aesthetics and effects of these artefacts on the network of informational practices in the Pacific region. Her notion of network, however, is not the arrangement of interconnected people and objects common to accounts of actor-network theory or network analysis, but rather: "a set of institutions, knowledge practices, and artifacts thereof that internally generate the effects of their own reality by reflecting on themselves" (2001: 3).

In this way, there is no 'outside' from which to 'look in', rather the practices under study are themselves generated and sustained through that very participation and study. Riles presents the argument that it is not so much the information itself that generates this network, but the ways in which the local and the global are brought into focus and enacted through particular aesthetic mediums. Riles reminds us that not only does the representation of language in written form generate particular spatialities and networks, but also the very mediums through which they are expressed. The various documents discussed above, from archival material, organisational reports, media pieces and website content generate their own unique realities.

Hodder (2000) likewise reminds us that written texts and artefacts are essentially mute, but that unlike the spoken word, they endure physically and can thus be separated across space and time from the author and user (2000: 393). In this way, the symbolic medium of text, is an artefact, much like buildings and objects, capable of transmitting ideas and concepts across space and time, to be recovered and recycled in different contexts and at different points of use (2000: 394). Developmental discourses are also never purely conceptual or representational, but exist and are enacted in countless material forms,
either on the ground in everyday practice from solar work to agriculture, or through documents and reports, news articles and websites. Thus, the media and development reports produced by the Barefoot College are part of a material spectacle that generates its own particular flows, effects, and impact, reaching different audiences through hybrid assemblages of people and things. In the next section, I turn to digital media and the ways in which the College utilises the internet to enrol supporters and sustain its interpretive network.

**Digital Technologies of the Spectacle**

In the previous section, I discussed the central role that literary technologies play in the enrolment and stabilisation of a Barefoot spectacle both within the development community and beyond. In this section, I return to Shapin and Schaffer's notion of virtual witnessing to explore the digital worlds that the College has embraced in recent years, as it seeks to validate its efforts of decentralised solar home systems.

The College first started making short-video productions in 1984 in order to reveal to a wider audience the scope of its activities. These were simple, video productions given out to partners and donors, and also for sale to visitors to the College. Over the years, the technology and their competence improved, and a dedicated audio-visual unit was established. To date, over one hundred short films have been produced relating to its various development programmes: from rainwater harvesting and hand-pump mechanics to traditional Rajasthani puppeteers. In recent years, however, it has moved much of its attention to the production of short films of its solar programme. The films, many of which have been made available through video-sharing websites such as YouTube, are short, documentary-style productions from seven to ten minutes in length depicting the various stages of a particular, country-specific solar programme, from selection of solar engineers, through to training, and eventual return and installation of the solar devices. They are all accompanied by a voice-over narrative from Bunker explaining the programme and its benefits.
The solar productions all tend to follow a similar format with an introduction that depicts images of life in a particular country as simple and unsophisticated: horse-drawn carts, kerosene lamps, mud-brick houses and individuals working in rice paddies abound, the remoteness and inaccessibility of the villages are stressed all set to an upbeat, acoustic sound-track of traditional song. These are then inter-cut with sequences of the same people using what appear sophisticated electronics, soldering irons and solar lanterns. The voice-over states that these simple, illiterate individuals are confounding “high-powered engineers, universities, donors, development planners and paper-qualified experts, with their incredibly sophisticated skills and exposing the fundamental inadequacies of the formal education system” (Roy 2009).

The films continue with profiles of the villages, their energy and income sources, before moving on to brief biographies of the women selected to be trained as solar engineers. A “partnership” model of community-managed solar electrification is expounded, the benefits of which, the narrative explains, include a “genuine bottom-up approach”, community-controlled projects free of external dependency in which no certificates are issued to impede migration to the cities in search of employment. A montage of the solar training follows with brief descriptions of the “extraordinary” skills the women are learning without the written word, language, or formal schooling.

The women are then shown on the return leg to their respective countries to great fanfare from their home communities, often with dances and celebrations as they install the systems with the help of other villagers, connecting the batteries and hauling them on to the roofs of village homes. The same cheery sound track from the opening sequence starts up again. The concluding section of the films all end with the voiceover stating the differences that solar has wrought in the villagers’ lives, from increased income generating hours to protection from snake bites and harmful kerosene fumes, in addition to reductions in CO2 from polluting the environment and the depletion of forests for fire-wood. The very last shot depicts the villagers standing around several illuminated solar lanterns singing and praising the light (see figure 13). One such end sequence from Mali reveals an elderly villager sitting in front of the illuminated lantern in the darkness, stating: “We are sitting in Tindjamban, and there is the light of India.
We are very happy tonight because it was very very dark in Tindjamban before.” In another video from Bhutan, the end sequence shows an elderly villager praising the solar lanterns: “I have lived all my life in the darkness so far, now I can live with the solar light. Thank you.”

The short videos, made for conference addresses and wider recognition of the “Barefoot approach”, begin with a thorough process of Othering the country and community in question. Thus, Timbuktu, the site of the Mali video, is depicted as “the middle of nowhere”. Scenes of rural ideals, simplicity and inaccessibility are highlighted, emphasising the contrast between the lands that the women come from, and the supposedly high-tech environment that they will receive their training from.

Figure 13. A typical solar video end-shot of villagers standing in a circle praising the solar lanterns (from Bhutan).

Throughout the videos, extensive use is made of maps, demonstrating not only the number of countries and villages electrified, but also the vast reach of the College’s
development efforts, with each coloured country signifying another Barefoot conquest in images akin to colonial victory maps.

The videos produced by the College, distributed internally to partners and donors, to the paying public and also through internet sites such as YouTube, act in much the same way as literary technologies. The digital technologies produced by the College extended the space of the workshop and solar programme at large by providing a valid witnessing experience to all viewers of the videos (Shapin & Schaffer 1985: 77). The editing techniques, metaphors, messages and reach of the videos acted to bound the viewers, producing an “interpretive community” (Mosse 2005) that inhibited dissent and kept the community, or ‘network’, continuous and robust.

Such Othering as mentioned above, brings to mind another sort of construction, that of the discursive construction of certain areas of the world by another. It needs hardly repeating the vast influence that Orientalism (1978)43, Edward Said’s ground-breaking work on the construction of representations of the East by the West, has had on the academic stage. As the founding text for the fields of postcolonial theory and subaltern studies, its reach and impact has been significant, yet also highly controversial. I will not dwell on the more theoretical and interpretive critiques of his work, which suffice to say, have been both searching and comprehensive in their critical analysis (see Irwin 2006, Warraq 2007). Before moving on, however, I do wish to draw attention to a common methodological and discursive criticism of Orientalism that cites not only the limited number of texts drawn upon to make larger historical generalisations, but also the restricted use of textual analysis per se to draw conclusions.

Said, of course, draws upon Foucault’s notion of discourse as the central theoretical framework to demonstrate how certain forms of knowledge about the ‘Orient’ are constructed. However, as Young (2001) and other authors have noted (e.g. Ahmad

43 To restate the central thesis very briefly, Said argues that Orientalism acts to discursively produce the East for its hegemonic domination by the West. The East is thus constructed through a dichotomous system of representations that serve to construct it as the West’s Other: as inferior, backward, irrational and feminine, in contrast to the West which is depicted as superior, forward-looking, rational and masculine (Moore-Gilbert 2000:38). Orientalist discourse thus essentialises East and West for the ultimate aim of the implicit colonial domination of the East by the West.
Said employs a largely restricted treatment of discourse analysis that focuses almost exclusively on textual outputs. In Said’s account, the Oriental Other is an object of fantasy and construction that exists prior to any material interaction with the East (Young 2001: 400). As Young notes, what is odd about Said’s account is that it takes discourse itself as the object of analysis, rather than invoking it to analyse particular social practices and artefacts (2001: 408). He neglects to acknowledge not only the textual productions by certain institutions and the relations between them (Young 2001: 387), but further the technologies and practices by which representations are made mobile.

Whereas Said focuses largely on the text as representation, Foucault’s notion of discourse, which he elaborates most extensively in The Archaeology of Knowledge (1972), centres primarily on the ways in which knowledge is forged at the interface of language and particular material practices (Young 2001: 399). Thus, medicine, psychiatry and the prison system produce different forms of knowledge that necessarily intertwine with a host of different material practices from the body and mind to the built and natural environments. In contrast, therefore, to a textual and linguistic-based form of discourse, Foucault conceives forms of knowledge as generated in the ‘contact zone’ between concepts and materiality, each shaped and giving shape to the other (2001: 399). Discourse, like knowledge, is always performed through material mediations both human and nonhuman.

Now, what you might ask, has any of this got to do with the Barefoot solar programme? Well, the answer is quite simple. If the College is to extend its reach and influence as a development expert and provider of skills training and solar hardware, it must also discursively produce its Other. It does this, however, not merely through textual representations, but as we have seen, through myriad vehicles of material enrolment: from disciplined spaces of workshop production to conference addresses, solar hardware, videos, reports, and light itself. As a heterotopic space, the College acts to generate spectacles of Otherness that stand in contrast not only to the society that surrounds it, but to global development concerns. Thus, the spectacles produced by the College act at
once to reflect certain discourses yet also to intensify them, generating the hopes, dreams, and Otherness, all of which is required to sustain its operations worldwide.

Conclusion: The Mobilisation of Interpretive Communities

In Shapin & Schaffer’s account of the socio-historical analysis of the air-pump, they demonstrated how the public experiment developed as a form of publicity for the validation of the experimental method via the enrolment of wider audiences through ‘virtual witnessing’. In recent years, other authors have noted the distinctly public form that experiments can take, with some (e.g. MacDonlad 2002; Latour 2005, Marres 2009) suggesting that the demonstration of science and technology in public spaces has “exceptional capacities” of transformation for keeping audiences involved and engaged (Marres 2009: 120).

In a discussion of eco-homes as material devices of public involvement in climate-change, Marres (2008) suggests that the eco-home as an object that is currently being ‘mainstreamed’, may reveal underexplored aspects of politically and materially constituted publics (2008: 31). Marres explores the material devices of publicity generation for the eco-homes (newspapers, billboards, the internet), and the ways in which the media campaigns seek to re-situate the home as a ‘micro-exhibition’ space for ‘green living’, connecting ‘distant’ and global phenomena such as climate change within domestic achievements of practical change (2008: 33). She suggests that such achievements might arguably be seen as an attempt at the organisation of a particular kind of material public, one in which domestic living spaces are redefined as sites where their inhabitants are transformed from domestic subjects into environmental publics (2008: 34).

The re-definition of technologies of the home from domestic appliances to practical achievements of ‘green living’, connecting the living environment to global concerns of climate change, as suggested by Marres, fits in well with the kind of achievements publicised by the College in relation to solar technologies. As I have shown, the College connects its solar devices to a host of heterotopic developmental and environmental
concerns, from underdevelopment and empowerment, to environmental destruction and global warming. Such articulations are mediated through different forms of communication technologies, from first-hand witnessing to literary and digital technologies. In the process, different material publics are formed through these material technologies, acting to create a community of consensus that essentially validates the knowledge claims propagated by the College. Just as Boyle established facts about the air-pump by way of extending the first-hand witnessing of experiments to a viewing public in his laboratory, so the College utilises the ordered and disciplined space of its solar workshop to convince and enrol supporters of the efficacy of its training and solar programme. This was further reified through the credibility afforded it via high-profile visitors and press-teams. As Mosse states:

“As much as anything, then, visits helped to secure project success. Visitors remained ignorant of the contradictions of the project, or unable to criticise the dominant interpretations offered. The more the project’s reputation grew, the more and higher-status the visitors” (2005: 167).

Likewise, the production of textual technologies to extend the reach of consensus making and knowledge validation via virtual witnessing was mirrored through the prodigious output of media articles by Bunker himself, reports to partners and donors and digital outputs to a wider public. As Townsend et al (2002) note, NGDOs (Non-Governmental Organisations in Development) have become powerful conveyor-belts of resources, authority and legitimisation from the periphery to the core: “NGDOs are responsible for taking buzz-words to all corners of the globe, and bringing back to the privileged of the earth images of people, of needs, of realities that attract more funding and legitimisation to donors and to NGDOs” (2002: 830).

Moreover, the College was able to demonstrate the replicability of its solar development model in countries throughout Africa, a key marker of success in the eyes of development specialists and donors (Mosse 2005: 163). These projects were highlighted and brought to the attention of donors and the wider development community through the medium of text, conference addresses and digital media. However, despite the universal praise bestowed upon digital forms of communication in highlighting stories
such as these, particularly in light of the recent Arab Spring, we are reminded that large areas of the world, and particular segments of the population, have differential access to such technologies (Castells 2010a: 32). These unequal spaces of access ultimately mean that dominant representations such as that advanced by the Barefoot College go unchallenged.

Such digital silences echo Gayatri Spivak's concern with the voiceless, homogenised 'actors' who find themselves caught up in all-encompassing narratives. Spivak, who asked the timeless question in her widely praised monograph of the same name: *Can the Subaltern Speak?* (1988), questions the tendency of dominant discourses and institutions to speak for and homogenise, and thus silence, heterogeneous groups and voices in their benevolent struggle to make the subaltern heard. As I have argued, however, it is not just dominant representations that silence the subaltern voice, but the mediums and materials by which they are delivered and made accessible. Such unanswered mediums help mask any internal contradictions and the 'messy' business of development work itself, to produce a coherent and polished veneer of black-boxed development spectacle to witnessing publics. Thus, through a carefully managed and highly visible marketing agenda employing stage-managed workshop demonstrations, conference addresses, literary outputs and digital technologies, the College was able to generate a consensus of success that helped validate its knowledge claims and ultimately extend the "Barefoot approach" worldwide.

To conclude then, I have argued that the College's success depended largely on its ability to create 'communities of consensus' through the spectacle and subsequent witnessing of its solar development programme. Such witnessing helped to enrol supporters whose presence and support through awards, grants and publicity contributed to the validation and reification of the College's knowledge claims.

Such witnessing, as Marres (2008) suggests, forms in the cracks and fissures of political "forcefields" (2008: 31) directing attention to the unstable borderlands of current environmental and developmental concerns. Thus, the Barefoot College's solar programme, as described above, might usefully be seen as an example of current global anxieties made manifest and played out through its heterotopic spectacles. Its
ability to keep functioning, sweeping up awards and grants as it repositions itself within this fluid topography, suggests an experimental character, the articulation of which reflects the temporality of our times.

In the next chapter, I look to the solar workshop of the Barefoot College and explore the practices and procedures involved in learning to be a woman solar engineer. With a particular focus on the workshop training that aims to turn subaltern women into ‘Barefoot Solar Engineers’ (BSEs), I aim to challenge the prevalent discourse of the “developed woman” as a self-maximising subject able to channel voice and power through newly developing knowledge spaces.
Chapter 6

Circuits of Knowledge

Lakshmi, forty-five years old, works in the solar workshop of the Barefoot College, assembling and testing lanterns, lamps and charge-controllers. She was born in the nearby village of Tilonia, where she still lives with her elderly parents and three children. As a widow, she is the sole household breadwinner. Unable to attend formal school during the day as a child due to her household chores, she enrolled in the local night school run by the College in her village. After completing night school, she worked as a labourer in the marble slurries of the nearby town of Kishengargh. It was hard, dangerous and dirty work. Thankfully, she heard that the College was looking to employ new graduates from the various night schools in the district to work in the College sections. After being accepted to work, she joined the medical section, acting as an assistant to the barefoot healthcare workers on their rounds of nearby villages, attending to common ailments and raising awareness of women’s health. She subsequently worked in the crèche section for a year before moving to the women’s empowerment programme. Here she learned about women’s legal and social rights, including the right to information act, employment rights, and domestic violence issues. From here, she spent two and a half months in the northern field centre of Shimla working in educational activities before returning to the College and the solar section where she has been settled since. She now spends her days assembling and testing solar lantern and lamp circuits, helping to train other women, and repairing field-centre and night school lanterns.

Before starting work in the solar section, she readily admits that she had no previous experience with electricity:

“When I started at solar, I didn’t know anything about switches, about off and on, and I can’t even start a TV or anything, no electricity in my father’s house and my
other family's house, and I am afraid about overhead electricity lines. The transformers here, I don't want them to come near me, this is very dangerous. Now I understand, and I can work with electricity, it is not dangerous like that, but I understand about electricity" (Interview 21.9.09).

Lakshmi adds that she has gained a new found respect in the village through her work repairing the solar systems, and how working with these technologies has changed her sense of self:

"Before this, I did labour work in Kishengargh at the marble market, and the marble slurries, cleaning all the place, doing labour work. I think there is dignity and respect in this job because people respect electricity and all these things" (Interview 21.9.09).

Lakshmi’s story is a common one at the College where women are given unprecedented opportunity to move around in different departments, learn new skills and travel to distant field centres in other parts of India. Her story, however, also alerts to the transformations in outlook and self that result from learning and working in spaces of global knowledge production. As Klenk (2004) has noted elsewhere, in neoliberal development discourse, the figure of the “female self-maximising entrepreneur” as someone who is empowered and has voice, has entered common usage in recent years, orienting their behaviour and comportment toward the free market and entrepreneurial ends.

In this chapter, I introduce the solar workshop-training programme of the Barefoot College that aims to turn subaltern44 women into ‘Barefoot Solar Engineers’ (BSEs). I aim to challenge the prevalent discourse of the “developed woman” as a self-maximising subject able to channel voice and power through these newly developing knowledge spaces. Such discourses often fail to register the particular kinds of material assemblages through which they are enacted, and the tangible ways in which knowledge and subjects

44 The term 'subaltern' was coined originally by Antonio Gramsci and used to refer to anyone of subordinate or inferior rank. It has since been appropriated by others to mean in a general sense marginalised and subordinated groups. Spivak uses it in a more specific sense to refer to those who lack a voice in the dominant narrative of production: “In postcolonial terms, everything that has limited or no access to the cultural imperialism is subaltern - a space of difference". De Kock, Leon. "Interview With Gayatri Chakravorty Spivak: New Nation Writers Conference in South Africa.” ARIEL: A Review of International English Literature. 23(3) 1992: 29-47. Accessed: 10/07/11
are formed, yet also silenced by different materialities. I argue that the College sought not only to manufacture particular kinds of material assemblages in the workshop for export, but also to manufacture a particular kind of modern, knowing subject. Such subjects encapsulate what Ong (2007) has described as the neoliberal shift from the production of goods to the production of educated and self-managing subjects (2007: 5). In this way, the College as a heterotopic space acts to re-order certain subjective aspects of the trainees to reflect wider market-driven agendas to development. The manufacture of solar lanterns and lamps then occurs in parallel with the manufacture of subjects, the visibility of which is an essential component for the continuing success of the project.

With a focus on the disciplinary practices enacted on the women by the College and the workshop space, including measurement, evaluation, and observational practices, I argue that solar work comes to resemble the “tyranny of the assembly line” described by Fernie & Metcalf (1997: 2) in their classic account of call-centre workers in India. Far from producing a knowing, modern subject, one with voice and power and expertise, the College instead speaks on her behalf, literally putting words in her mouth, and promoting the rote-learning and passive memorization of impenetrable tracts of modernist knowledge without due thought to understanding. Such teaching and learning methods serve to silence the woman and gain her acquiescence for the continued spectacle of the transformation of subaltern subject to modern, calculative, globalized subject.

Neoliberal Tigers

Bunker Roy, Director of the Barefoot College, has a knack for coining memorable phrases; he describes the African solar trainees thus: “I see them as grandmothers, and they go back like tigers”45. Bunker’s description of the women as “tigers”, a phrase designed to elicit good natured praise for their newly found ‘voice’ and ‘empowerment’,

highlights a particular strand of neoliberal development discourse that has emerged in recent years, that seeks to enable grassroots actors, particularly women, to self-manage themselves rather than rely on state welfare systems (Sharma 2008: XVI).

The College does not explicitly address the category of the ‘woman’ in its solar development programme. Rather, they fall back on the premise that women make better training subjects than men, who are prone, they claim, to ill-discipline, restlessness, and a desire for a certificate that will lead them to more gainful employment. Women on the other hand, particularly elderly women, are more committed, less likely to complain and less likely to migrate from their home villages in search of work, due to family commitments and their “roots” in the local community.

As Sharma has suggested elsewhere, ‘empowerment’, especially the ‘empowered woman’, has generally been warmly received by feminists and leftist groups for raising the status of women in development, and thus contributing to their political mobilization. However, in some cases it may also be seen as a form of neoliberal governance in the Foucauldian sense, where behaviour and self are managed and manufactured in line with hegemonic, market-oriented ideologies (2008: XX). Empowerment, therefore, despite its origins in radical, activist oriented social movements, has in effect been co-opted by institutions like the World Bank (World Bank 2002), and deployed as a strategy of participatory, decentralised self-management (Sharma 2008: 2). As Sharma suggests, the term’s very vagueness and celebratory tone, encompassing at once social change, self-esteem, participation, self-actualisation, voice and power, allow it not only to be reinvented and practiced in different contexts, but to also obfuscate certain ideological sub-currents that may appropriate it. In this chapter, I explore how such concealments are practiced and played out in a particular institutional development setting, and analyse the material dynamics that make it possible. I suggest that the

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46 Foucault developed the concept of 'governmentality' as part of a wider analysis on the role of disciplinary institutions to describe a notion of power exerted by the state that is de-centred, becoming internalised by the individual, guiding their behaviour and leading to more efficient forms of social control. In this way, governmentality, particularly as exerted by neoliberal forms of governance, constructs self-managing and auto-regulated citizens able to participate in certain forms of governance more effectively (Burchell et al 1991).
women's training and development are marked less by the roar of empowerment, and more by a muzzle of silence.

**Arrival Stories**

Each country that the College works in is coordinated on the ground through a local NGO. Representatives of these NGOs tend to be enrolled in the solar projects through presentations and seminars given by Bunker to various international development conferences. Following visits to the country that the NGO is working in including the selection of appropriate villages to be solar electrified and the identification of several village women to be trained as BSEs (see the following chapter for a case-study example of the process), the selected trainees have their documentation organised and are flown out to India sometimes within days and other times within weeks, to begin their training.

The women arrive in India from several different countries over the course of a week, where they are met at Delhi International airport by College employees and ferried to the College by jeep. I was dispatched myself to meet several groups of the women at the airport, to collect them and bring them back to the College. For all of the women participating in the programme, this was the first time they had travelled by air. Several of the women missed connecting flights as they struggled with confusing signs they could not read and the general stress of international air travel. The enormity of the task the women had assented to, and the absolute power differentials between their subaltern selves and the College, was made manifest in my first encounter with these village women as they wearily and anxiously approached the arrival gate, for many, clad in their best traditional dress, the look of sheer trepidation on their faces was plain for all to see.

Such uneasiness was further exposed when one group of women, being driven from Delhi to the College in Tilonia by several of the College employees, ran off into the night when the inexplicable behaviour of their new hosts proved too much. It later emerged that the jeep they were travelling in had stopped by the side of the road, for reasons unknown, to transfer the women to a different jeep being driven by different
College employees. The women, anxious and confused, and unable to ask what was going on, made the universal sign for a toilet break, and ran off into the surrounding fields. They were eventually found several hours later after they approached a tollgate and the police were called. It later transpired that the women, troubled by the odd behaviour of their drivers, believed that they were being kidnapped and sold off to the highest bidder, a concern shared by many of the women before they had even arrived in India.

The unspoken relationship between the women and their hosts continues upon their arrival at the College. Upon entry to the College, the trainees are assigned living quarters in simple rooms adjacent to the solar workshop, which they share with other women from their home country, usually three or four to a room. In the first few days, they are given their first and only tour of the campus areas; they also undergo a medical check-up at the College infirmary, including an eye-test for the close-in work required of the solar engineer. Later, they will be measured up for new loose-fitting clothes produced by the College, and each given a pack of simple toiletries. During this time, they are also photographed for record keeping purposes and various details ascertained (although the accuracy of which, due to language differences, is uncertain), such as number of children, family income sources, energy sources (wood, diesel, cow dung etc.), monthly expenditures, and distance from electricity sources (see appendix B for an example).

During subsequent interviews, many of the women expressed their bewilderment during these first few days at the perceived discontinuity between their expectations of a high-tech, modern training environment in India, and their immediate surroundings of the harsh and desolate Rajasthani landscape. They also expressed frustration and upset at the perceived slight when the Director of the College, Bunker Roy, was not there to meet them on their first day – the only Indian face the women had until then seen. Camille, one of the Barefoot solar engineers from Kenya, described her first few days thus:

“When we reached here, when we were being told that this was Tilonia we thought we were stranded. Is this the place? Dry, no trees, no grass, we were burning. The moment we stepped down, we wanted water, we were given water but it was hot, room was hot, everything was hot, we went to the mess, mess hot and were given hot chillis, too much hot. We phone to our NGO – ah! Is this the place you were
talking about? It is very dry and not even enjoyable (laughter). And they told us we were going to Bunker's home, this such a dry area with no grass and no trees, we were stranded, we couldn't even go outside, we couldn't talk to anybody, when we talked they don't understand what we are talking about, they don't understand, we were just struggling" (Field notes 11.3.10).

As noted in chapter two, funding for the training programme comes by way of the Indian Technical Economic Cooperation (ITEC) and the Special Commonwealth African Assistance Programme (SCAAP). This fortuitous arrangement was set in motion in 2007 when a representative of the Government of India visiting the campus, convinced of the effectiveness of the programme, recommended that the College apply for Government funding as an official partner in their South-South development cooperation scheme. Under the ITEC scheme, the Government of India provides funds for the "software": air fares, accommodation, materials, food and training costs during the duration of foreign nationals' stay in India; partners and donors provide funds for the "hardware": photovoltaic solar home systems, including batteries, lamps, and lanterns, plus six months of spare parts and equipment necessary for a Rural Electronic Workshop (REW). Funds notwithstanding, perhaps the most important contribution provided by ITEC/SCAAP, is the administrative and logistical support, including, but not limited to, the arrangement of visas at short notice from Indian embassies abroad; access to government ministers for pushing through sometimes debilitating bureaucratic hold-ups; approving candidates at short notice; securing visas from African embassies for Barefoot staff; and facilitating the continued enrolment and spread of the 'Barefoot Approach' through film showings at various industry conventions, including the Confederation of Indian Industry (CII), and the Associated Chamber of Commerce and Industry in India (ASSOCHAM). Such screenings ensure enrolment of further partners and donors, and the continued spread of the Barefoot 'network', a point that will be explored in later chapters.

The first group, or 'batch', as they are termed in the Barefoot literature, of ITEC/SCAAP funded women arrived on September 15 2008 and completed their training in March 2009. They were thirty-four women from seven countries: Malawi,
Tanzania, Ethiopia, The Gambia, Rwanda, Uganda, and Bhutan. Since this first group of trainees arrived, groups of women from the Least Developed Countries index list have arrived every six months to be trained in the repair and maintenance of solar home systems. I formally joined the second group of women to arrive for training in March, making thirty-five, including myself, in total: five from Djibouti, seven from Senegal, seven from Ethiopia, three from Mozambique, three from Sierra Leone, three from Mali, four from Sudan, and two from Russia.\(^47\)

### The Training Environment

The solar training block is situated in the “old campus”, a former tuberculosis sanatorium previously rented from the government for the token sum of one rupee per month, but now privately owned by the College. It is a sprawling and neglected-looking compound spread over twenty-eight acres and housing a school, a crèche, a craft section, a solar cooker workshop, blacksmiths, various storage buildings, a computer training centre, a canteen area, and of course the solar workshop.

The buildings are careworn and crumbling. Broken glass, old machinery, scrap metal and rubbish litter the area. As in much of rural Rajasthan, the surrounding space of the workshop is barren and dry. Stray dogs and cattle wander listlessly, seeking shade and water wherever it can be found. Most of the trees have been stripped-bare for goat-feed, their limbs white and unadorned, reaching out like branches of withered coral. The few trees that have been planted around the workshop are encased within thick spirals of a ubiquitous thorny shrub tree to prevent further goat marauding. A long desiccated recharge pond remains scarred with the deep lines of thirst.

The workshop itself is contained within one long rectangular building set towards the furthest-away corner of the campus. Concrete worktops line the perimeter, their tops covered with boxes of lanterns and components, choke coil machines, an old television set, stacks of circuits and lamps, and a display table exhibiting the various lanterns and

\(^{47}\) The two Russian trainees completed their training in the Northern field centre of Ladakh, Jammu-Kashmir, in order to avoid the searing summer heat of Rajasthan.
solar modules. One long workbench runs down the centre of the workshop covered with the tools and equipment necessary to perform the work of a barefoot solar engineer: soldering irons, various wires of different colours and width, screw drivers, pliers, wire cutters and wire strippers, volt meters, circuit boards, and drawers full of diodes, condensers, capacitors and resistors spill their wares over the floor and work surface. Large power supplies are placed periodically along the workbenches as groups of women in brightly coloured saris huddle around LED displays testing circuit boards and lamps. Other groups of women sit in front of small printed circuit boards, concentration etched on their faces as they methodically thread various components through the openings. Near a wire mesh window, two women sit behind a large steel winding machine, turning a handle as they carefully monitor the progress of a spindle of wire being slowly spun into a choke coil. Other women sit in a group on the floor on flattened cardboard boxes chatting away to each other while measuring out lengths of wire and tying them into bundles.

The walls are covered with a variety of instructional and technical posters: resistance colour charts in various languages; posters of basic greetings and phrases in French, Arabic, Swahili, English, Hindi, and Dzongkha; a chart displaying the days of the week when the women are entitled to call home; a wall-hanging from Ethiopia depicting symbols of development from Addis Ababa, including the Marriott Hotel. At the far end, a large chalkboard is positioned on the wall; a map of the world at the opposite end (Field notes 10.2.10).

**Learning-By-Doing**

The training, as Bruce (2007) notes, is similar to the training imparted by a technical college: trainees learn how to manufacture, assemble, operate and maintain circuits and systems, but are not equipped to mathematically design, model or predict the behaviour of the circuits (2007: 327). During the course of the six months, the trainees learn how to assemble and test three circuits: the fourteen-component fixed lamp circuit; the
seventy-one component solar lantern circuit; and the eighty-one component charge controller circuit, used to regulate the electric current drawn from or added to the battery.

These primary skills are complimented with training in the fabrication of transformers and choke coils, an understanding of the electronic colour code and resistance values, installation of the system including placement of solar module, lamp fixings and battery, and the usage of a multi-meter and power-supply to test circuits. Other skills, such as handling and use of tools like wire strippers and wire cutters, are learned in an informal manner in the course of the trainees' development (see appendix C for a list of the contents of the training as set forth by the College).

With seven different nationalities speaking seven different languages, it was perhaps not wholly surprising that the foremost obstacle the trainers faced was communication. Of the thirty-four women that I trained with, eighteen were described as illiterate; three were described as semi-literate, and eleven as literate. The centre defined “semi-literacy”
as having achieved less than five years of schooling. In practice, this worked out as having a basic grasp of reading, writing and numeracy. Since, however, all written materials provided by the centre were in English, even literate individuals not versed in the Latin alphabet were at a disadvantage. Of those thirty-four trainees, only four could speak, read and write in English: three Ethiopians, and one Sierra Leonean.

The College made much of its “learning-by-doing” approach to education and particularly emphasised the fact that no common language of instruction was utilised during the course of the training. Far from a perceived hindrance, this aspect of the training was rather highlighted as an example of the incredible skills that these “illiterate Barefoot grandmothers” possessed, which have apparently been overlooked by the development industry. The problem of communication, they claimed, is rather overcome by way of “sign-language”. Admittedly, before arriving at the College, I myself rather taken in and awestruck by this wondrous claim of cross-cultural communication by way of a universal, ad-hoc sign-language developed through the untapped skills of an unlikely group of illiterate solar engineering grandmothers. The reality of this claim, however, is rather more mundane. Having undergone the six-month solar training myself, the purported “sign-language” turned out to be nothing more than the gestures we all make when in a foreign country and trying to make ourselves understood without the language. Thus, the women pointed at objects if they needed them, looked exasperated and held their hands out if they did not understand something, mimicked the gesture of drinking or eating if thirsty or hungry, and made a sad face and rubbed their stomach if feeling ill. Non-verbal knowledge production of the kind associated with a learning-by-doing approach - learning certain procedures through observation, mimesis and repeated exercise - does indeed work, but is confined to particular aspects of the solar training (e.g. tool manipulation and lantern assembly), and is not sufficient in other areas, such as diagnostics and theory as I will show below.

Perhaps the most surprising aspect of this apparent ‘misrepresentation’ is not that the truth has been ‘stretched’, but rather that donors and partners have never questioned its efficacy as a method of education and communication. The effectiveness of the whole project, it would seem, rests on the realization of the trainees successfully attaining the
skills to maintain and repair solar home systems, and yet, as I explore below, such skills and knowledge are simply unattainable for the majority of the women.

Teaching in the Workshop
The "master-trainers", that is, locally trained staff with a minimum of 4-5 years of experience, are tasked with instructing the newly arrived trainees. They consist of both local men and women who have usually held various roles within the organisation before settling in the solar section. None of the master-trainers spoke fluent English, one or two had a basic grasp both written and spoken. Over the course of the six months, the trainees picked up basic words in Hindi to express fundamental needs, such as food, sickness, water, likes and dislikes.

In order to communicate, the first few weeks are therefore spent establishing a common platform of English terms for equipment and numbers. Despite the fact that most, if not all, of the master-trainers have only a weak grasp of English themselves, English remains the preferred language for technical communication between participants. Thus, English terms for all tools, components, measurements and numbers are first established in a rote-repetition style of teaching and learning.

The electronic colour code48 (see figure 15) used to indicate the resistance value of resistors and other components, is the first group of words learned. Each number from 0-9 represents a particular colour on the electronic colour code, which is marked in bands on the resistors49 themselves. For example, black = 0, brown = 1, red = 2, orange = 3 and so on. The trainees must therefore not only learn a new group of words, but must also make a cognitive link between certain words, certain numerals, and certain visually recognised colours. Teaching takes place through a rote-repetition style of pedagogy.

48 The electronic colour code is an international colour coded system used to indicate the values or ratings of electronic components. It was developed in the early 1920s by the Radio Manufacturers Association and commonly uses colour coded bands, particularly on resistors, to indicate resistance values.
49 A resistor is an electronic component that determines the flow of current in an electrical circuit. They are common to most electronic equipment.
Standing at the front of the class, the master trainer points to each colour on a wall chart and states the colour name in English and its corresponding value. The whole class then repeats in unison.

This mass chanting of colours and numbers is repeated over and over again during the course of the morning. It should be noted, however, that due to the differences in language, little attempt is made to explain to the women exactly what it is they are chanting, or for that matter, why. Displaced from their homes thousands of miles away to rural Rajasthan, the trainees have no way of asking what they are learning, the significance of the strange wall charts, or even express the that they do not understand. Not only do the women have no means to ask what is going on around them, but the huge power differentials that brought them there in the first place, also necessitates against them asking why. Camille, again, expresses her experience succinctly:
"We stayed for about two weeks without going to class, and we were asking eh, when are we starting this class, where are the classrooms, so the moment we went to the classrooms we could not understand, we could not communicate (laughter), so we were just quiet, just keeping quiet, one month we were just keeping quiet. After that, teacher Guman, he is a very good teacher, he was trying to make us understand what he was saying, but the rest of the teachers were quiet, they couldn’t even talk to us, we were facing them, we wanted to be free, but…” (Field notes 11.3.10).

The rote repetition of colours and numbers continues throughout the first week of training with variations such as pointing to a number or colour and waiting for the correct response from the class thrown in. Each trainee is also expected to step up to the front of the class and repeat the colour and number in English. The trainees are further provided with coloured pens to copy the chart into their notebooks. Those who are illiterate seek assistance from the master-trainers or are helped by fellow trainees.

The teaching of resistance values is followed by the learning of different tool names to be used by the women. Each tool that the women will use - from nose-pliers to volt meters to soldering wire - is held up in front of the class, and the name repeated slowly and clearly by the master-trainer. A list of all the tools is further chalked up on the board. Each trainee is encouraged to draw pictures of the various tools and write the names in their notebooks. Again, each trainee steps up to the front of the class, picks up each tool and repeats its respective name. Those who forget or have difficulty pronouncing the word are good naturedly helped along with shouts of encouragement from the rest of the class.

In a discussion on the Eurocentrism and top-down power structures of human rights discourses in the global South, Gayatri Spivak (2004) argues that demands for abstract notions of freedom should be tempered with the basic right to material resources such as food, water, and literacy. The latter, she argues, is essential if a “pedagogy of the oppressed” is to be enacted and thus enable the righting of wrongs through a dynamic and interactional educational process. Spivak argues that for far too many in the South, the national education systems, themselves relics of the colonial era, are geared for nothing but the passive memorization and rote learning of pages of incomprehensible
text, without due consideration to its actual understanding. Such teaching methods serve, Spivak states, to generate anew the submissive and subservient subjects of a divided and disenfranchised global South.

Spivak forcefully reminds us that forms of teaching and learning are never neutral, value-free territories, but are themselves implicated in the shaping of knowledge, and ultimately its delivery. The above description of learning in the workshop demonstrates that despite a general discourse of education in development as emancipative, in some cases, as I have documented here, the material processes through which education is delivered can ultimately silence, and in many cases reify the power differentials inherent in the context. Such materially enacted processes, however, are the starting points to consider how categories such as the ‘developed woman’ and education play out in developmental contexts, and the silences through which other actors may appropriate them.

**Circuit Construction**

After establishing a common terminology, the class moves on to constructing the circuits for the various solar components, starting with the lamp circuit. For most, if not all of the women, this will be the first time that they have encountered an open circuit board. The lamp circuit, or inverter circuit, comprises fourteen components in all, and is the simplest of the three circuits that the women will learn to assemble and test. The lamp itself is a nine-watt, twelve-volt Compact Fluorescent Lamp (CFL). The College buys in the component parts of the lamp: the lamp housing, wires, circuit boards, components, tubes and switches, and assembles them on-site. Since the College lacks the resources to design circuits themselves, consultants with relevant experience are approached to design circuits based on their needs of simplicity, durability and ease of repair.

Each component is held up and named while completed circuits are handed around the class for the women to examine. They are then instructed to copy out a diagram of the circuit into their notebooks. The next few days are split into rote learning and theory in the morning with practical, hands-on learning in the afternoon. From here, lamp
circuit are slowly assembled by the women. At first, each component necessary for its completion, e.g. capacitors, transformers, heat sinks and diodes, is handed out individually to the women. These component parts are then threaded through particular points on a printed circuit board (PCB). The women learn where each component is placed either by comparing their work-in-progress with a completed circuit board or by referring to printed hand-outs listing the component parts. For example, on the lantern circuit board, points “R1”, “R6” and “R14” each indicate resistors to the value of 10kΩ represented by bands of brown, black, and black and red colours. The women then find the relevant components and points and thread them through. At this early stage of training, the master-trainers check that each component is in the correct place before the trainees solder it into place. Later, with more experience, the trainees solder independently without the need to consult staff. The training progresses from the distribution of individual components by staff, to packets of pre-arranged components, and finally to the trainees selecting the components themselves.

The production of the lamp circuit is also completed in parallel with the assembly of the lamp body itself. The ability to assemble the wires, switches and casing of the lamp as a fully fabricated unit not only provides much needed skills for future installation and repair, but also generates confidence and familiarity in the handling of tools and equipment, which for many of the women is still considered the preserve of men.

The fourteen-component lamp-inverter circuit is proceeded by the seventy-one component lantern circuit, containing both an inverter and charger, and followed by the eighty-one component charge controller circuit, which regulates the electric current that is drawn from or added to the battery. The circuits are tackled by level of perceived difficulty and complexity: as component numbers increase, the potential for error increases concomitantly. Because of their age, many of the trainees at the workshop suffer from various eye complaints, from long-sightedness and colour-blindness to cataracts rendering much of the close-in work performed with the circuit boards problematic. Once each circuit has been completed, they are tested on the power supplies.
Solar Training: Theory

While the trainees quickly pick up the more tactile aspects of the training, such as manipulating and handling wire-strippers, sockets and lamp casings, with ease, the theoretical aspects of the training cause some confusion, not least because of the communication difficulties. Each resistor used in a circuit is marked with four bands of colour representing its resistance rating. The first two colour bands represent resistance values, the third colour band the decimal multiplier, and the fourth the tolerance value. So, a resistor with the colour coded marking of red, violet, black and red, for example, would give a resistance value of 27 ohms or 27Ω.

The lessons are dictated in a mixture of Hindi and English. Those women who do speak and understand English, in the main, grasp the theory (with some difficulty) after a few lessons. Their shared understanding of English not only gives them an advantage in terms of communication, but also indicates a longer spell at school; with added years at school comes better numeracy and reading skills. They are also encouraged to discuss it amongst themselves and assist those who are slower at picking it up. Those groups who speak little to no English, however, and have basic to none numeracy skills, find the lessons, understandably, hard to grasp.

Further abstract reasoning is required for circuit testing. When a circuit has been completed, it is connected to a power supply for testing. The bench-mounted digital dual-power supply unit provides the means to regulate output voltage (measured in volts) and current (measured in ampere, shortened to amps) at a wide variety of adjustable settings for the testing of electronic circuits. Output settings are displayed on LED controls with “coarse” and “fine” settings giving precision adjustment. By regulating the voltage or current administered to a circuit, the trainees are able to test whether it is working to proscribed standards.

The ability to correct the circuit fault relies, for the most part, on being able to communicate to the trainee either vocally or symbolically the what and the why, rather than the how. Interviews with the solar trainees and master-trainers bore out these disparate knowledge practices.
Two women from the Gambia were confident about the training they received at the workshop:

"Yes, we understood everything. It was not a little bit easy at the beginning, because we had never been to school, we had never learned English, we couldn't speak it, we couldn't write. It was a bit difficult in the first month, but at the second month, we start understanding the system and in the third month, we are able to do it and we are doing it now by ourselves" (Interview transcript 14.01.09).

The master-trainers, however, expressed a different view during interviews. They maintained that the two trainees had picked up the practical hands-on component of the training, but felt that they had understood little of the theoretical component. This proved to be a recurring theme. During further discussions with the master-trainers on the skills and knowledge that each trainee had acquired, it soon became clear that only the women with a strong grasp of English, both written and spoken, understood the theoretical aspects of the training. Some of these women were able to translate and explain the theory to non-English speaking members of their group. For the majority, however, the communication barrier was insurmountable. Theoretical aspects of the training, in particular fault finding and diagnostics, required explicit explanation in either spoken or written instruction. Procedural knowledge of the learning-by-doing type would not suffice in such instances.

In this way, much of the theory is simply lost on the non-English speaking and illiterate trainees who account for the majority of the intake. While the non-linguistic (Bloch 1991), embodied skills associated with using tools and components can be picked up by observation and mimesis, the descriptive, theoretical knowledge associated with calculating resistance values and diagnostics require a shared platform of communication.

Daisy, forty-eight years old and a mother of eight from Uganda, was one of the few English speakers in the first ITEC-sponsored group. Despite her excellent English, she told me that communication remained the most significant obstacle to learning despite being told by the Director of the College when he visited her village, that they did not in fact need language to learn in the workshop. Daisy spoke eloquently about the
frustrations of wanting to ask the master-trainers questions relating to the functioning of
the circuits but being hindered by a lack of shared language, or how the answers given
when she did manage to communicate were rarely what she asked. Further, the lack of a
clear structure or outline to what they were learning meant that with one month left,
they were still picking new points up.

Daisy, who with the other Ugandans arrived at the campus on September 25, ten days
late due to problems with their visas, described her first day in the workshop:

“So the next day on the 26th we just started class, that was very strange because not
understanding anything, anything, even their English we could not understand a
word… it was just showing us the tools that we are going to work with. But the
way they were calling and pronouncing the tools, we did not imagine it was
English. It was difficult because these people have no work-plan, because, if you are
going to teach somebody something you have to tell them that “this thing is like
this”, but for us when we came late, we were just given those small PCBs, you fix
this, you fix this, not knowing where we are to fix, so we are just gambling,
gambling until we catch up. They had us speaking English, but how can you do
something without explanation (laughing)” (Interview transcript 8.02.09).

Daisy explained that the only way they learn without a shared language and competent
teachers (“If I ask the same question four times, I won’t see that teacher again”), is
through trial and error, trying what works and what does not: “When we measure the
voltage of a circuit using the voltmeter, it should display 12V, if not, we keep trying and
trying and experimenting until it does” (Daisy Interview transcript 8.02.09).

**Regimes of Production, Regimes of Silence**

During the course of my fieldwork, I underwent the solar training myself, as part of an
apprenticeship-as-research-method approach to fieldwork. Therefore, I feel fairly well-
placed to judge the relative stresses of the solar training regime, which acted, to all
intents and purposes, as an assembly line for the production of solar components for the
benefit of the College.
I was present for three “batches” of solar trainees during my time at the College, consisting of over one hundred trainees in total. As I have described above, the training consists of a variety of verbal and non-verbal (descriptive and procedural) knowledge tasks from learning how to strip wires and assemble a lantern, to calculating resistance values and testing circuits. Such learnings, however, do not take place outside of the act of production; rather, from the very first day the women are manufacturing and assembling the products that will eventually be delivered to their home communities.

Both the second and third batch of women began their training by assembling the lanterns and lamps that were to be shipped to the previous group of trainees. 'Training' took place in an assembly line of production with one group assigned to wiring battering into the lantern cases, another assembling the lantern itself, a third group assembling solar lamps, and a fourth tasked with measuring and cutting wires. Such work practices often took up the entire first month of the women’s training schedule, before ‘formal’ training began. Again, during the actual training itself, circuits assembled by the trainees were placed in storage for their eventual inclusion in completed lamps and lanterns. The number of circuits completed by each trainee was closely monitored by staff members, with the trainee’s initials inked on to each circuit in marker pen and tallied up at the end of their six-month stay.

The solar work was at times challenging, awkward, and monotonous. Spread over the course of six days, Monday to Saturday, 9 am-5.30 pm, in sometimes intense heat, many of the women complained of the tediousness and long-hours, made worse through lack of language, unfamiliar surroundings, and alien food50. Moreover, the women were confined to their immediate surroundings with only a once-weekly, ten-minute call home allowed at the new campus of the College. Visits to the nearby village of Tilonia were prohibited, as was any kind of monetary allowance. All provisions (e.g. toiletries, clothing etc.) were provided for by the College. At the end of their stay, the women are

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50 Many of the women complained about the spicy food and lack of fresh fruit and meat in their diet.
presented with a ‘stipend’ of several hundred US dollars as compensation to their family “for sparing their productive and bread earners to India”.

The only period when the women were permitted to leave the College campus was during a three-day sightseeing tour of India funded by ITEC, during which they took in the Taj Mahal, Jaisalmer and various Government-funded alternative energy schemes. The tours also act as publicity events for the College and Indian Government, with the women in their traditional clothing, attracting large crowds and various press articles wherever they set foot.

Indications of the strain that the training placed on the women were evident during my first few months at the College. One of the Bhutanese trainees experienced periods of continual crying, non-responsiveness, and perhaps more pertinently, the sabotaging of solar components. The trainee was eventually allowed to return to Bhutan after medical interventions failed to halt her decline. The other Bhutanese trainees also expressed their desire to leave the training programme early due to lack of understanding. Four further trainees, two from Russia and two from Palestine, also left the training early after complaining about the poor conditions, including food, insects, environment, and lack of internet access. It might be noted that these latter trainees arrived from relatively developed countries in comparison to the majority of African trainees. The power relationship between their selves and their hosts was thus less acute, and it might reasonably be deduced that they had more confidence to voice their dissatisfaction with the regime.

Such ‘resistances’ might favourably be compared with the well-established strand of ‘everyday forms of resistance’ within the anthropological literature (e.g. Ong 1987; Colburn 1989; Scott 1985, Ortner 1995). Informed by Foucault (1972, 1977), such analyses focus on the capacity of subordinate groups to challenge and resist dominant power structures in society via small acts of defiance (Seymour 2006: 303). While question marks have been raised about the attribution of resistances along an unsophisticated binary opposition of resistance/domination without heed paid to the

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ambiguities and contradictions in different cultural contexts (e.g. Ortner 1995), resistance as a concept is nevertheless a useful starting point from which to recognise movements at variance with deterministic social orders (Hoffman 2010: 675) as demonstrated by the Bhutanese and Palestinian women above.

The production of subjects occurred coterminously with the production of objects, and was aided in large part, I suggest, by the relative silence of the women trainees, both in terms of language and power. Power and silence, however, are always enacted through particular material assemblages, the "missing masses" (Latour 1992) of developmental discourse. A further example of how the trainees were materially silenced is evidenced by the ubiquitous reports produced by the College for donors and partners. In one example, a report produced for the Skoll Foundation, a social entrepreneurship foundation based in Silicon Valley, California, the College included, alongside the standard description and impact of the solar project, a series of quotes from each BSE describing their time at the College. The quotes, as will become clear, were fabricated by the College, and by one staff member in particular, who thought the whole episode highly amusing. Some examples are displayed below:

"I love Barefoot College more than my family." (Sigey Sigey, 37 Years, Bhutan).

"I really do not want to go back The Gambia and I have nothing there. Tilonia is my own home, how I can leave Barefoot College. NO GO GAMBIA ONLY TILONIA." (Fansainey Sanneh, 48 years old, The Gambia).

"I never leave Tilonia and stay here only - Gambia achha nahi, Tilonia achcha." ('Gambia no good, Tilonia, good.' Kaddy Sanneh, 47 years old, The Gambia).

"We had pleasure time in our life at the Barefoot College, without meat for six months" (Maria Charles, 46 years old, Tanzania).

Thus, the women were not only silenced, but spoken for, becoming the unwilling and unknowing mouth pieces for their ventriloquists at the College. The solar training regime, then, was not just in the business of manufacturing lanterns and lamps, but a particular kind of modern, empowered subject, fashioned to fit the requirements of a new and expanding regime of market-oriented governance.
Academic studies of disciplinary practices in the workplace are wide and diverse and are most strongly represented in the fields of sociology, management studies and organizational studies, and are in general informed by a Foucauldian (1972, 1977) approach to discipline and power. The anthropological literature however is more varied with ethnographic studies taking a more holistic view of organizational phenomenon in general. Barnard and Spencer (2002) note that from the 1970s to the 1990s, the literature on work tended to reflect enduring anthropological interests, such as gender divisions, historical divisions of labour, and forms of power (2002: 848). More recent studies have been strongly influenced by sociological approaches to industrial society, particularly in relation to global production, distribution and consumption patterns (2002: 848). Anthropologists such as Ong (1987); Rothstein & Blim (1992); and Ward (1990) have further explored the global factory, globalized forms of labour, and workplace disciplinary practise.

Within the organizational and management literatures, one particularly rich strand of thought in the past decade exploring many of the themes listed above, and one that I suggest has cross-over relevance to the current chapter, is the line of study related to the emergence of Indian call-centres. This has application for a number of interrelated reasons, including the display of certain characteristics associated with the Taylorization of work in both call-centres and Barefoot solar training, such as assembly-line management practices of work (Taylor & Bain 1999), technologies that limit the autonomy of the worker giving them reduced control, and emphasis placed on knowledge transfer between workers and from workers into tools and processes (Russell 2008: 197). Both call-centre and solar workshop also display clear characteristics of the disciplining of the self that contributes to the construction of subjects and identities (Ledema et al 2006). Lastly, Winiecki (2004) notes how managers within Indian call-centres routinely rate their agents based upon their docility to particular workplace features, such as schedule changes, professionalism, communication skills, and responsibility (2004: 83). Such compliance is worth noting in relation to the African trainees who, as I noted earlier, are selected according to their age, with older women
favoured due to their propensity to work without complaint, and their unlikelihood of migration upon return to their home communities.

Many of the above features of call-centres can be discerned in the treatment of the trainees: they are photographed, surveys are carried out assessing their family background, socio-economic and financial status; health assessments are conducted to check their work-readiness; a new ‘uniform’ of clothing is distributed to each trainee along with toiletries and other essentials; trainees are assigned very basic shared ‘quarters’ for the duration of their stay with three or four to a room, and thus little privacy; trainees are restricted to the campus, with only a once-weekly telephone call allowed by the College; access to other services such as internet is also restricted and controlled; they are assessed on their knowledge of solar throughout the training, with the number of circuits made by each trainee carefully recorded. Many staff members also had their ‘favourite’ groups, with those who were deemed quick learners praised, while those groups who fell behind in the training, almost always as a result of language difficulties, were dismissed as “no good” often in conjunction with the refrain “[country name]... no good”.

As seen above, from their very first day, the women are subject to surveillance and disciplinary measures that help orient their behaviour in the construction of new subjectivities. Many of these measures, it might be suggested, served to de-humanise the ‘batches’ of women trainees in certain respects, and to help to re-construct aspects of their selves and identities in new ways. I have argued here that such heterotopic subjectivities were constructed and re-ordered in terms of the ‘empowerment’ of the women as entrepreneurial agents with voice and power able to function effectively in a market-driven economy (Sharma 2007: 26). The sticking point, however, is that the women were far from empowered; rather, as I argue below, it was only required that they were seen to be empowered by viewing audiences for the continuing spectacle of the project.
The Shaping of Subjects

So what, one might reasonably ask, is exactly going on here? As it has been shown above, the ITEC-funded training of illiterate and semi-literate women from some of the poorest countries on earth is a substantial operation and involves, uniquely amongst aid projects, the transfer of not just technologies, but people too. It costs $15,000 to train each solar engineer, including airfares, accommodation and food. Each solar home system costs a further $300 (consisting of: one 20 watt solar panel, one fixed light, one LED lamp, one deep-cycle battery and one solar lantern); putting the cost to solar electrify a typical village of one hundred houses at $30,000. The total cost including training and hardware thus runs to $60,000 per village (typically, two BSEs are trained for each receiving village).

These are not insignificant sums of money, yet evidence shows that the solar training has failed to deliver on even the most basic levels. Through a lack of communication, shared language and poor training, many, if not all of the trainees, leave the College after six-months without the means to repair, diagnose faults, install the systems, and in some cases with their health severely impacted. And yet, the training continues, funds pour in, the awards keep coming and the media reports become ever more exalted in their praise. How do we account for this continuing success when all evidence points to the failure of knowledge transfer and learning?

To answer such questions, I turn to Seth (2007), who discusses the practices through which Western knowledge travelled to India, and the ways in which it produced 'modern' subjects. Seth draws attention to the pedagogical teaching methods of Colonial India, and the lament of Indian nationalists and colonial officials on the tendency of Indian students to cram and memorise for exams without digesting the meaning of a text, in the students' words, "to by-heart it"(2007: 22). Various reasons were advanced to explain this overemphasis on rote learning and cramming, with the pervasive prominence of exams within the Indian student's life cited foremost. Another reason given, however, was the use of English in teaching and examinations. Forced to learn in a language that many students were unfamiliar with, they understandably chose the economical approach and simply committed texts to memory, rather than expend the
time to fully grasp and understand them. The distinguishing mark here is of course the difference between understanding something, and to 'merely' memorise and regurgitate it. Thus, despite, to all intents and purposes, successfully performing a designated task (passing the exam), they were still deemed to have failed by virtue of the fact that they circumvented the all-important transformation of the subject through the enrichment of knowledge (2007: 28).

Such notions of the transformation of the subject, brought about through, not the acquisition of knowledge, but rather the critical activity of reflecting and concluding for oneself, can be traced, Seth states, to the scientific revolution, the Reformation, and the Enlightenment (ibid.). Modern knowledge, in this sense, was conceived to be not only transformational in the external world, but more importantly, in the internal world, forging modern self-reflexive individuals.

Individuals were considered modern by virtue of their ability to stand back from the world and reflect upon it as sovereign subjects. Just as Latour (1993) has argued that the notion of modernity is predicated upon the division between nature and society, so is the status of the modern subject contingent upon their ability to step outside of the fray, from a world of passive rote learning, to one of active deliberation.

The idea that education is not simply about the transmission of knowledge, but also socialisation, power (Seth 2007: 36) and selfhood, intimates that the material practices of its delivery, from the hierarchical relationship between teachers and students, to timetables, material aids and disciplinary measures, all contribute to the shaping of not just knowledge, but also people themselves. This “hidden curriculum” (Snyder 1973) implies, of course, that knowledge is never distinct from the modes of its transmission; rather, knowledge and its bearers are shaped in the very course of its generation by a host of extraneous factors. In this way, it is not just knowledge that is grown into and enlarged, but people, identities and discourses too.

Seth perceptively notes that it was not that the British sought to actively produce modern subjects, but rather that modern Western knowledge practices engender a particular type of selfhood and subject regardless of the initial intention. Modern,
Western knowledge Seth argues, implies not just the learning of new ‘facts’, but a certain deportment, a way of inhabiting and being in the world much of which is informal and tacit rather than explicitly taught or communicated (2007: 27).

One trainee from the Gambia expressed how the training had changed her and her fellow countrywomen:

“Now we will know how to behave when we go back, we have benefited a lot from this trip. We have experience from interacting with other people in this place, it teach us a lot of lessons. We are a different people now” (Interview 14.01.09).

Another trainee from Bhutan expressed similar sentiments on how living at the campus had changed the way she thought about her body:

“Then whatever they see, they learned, we got many changes, how to live, of cleanliness, in the village we never have time to wash our hands to eat food, when we came here, many changes, about our body also, we know, if we know this, then it will also help our village” (Interview 6.2.09).

The above accounts indicate that despite the relative failure of knowledge acquisition, such knowledge practices (performing a learning role in a scripted educational environment) are nevertheless transformative, changing the outlook of participants and the way that they think about their selves and bodies. More importantly, for the continued success of the project, it mattered less that the trainees fully grasped and understood what was being ‘taught’ but rather that they were seen as acting modern. The transformations that mark entry to the modern are more often than not a visual spectacle as much as an internal change. Thus, the car replaces the horse, the computer the typewriter and solar the kerosene lamp. As Seth notes, embracing modern ways of thinking and acting, adopting a “modern outlook” through material enactments is both a cause and an important emblem of modernity (2007: 183), and concomitantly of continued project success.

The solar training and workshop, I argue, served largely to reflect this heterotopic spectacle of modernity irrespective of the veracity of training taking place. Just as Mosse (2005) has documented the role that demonstration villages play in providing highly visible examples of a participatory process of development being applied, so too does the
workshop serve as a space in which the women became signifiers of the efficacy of developmental policy. Such spaces act to highlight not only project success (the inefficiency of the training is in effect black-boxed), but more significantly, to make visible the transformation of poor, illiterate subaltern women to modern, knowing, self-regulating subjects.

In answer, then, to the initial question of how the solar programme continues to be a success despite the relative failure of the training, it matters less that knowledge is transferred and that the women become empowered, and more that knowledge is seen to be transferred, and the women are seen to be empowered. They provide the spectacle of change and development required by the donors. The women, just like the solar components they are making, are emblems of modernity, symbols for a new age. The fact that they do not work, neither lighting up lives nor empowering lives, is neither here nor there.

In the next and final chapter, I look to how workshop training is enacted in the receiving communities of the returning solar trainees via two case studies in Ethiopia and the Gambia. In the course of this, I explore the processes by which the College has attempted to translate its enterprises, traversing the bounds of regional and cultural specificities.
Chapter 7

Replication and its Troubles

In August 2007, as part of the ITEC and SCAAP agreement, and in conjunction with the International NGO Riders for Health, eighteen solar photovoltaic systems were installed in the village of Kafenkeng, the Gambia, West Africa, and a further fifty-seven systems in the nearby village of Kankurang by two Barefoot solar engineers (BSEs) trained at the Barefoot College in Tilonia, Rajasthan. The systems were inaugurated by the vice president of the Gambia at a ceremony in September of that year, attended by the Indian High Commissioner to the Gambia and other senior officials. Approximately one year later, all fifty-seven lanterns were found to be malfunctioning, despite a battery life estimated at two to three years with proper maintenance. A further twelve households had deep-cycle battery problems that could not be rectified, despite the battery life estimated at eight to ten years. A similar story was to be found in the village of Kafenkeng, with all eighteen household lanterns no longer working. Two further women from the villages of Kamwally and Bullengart were trained from September, 2008 to March 2009. In July 2009 they installed seventy-two systems and forty-two systems respectively. By June 2012, almost all of the systems were out of order.

Various reasons were offered for the failure of the systems, from the paucity of the training offered to the women in India (Abdoulaye, the coordinator of the project in the Gambia), the lack of commitment and education of the women trainees themselves (the Indian master-trainers); the lack of infrastructural support given by Riders for Health (Bunker, the Director of the College); the humidity of the environment in the Gambia and a lack of care shown to the batteries (solar section coordinator in India).

In this final chapter, I explore the production of success through the replication of the College’s solar programme worldwide: how knowledge, people, and technology move through different orders of translation. I illustrate this via an account of the ‘failure’ of
two Barefoot solar projects, in the process bringing to light the difficulties and labour involved in the generation of replicable development 'success'.

In reference to the conjuring practices of gold prospecting companies, Anna Tsing (2005) looks to the ways in which they exaggerate the possibility of mineral finds in order to draw in an audience of potential investors. Through a dependence on spectacle and the dramatization of dreams, profit must be imagined before it can be realised: “The more spectacular the conjuring, the more possible an investment frenzy” (2005: 57). In the lateral expansion of their solar programme across the globe, the Barefoot College is also involved in the performance of dreams and possibilities, gathering funds and awards through the conjuring practices of its heterotopic development spectacles. How do the dreamlike spectacles created by the College as explored in chapter five, act to shape the different worlds and peoples that they come into contact with? In the following, I explore the conjuring practices of the College’s global solar programme, and the way success is generated through the dramatization of dreams and spectacles. My first example concerns the impact of a Barefoot solar project in several communities in Ethiopia via a UNDP impact assessment report; the second involves a case-study analysis of an ITEC-funded solar project in the Gambia that I investigated in 2010. I argue that despite the relative ‘failure’ of the solar transfer projects, the mobilisation of knowledge and technology as it is documented via the public witnessing of the projects through digital media and development reports, signifies the ‘success’ of the project and has been a key, if not the key component in the solar programme’s realization.

Through the outward movement of its solar programme, the Barefoot College is able to breach national and regional specificities as it extends its Barefoot approach worldwide. Regionally specific knowledge is thus made detachable and universal, in the process conjuring new people, new social worlds, and new markets. However, the movement of knowledge, people, and technology requires work; it requires effort (Law & Singleton 2003: 4) to sustain stable relations between different locations. Thus, I also consider the struggles required in the construction of these new worlds. I describe the technical aspects of replication and technology transfer, and the particularities involved in the dissemination and construction of solar technologies. Furthermore, I also look to the
human aspects involved. People, just like objects, must also hold themselves together as functioning organisms - if they are to secure stable status as 'immutable mobiles' (Law & Singleton 2003: 4). However, people, unlike their non-human counterparts, have voices and feelings, resistances and identities, the mutability of which further weighs on the success of replication.

Lastly, I reflect upon silence, in particular the silence that affords development work success through the muting of some voices and the amplification of others. I argue that successful development work as it is carried out by and through the Barefoot College's global solar programme, is predicated upon the silence of certain interlocutors, which allows a dominant institutional narrative to emerge. In this way, this chapter continues the theme of the thesis as a whole, of uncovering and revealing the currents and pathways of seemingly unproblematic development efforts, exposing the grind beneath the gloss.

The Economy of Appearances

In 'The Economy of Appearances' (2005), Anna Tsing highlights how the practices of global finance and north-south inequalities are materialised through the dramatic spectacles and performances enacted by start-up companies through their desire to attract the financial capital needed to pursue their aims and goals. Through an analysis of the Bre-X scandal, a major gold-mining fraud, billed as the biggest mining scandal of all time (Wells 1998) Tsing looks to the ways in which Bre-X created a “performance, a drama, a conjuring trick, an illusion … a dramatic exposition of the possibilities of gold” (2005: 56-7). Tsing describes this performative activity as the “economy of appearances”: “the self-conscious making of a spectacle is a necessary aid to gathering funds” (2005: 57).

Tsing's examination of the dramatizations of global finance also brings to mind the kinds of spectacles and arresting narratives performed by the Barefoot College that I have explored throughout this thesis. Through these spectacles, the College was also, in its own way, attempting to attract its own kind of investors for the expansion of its
operations and the continued enrolment and validation of its projects. However, spectacles, as I have argued, also entail ignorance and silence. It is through the active making of spectacle that silence ensues, helping the College to maintain a robust and coherent interpretive community for the continued enrolment of supporters and donors alike. From historical development narratives to modern day energy policies, transnational replication work and workplace training, ignorance and silence, I have argued, play a significant role in making and shaping successful development initiatives. The College, I have argued, acted at once to conjure new worlds, and to silence those worlds. Yet, through such summoning, particularities, differences, voices and alternate visions must be screened out and ignored for knowledge to be able to traverse the different scales expected of it. The same is true, of course, in the wake of the failure and breakdown of such efforts. The fall-out of the 2008 global financial crash demonstrated that ignorance and denial can be harnessed productively in order to assert lack of foresight and hence culpability among financial analysts and governments (McGoey 2012). Likewise, transnational institutions such as the Barefoot College channel ignorance in order to screen out their own failures and complacencies through robust narratives and dramatic spectacles. Ignorance and silence as mobilizing forces of spectacle and non-accountability are thus productive accomplishments of the generation of success, essential components in the creation of globes, territories and people.

Tsing focuses on practices of ‘scale-making’ to account for how global structures of capitalism make themselves relevant at different dimensionalities. Contemporary masters of finance, Tsing argues, must claim that their projects have universal appeal and global scales of deployment (2005: 57) in order to breach national and regional specificities. In this chapter, I focus on processes of translation, a practice not dissimilar to scale-making, but one that more closely matches the ways in which the Barefoot network overcomes resistances, enrolls other actors to their cause, bestows certain desirable qualities and scripts to actors, and how their networks become increasingly transportable through

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52 Tsing describes scale as: “... the spatial dimensionality necessary for a particular kind of view, whether up close or from a distance, microscopic or planetary” (2005: 58). Tsing argues that scale is not a neutral frame for viewing the world, but must rather be brought into being, whether locally, regionally or globally.
trials of strength. In this way, through acts of translation, remote and 'wild' places are opened up to development offering up a landscape of potential change and advancement for new markets, resources and influence. In the same way that science must demonstrate its reproducibility in different locations to confirm its truth and validity, NGOs like the Barefoot College must also demonstrate the applicability and usefulness of their enterprises in different social and cultural spaces. From the deserts of Rajasthan, to the mountains of Himachal Pradesh, to the tropical rainforests of the Gambia and beyond, the reproducibility of the solar projects demonstrates to witnessing audiences the universal truth and reliability of the Barefoot approach. Local knowledge is thus made universal, able to traverse the boundaries of cultural difference and geographic spans. In this way, the College is involved not only in the production of development and development narratives, but also in the conjuring of new heterotopic worlds in which energy, development, people and technology collide and converge in new orders of place making.

The Barefoot College's own project of scale-making has been operating in earnest since the early 2000s. In the following account, I summarise the proceedings of a UNDP impact assessment report commissioned to study the transfer of solar technologies and skills from the Barefoot College to several communities in Ethiopia in 2006. The reports document in detail the complications and unforeseen problems involved in the replication of knowledge and technology in different cultural and social milieus.

**Barefoot in Ethiopia**

Before ITEC and the Indian Government became the primary sponsors of the Barefoot College's solar programme, the College was involved in several pilot studies with partner agencies and, in this case, a foreign government, to implement the 'Barefoot approach' to solar worldwide. The assessment reports (the first dating from 2007 and an updated version from 2010) were undertaken on behalf of the UNDP as a final evaluation of the decentralisation component of the 'Civil Service Reform Strategy and Implementation Plan for Decentralised Service Delivery in the Emerging Regions of Ethiopia'
programme. The programme was pilot based with a primary focus on the institutional capacity of the woredas and kebeles\textsuperscript{53} to manage and implement projects and programmes, implement small-scale infrastructural projects, and the potential to upscale the programme to regional levels. According to the first of the reports, the "fundamental rationale" for the project was:

"...the recognition by government that it cannot achieve the objectives of promoting development, reducing poverty, and strengthening democracy set out in the SDPRP simply through its own institutions, agencies and programs but must work in close collaboration with other development actors. This represents a shift in thinking from previous eras, and a change in the 'rules of the game' from one where the government is compelled to solely drive the development process to a situation where promoting development involves a partnership between government, the private sector and civil society" (2007: 15).

The project thus demonstrates the emerging and growing nexus between the state, the private sector and civil society, and the different institutional rationales that each brings to the table. In the Ethiopian context, a weak state and fragmented civil society organisations led to partnerships with the UNDP and the Barefoot College to experiment with alternative approaches to decentralized service delivery, which in this case constituted the 'Barefoot approach' to solar electrification.

The evaluation was conducted over the course of four weeks and made use of briefing sessions, key informant interviews, focus groups, and general observations and site-visits. The evaluation primarily concerned the Barefoot solar programme as it was implemented in four regions in Ethiopia, involving seventeen villages and the training of thirty-four men and women. Funded as a pilot project by the Skoll Foundation and the UNDP, the programme was agreed in 2004 under the 'Tilonia Declaration', a memorandum of understanding between the Barefoot College and a delegation from the four regional states of Afar, Benishangul, Somali and Gambela. As a result of this, in 2005 thirty-four men and women were sent to India for six months to be trained as Barefoot solar engineers. On their return, 510 solar lighting units were installed,

\textsuperscript{53} A 'woreda' is a district administrative unit of Ethiopia, managed by local government. A kebele is the smallest administrative unit of Ethiopia, similar in size to a neighborhood.
including 170 solar lanterns and the establishment of ten Rural Electronic Workshops (REWs) for repair and maintenance.

The report’s criticism of the project covers the following main points: firstly, with regard to the projects outcome and skills imparted, all of the solar systems installed in the region of Afar by illiterate BSEs were found to be non-functional. Mixed results were found in the three remaining regions installed by semi-literate BSEs. Illiterate BSEs trained in India were found unable to repair and maintain the solar systems with one BSE reported as stating: “I have never transferred any skill to beneficiaries because I cannot do it” (Gera & Cherkos 2010: 29). This prompted the Kebele chairman to state: “Delegating people to India is worthless unless they are able to repair and consult beneficiaries on solar electricity” (2010: 29). With regard to the selection of households, beneficiary households were not selected on the agreed-upon criteria and village committees were not active in their selection. The 2007 report makes clear that in the Eastern regions of Afar and Somali, a “snatch and grab” and “first come first served” policy was in place with households selected to be electrified based upon their willingness to pay a monthly fee (2007: 45). Thus, only a small proportion of households from each village gained access to solar electricity. As a result, disagreements and tensions arose among community members. Furthermore, there was also a lack of any kind of follow-up technical support in the training of the BSEs once installation was carried out, with the provision training, equipment and assistance by the Barefoot College a one-time event. This resulted in the improper utilisation of Rural Electronic Workshops (REW) due to the lack of technically capable BSEs. Other issues encountered included: low and irregular payments to the BSEs due to low financial capacity among beneficiaries and dissatisfaction with lack of maintenance; irregular payments from beneficiaries also affected the reserve fund, which was expected to fund spare parts required for maintenance of the solar systems. As a result, beneficiaries were unable to replace costly items, in particular batteries, leading to questions over the sustainability of the project; lack of coordination among community participants with senior district officials unaware of village-level solar committees and their management of the solar projects; no training or application of Rainwater Harvesting (RWH)
techniques was implemented despite contractual agreements in the original memorandum of understanding to do so.

Despite such criticisms, however, the reports also describe increased levels of community participation, extension of working hours for community members, and reduction in money spent on kerosene and batteries for lighting, although the expected improvement in indoor air-quality was not realised since electricity is not generally used for cooking purposes.

These gains however are somewhat overlooked in the conclusion of the report concluding that the Barefoot approach to solar lighting is not economically sustainable without further UNDP support due to “unrealistically” high initial installation costs, high maintenance costs, lack of spare parts, limited technical skills among the BSEs, and lack of transferable skills to other community members for future replication purposes. Neither replication, the upgrading of skills, nor the training of other community members was possible, the evaluators found, due to the illiteracy of the BSEs and lack of training to train others (2007: 45). Skills learned were also not transferable to configurations of equipment other than those trained upon with all BSEs responding that “it requires different training” (2007: 45).

Further to the point mentioned above regarding the tensions that arose among community members as a result of the lack of pre-planning in implementation of the solar systems, the report makes worrying reading. In addition to “a snatch and grab” and “first come first served” (2007: 45) selection policy of receiving households, evaluators found that it was alleged by non-beneficiaries that they will “burn down” the dwellings of those that received “the light”, if they do not also receive it (2007: 45). The section concludes with the disturbing observation that: “Generally, beneficiaries in BGR [Benishangul-Gumuz Region] and Gambella showed little empathy towards non-beneficiaries’ grievances in the sense that “we will not share with others” – “if they turn on us, we will not kill them, but we will call in the militia” (2007: 46). An observation, which, it is safe to say, will not be making it into the Barefoot promotional literature.
With regard to the issue of importation of the equipment from India, a somewhat contradictory policy given the Barefoot College's emphasis on indigenous, sustainable and appropriate technologies, the report notes that the cost of the solar systems including “opportunity costs” such as travel, accommodation, workshops, study tours, import taxes and inland transport, amount to 1000 USD per household (Gera & Cherkos 2010: 46). Further, the evaluators took issue with the training of the BSEs in India, noting that it could have been done cheaper, over a shorter period of time, and without the imposed language barriers (a hindrance that existed for three months in India until a translator was recruited from Ethiopia), if the training was conducted in Ethiopia instead. Ultimately, the report concludes that:

“It is evidenced that the program will not be economically sustainable without future UNDP support ... At the same time it seems that neither the GoE [Government of Ethiopia] nor the communities have the financial capacity to expand and replicate innovative approaches to service delivery such as solar lights” (Gera & Cherkos 2010: 44).

I should stress that the Ethiopian example should not be taken as representative of the solar programme as a whole, at least without further investigation of additional projects. However, it does make for unfavourable reading regarding the effectiveness of the solar projects as enablers of developmental progress. Then again, a further reported failing of the transferability of skills arrived while I was working in the solar office in Tilonia. This time, an e-mail from the coordinator in Benin reported that the two BSEs “do not succeed on making the connections and there is no light for the moment.” Further: “The ladies lost self confidence on themselves and I have decided to go to Benin by the end of April in order to see by myself what is going on.” (Fieldnotes 19.4.09). The situation was compounded by a national television crew filming the two BSEs in the village at the time. A further report from January 2010 summarizing problems experienced with three-hundred systems installed in May 2009 noted that by September of that year, “the rate of breakdown is about 90%”.

Such exhortations should be seen in light of the Barefoot perspective, made clear by a senior Barefoot section-head who visited Ethiopia in 2007 and which may help elucidate the apparent disjuncture in official policy and on-the-ground reality. In his report to
Tilonia, the senior Barefoot representative stated that the Indian Ambassador to Ethiopia “is acting as a barefoot icon in the capital” (Fieldnotes 10.9.9). Through the showing of a promotional film on the Barefoot solar programme to visiting diplomats of different countries, and bureaucrats and MPs of Ethiopia, the film acted to make visible, to convince and enrol influential others of the efficacy of the Barefoot approach.

Thus, the film as a material device of persuasion works not only to enrol supporters to the Barefoot cause through the act of witnessing, but also to translate detached knowledge practices, in the process making them visible in new and distinctive ways (Hirsch 2007: 121). Unlike the document discussed above, the film achieves these effects, I suggest, through the spectacle of development initiatives (Tsing 2005). As Harvey (2007) notes in relation to the mobility of scientific knowledge: “Scientific knowledge works ... as knowledge forms that appear ‘big’ and significant because of their capacity to extend far beyond their conditions of emergence” (2007: 168). The Barefoot College must likewise demonstrate that its knowledge practices are not constrained by local ways of production, but rather can be detached from cultural specificities, conjuring and concealing on-the-ground contingencies, through spectacles of globe making.

Yet, as Tsing reminds us, conjuring is always culturally specific, “creating a magic show of peculiar meanings, symbols, and practices” (2005: 57). In this way, dramatic performances and spectacles are always restricted by their own cultural distinctiveness and material configurations. Thus, if knowledge is to move and travel, then considerable amounts of labour and care are required for it to be both persuasive and applicable. Similarly, as Harvey reminds us, detachment from specific locales is always partial: “Knowledges, like all travellers, carry something of where they came from, the contexts in which they were formed, the motivations through which they were conceived” (2007: 168). In the following account, I consider some of these conjures and attachments, and explore how they act to constrain the globe making projects of the Barefoot College.
The Gambia: Translating Success

The above solar project was conducted as a stand-alone venture between the Barefoot College and the Ethiopian Government. As I have noted in previous chapters, however, the solar programme only really took off when it received state validation via its enrolment into the Indian government’s ITEC (Indian Technical and Economic Cooperation) programme, a South-South, bilateral development scheme designed to foster “cooperation and partnership for mutual benefit” (ITEC website). Latest figures show that since the programme began in 2008, the College has trained 153 women as Barefoot solar engineers (BSEs) from twenty-nine countries worldwide, including twenty-four countries in Africa. In the following account, I describe the means by which replication is undertaken in one of these projects in the Gambia, West Africa, in the process bringing to light the difficulties and labour involved in the scaling up of development initiatives.

When their six months of solar training is complete, the women prepare to leave India and return to their respective countries. After a period of time, they will eventually install the solar photovoltaic systems in their communities and further establish a rural electronic workshop for their maintenance. I followed up one such participating country, the Gambia, in West Africa, to observe the progress made. The Gambia was chosen for a number of reasons, foremost of which was the fact that I was already familiar with the country following previous research there, albeit on a different topic. I had also maintained contacts there and had become acquainted with the field coordinator for the Gambia project during his short trip to the Barefoot College while I was conducting fieldwork. I met with the coordinator of the project upon my arrival in the Gambia. He welcomed me warmly, and not a little expectantly. Over the course of several weeks, I interviewed the four solar engineers themselves, inspected the solar systems and spoke to village elders and household users of the systems. What emerged was a story of fragile bodies and worn-out artefacts, lost knowledges and ultimately system breakdown. In what follows, I describe not only the human actors involved in the story, their frustrations and concerns, but also those non-human elements, the objects and silent performers that help shape our lives.
As I noted in the previous chapter, each country that the College works in is coordinated on the ground through a local NGO, representatives of which are persuaded and enrolled to the Barefoot approach through presentations and seminars given by the director of the College, Bunker Roy, at various international development conferences. It was during one such conference in 2006 that the Director met with the founders of the UK based international non-profit based organisation Riders for Health (henceforth RFH), and came to an agreement regarding the solar electrification of several villages in the Gambia, a country with which they had extensive working experience. Following this arrangement, Bunker made his first visit to the Gambia in 2006, where he met with employees of the Gambia field office for RFH and requested that they identify several villages based upon their socio-economic status and remoteness from central grid electrification. Following the selection and training of two women from the Gambia in 2006-2007, Bunker again visited the Gambia in 2008 to select two more villages and two more women to be trained as solar engineers.

Following their identification as suitable for solar electrification, the selected villages were then approached by RFH and an open meeting was held with Bunker to discuss the aims of the project and whether they wished to participate. With approval given, volunteers were chosen from the village. The women chosen to undergo training are selected according to their age (40 and over preferably), their roots in the community, and enthusiasm. Women, in the 40-60 age bracket, preferably grandmothers who are either semi-literate or illiterate are favoured due to their roots in the community and unlikelihood of migrating upon their return to seek employment elsewhere; a problem previously experienced with men and young women. For the same reason - and it might be argued, somewhat rather punitively - no certificates are issued upon completion of the training to further hinder movement away from the receiving community.

During the village meeting, a Village Energy and Environment Committee (VEEC) is established, comprising ten to twenty members elected by the community. It is the VEEC's responsibility to administer the solar programme, collect monthly fees from the users, and keep track of payments into the village bank account. At this early stage, all families who wish to be covered by the system are signed up and the particular solar
configuration to be deployed for each household is determined, e.g. one lantern and one fixed lamp per household. The VEEC also decides what kind of payment system to put in place. For most, an upfront sum is paid and a monthly payment follows thereafter; for others, a simple monthly contribution suffices. Contributions are determined according to how much each family, on average, pays for kerosene and candles for lighting per month. This money is then deposited into a bank account managed by the VEEC and used to pay the eventual Barefoot Solar Engineers (BSE) a monthly salary, with the remainder kept aside to pay for future spare parts and replacements. The VEEC further acts as a regulatory body, ensuring that all systems are working and the BSE is performing her role to expected standards.

The knowledge-transfer capabilities of the College can thus broadly be de-limited within two dynamics. Firstly, and as discussed in the previous chapter, the training component that takes place in India. Here, knowledge is shared and hopefully transferred between individuals in a scripted learning environment. Learning takes place through a mixture of ‘knowing that’, that is, knowledge that can be expressed verbally or symbolically, and ‘knowing how’, the knowledge required to perform a task. The second component of the replication process occurs when the women return to their communities to implement the knowledge and skills that they have learned in India.

**The Sunshine Coast**

At approximately 300 km long, and yet only 35km wide, the Gambia is Africa’s smallest mainland country. With a population of approximately 1.7 million people, it is also one of its most densely populated. The Gambia occupies an area of roughly 11,300 square kilometres and except for 80 km of coastline, is completely enclosed within Senegal. The country’s territory and very existence is determined by the Gambia River, which flows into the Atlantic Ocean. The peculiar shape of the Gambia, likened by some to a crooked finger poking into the heart of Senegal, is a legacy of imperial strategy during the scramble for Africa at the end of the 19th century. From approximately 50 km upstream, every bend of the river is matched with a correlating arc in the border. Local
legend tells that the dimensions of the Gambia were determined according to how much territory could be defended by a British gunboat sailing up the river and firing shells as far as possible onto each bank. Whether fact or fiction, as one of the most navigable waterways in Africa, the river has been a gateway for centuries of trade, conflict, exchange of ideas, and travel. It was infamously one of the primary conduits for the transportation of slaves to the Americas, and its riverbanks remain dotted with the crumbling remnants of this legacy.

The Gambia today is one of Africa’s poorest countries with a GDP estimated at $1,400 per capita in 2009. The economy is dominated by the tourism industry and subsistence agriculture, accounting for 52.3% and 34.9% respectively. In 2010, the United Nations Development Index placed the Gambia 151st from 169 countries. Approximately 50 per cent of the population now live in urban areas, predominantly in and around the greater Banjul area. Electricity coverage in the greater Banjul area averages below 20 per cent, except for the capital Banjul, which stands at 70 per cent (Sanneh and Allen 2009: 2). Coverage in rural areas remains sporadic, with most communities relying on kerosene lanterns for light and firewood for cooking; some are also serviced by local diesel generators.

Abdoulaye, my contact in the Gambia, works for Riders for Health, an international NGO specialising in the provision of healthcare to rural communities in Africa using motorcycles and motorcycle ambulances. Its main compound is in the bustling market town of Serrekunda where its courtyard is home to several mechanical workshops and a multitude of different vehicles, from motorcycles to 4x4s, all in various states of repair. NGOs who agree to act as partners to the Barefoot College for the installation of a solar project have varying degrees of involvement in the project depending upon their level of investment and state support. In general, however, partner NGOs provide administrative, logistical and technical support for the projects. In their role as the local ‘fixer’, they act as the go-between between the College and rural communities, assisting in the selection of candidates for training, and arranging their visas and passports before travelling to India. They further help arrange the release of the solar equipment from customs, organise its transport to the communities, and help organise meetings with
policy makers, donors, and media in the country to publicise the 'barefoot approach' and seek further support.

While RFH acted as the local contact for the project providing local know-how, contacts and infrastructural support, funding was provided by two private development foundations: Stichting Het Groene Woudt, a Dutch foundation promoting sustainable economic development in developing countries, awarded the College €653,400 over two years in 2006; and the Skoll Foundation, a social entrepreneurship foundation based in Silicon Valley, California which awarded the College $250,000 in 2008. Approximately sixty per cent of the College’s funding is provided by external agencies, through either funding proposals or award money. The remaining forty per cent is made up equally of government funds and internal revenues generated from handicraft production, which they sell within the campus itself and on-line through the separately registered organisation Hatheli Sansthan. The majority of the funding for the solar projects is contingent on the networking abilities and contacts of the College’s director Bunker Roy. Through international conferences, demonstration events, and media interviews, Bunker sells the idea of the ‘Barefoot Approach’ to solar lighting through a blend of charisma, spectacle, and marketing. As Bruce (2007) notes, the importance of such a personality for the survival and replicability of the College is unquantifiable and may be very difficult to compensate for in his absence (2007: 335).

I met Abdoulaye at his office in the compound of RFH where he began to outline the history of the solar project and its current state. Abdoulaye, a tall, well-set individual with a proud yet gentle demeanour appeared tired and disillusioned as he began to describe the various difficulties that the project had experienced. During the course of our meeting, he emphasised several times the toll it had taken on his health and the medication that he now had to take for high-blood pressure, a result he attributed to the trials of establishing the solar project.

As I noted previously, the first two women from the Gambia began training in November 2006, where they spent six months at the solar workshop in Tilonia. Upon completion of the training in 2007, they returned to their villages and sometime later that year, with the arrival of the solar equipment, installed the devices in their home
villages: fifty-seven systems in the village of Kankanang and eighteen systems in the village of Kafenkeng respectively. Abdoulaye stated that when the systems were first installed – a very challenging process, he stated, since the trainees had apparently “forgotten” everything they had ‘learned’, forcing Abdoulaye, previously unfamiliar with such devices, to improvise and install them himself on the spot – they did indeed work for the first year. Thereafter, one by one, they began to fail, and have remained so since. However, they began to fail only after Bunker had proposed in 2008 that two more women from the Gambia come to India for solar training, a proposal that Abdoulaye, and RFH readily agreed to. Thereafter, in 2009 forty-two systems were installed in the village of Bullengart and a further seventy-two systems in Kamwally, together totalling 189 systems installed to date.

Abdoulaye, his large frame squeezed behind an awkwardly positioned desk, and a framed photograph of the President Yahya Jammeh looking down upon him, began to put forth his view of why the solar project was so far failing. Since the first solar engineers were trained, Abdoulaye explained, no support network of any kind has been in place to ensure that replacement parts for the devices were made available or refresher training for the women accessible. Moreover, according to Abdoulaye, the age of the women played a significant part in their knowledge lapses:

“The women are old, they forget everything. When Bunker came to the Gambia, he asked for the oldest members in the community, how can they remember everything at their age, when they have families to care for and work to do?” (laughing) (Fieldnotes 11.01.10).

Abdoulaye went on to describe the frustrating time-gap between the return of the women to their communities and the receivership of the solar equipment, an interlude of three to four months, a period he felt, contributed greatly to the loss of knowledge and confidence in the women as they adapted back into the rhythms of village life. Fault-finding and diagnostics were the main problems he stated, with the women unable to determine why the fuses burned out so quickly and why all the batteries were “swelling” (see Figure 16). Because the systems operated as expected for the first year, he stated, when problems did eventually arise, they naturally had no idea what to do: “If
there is no problem, the women go and relax and forget their skills” (Fieldnotes 11.01.10). Language and illiteracy also played an important part, he felt:

“If they could read, they might be able to refresh their memories, but the training manuals sent to us were written in English. No-one in the villages can translate them so they have become useless” (Fieldnotes 11.01.10).

During his time at the Barefoot College, Abdoulaye was also accompanied by a young, literate male associate sent by RFH to learn how to construct composting toilets in a different NGO. Abdoulaye requested from Bunker, that he also be trained in the solar devices while visiting the College, but was refused owing to the policy of the College to exclusively train illiterate, older women, a point which exasperated him.

After our initial meeting, Abdoulaye and I made the journey out to the villages the following day in his own car, a large 4x4 with raised suspension to cope with the parlous state of the roads in and around Serrekunda.

Figure 16. The malfunctioning batteries

Once we left the cacophony of traffic and market bustle, however, the roads noticeably improved as we made the three-hour journey into the rural heartlands, a result
Abdoulaye stated, of the incumbent President’s home village being off the same stretch of road. Once we reached the first village, after several military checkpoints and the ‘gift’ of my watch to a keen-eyed young soldier, we were met by a large group of villagers headed by the local district chief.

The first village we arrived at, Kamwally, the largest of the villages to be solar electrified, was set just off the main road. The main receiving area of the village consisted of several mud-brick dwellings, topped with corrugated iron and adorned with our familiar solar panels, glinting in the mid-day sun. In the shade of the buildings were several ‘bantabas’, a village meeting place and men’s communal siesta platform, found in almost every village in The Gambia. The district chief received Abdoulaye warmly, and after introductions were made, ushered the two of us through to the first solar workshop where the solar engineers Kaddeh and Fansaine were waiting patiently for us.

Kaddeh and Fansaine two grandmothers in their late forties wearing traditional lightweight *grandmubas* in bright blue, wrapped from the waist to head, were clearly unaccustomed to the attention they were receiving. I had met Kaddeh and Fansaine when I first arrived at the College and trained alongside them intermittently during their last few months. I had also interviewed them via the help of Abdoulaye who was visiting the College during this time. Under the scrutiny of several other villagers, including the district chief, and with Abdoulaye acting as translator, they were initially shy and hesitant in their answers to my questions. With a little coaxing from Abdoulaye, however, and a thinning of the watching crowd, they soon opened up about the problems they were experiencing as the anointed purveyors of the solar systems. Their main problems they felt could be traced back to the training in Tilonia, which they admitted they could not understand, but were unable to express at the time. Some skills, Kaddeh explained, stayed with them when they returned, such as fabricating choke coils and soldering circuits. However, after a period of time, that too had gone amiss:

“I can’t come to the workshop all the time. I have domestic work to do. There is also the harvest, there is nobody who can harvest the rice fields for me, I do it by myself. Once I have finished my work in the morning, sometimes I come after
lunch. In the evening I am too tired to come. I need a little help, I can't do this solar work any longer, it has gone from my mind" (Fieldnotes 12.01.10).

As they showed me around the rural electronic workshop, set up in the wake of the equipment arriving from India, large pieces of gleaming equipment used for making choke coils and transformers sat idle on workbenches. They showed me the large deep-cycle batteries, used to power the workshop, which now sat inertly in the corner, all life having been drained from them. One was being used as a doorstop. The women stated they had also forgotten how to use the tools and equipment necessary to assemble the circuit boards, actions that only a few months previously they had performed daily.

Interviews with Abdoulaye and members of the solar committee also established that no evaluation or monitoring system was in place either from the Tilonia end, or as instigated by RFH. Abdoulaye was, however, pressed by Bunker to deliver monthly reports on the purported benefits of the project (reductions in CO2, kerosene saved, snake bites prevented etc.) for the inclusion of reports and proposals on the impact of the solar projects.

A similar story was told in the next three villages we visited, with all four women having seemingly lost the ability to not only diagnose problems – an understandable issue given the dearth of communication in Tilonia’s workshop – but also to make routine repairs and conduct maintenance. In two of the villages there were also problems relating to monthly payments to the VEEC, with villagers unable to contribute regular sums due to inconsistent incomes and unhappiness with the training afforded the women. Despite strenuous efforts on behalf of the district chief, it would appear the villagers (understandably) had collectively decided that in light of the failure of the BSEs to repair the faulty systems, they would no longer contribute monthly payments.

On the way back, Abdoulaye opened up about his difficulties in dealing with Tilonia, and Bunker in particular, who, he claimed, had stopped responding to his e-mails or acknowledging receipt of reports sent regarding the status of the solar project. Abdoulaye again lapsed into disillusionment with the project as he expressed his concern at the future status of the venture.
Despite these negatives, there were reported positive benefits, including a more inclusive feeling of ‘community spirit’, reported by many users. Although not quantifiable, a wide-spread feeling of increased participation in community affairs through monthly village meetings, cleaning exercises for the solar panels, and the reporting of misuse of the systems by neighbours led to an increase in community participation. Further, in the village of Bullengart, the VEEC also established a system whereby the villagers, for a small fee, could charge their mobile handsets from the REW, the small fee going towards the central fund for replacement parts and the BSE’s salary.

As Nieuwenhout et al (2000) note, maintenance and the ability to make repairs is far more important in the functioning and sustainability of PV systems than users and policy implementers tend to give credit. The effectiveness of maintenance programmes, however, depends in large part on three main factors: firstly, the ability of users to understand and make repairs to the system; secondly, the costs in time and effort involved in the maintenance; and thirdly, the ability and willingness of users to pay for their upkeep (2000: 62).

Fourthly, I might add, and a point, which so far seems to have gone amiss from studies relating to the replication of experiments or the ‘transfer’ of embodied skill-sets is the intangible contribution that confidence and identities play. In their descriptions of the immense amounts of labour involved in the replication of Boyle’s air-pump experiments in different laboratories and different countries, by different individuals, Shapin and Schaffer (1985) note that no one ever built an air-pump from written instructions alone, “the transmission of pump-building and pump-operating skills required the transfer of people” (1985: 281).

While the inability of the women to diagnose and trouble-shoot problems was perhaps foreseeable, given that the knowledge required to perform such tasks was represented in verbal and textual form, neither of which the women had access to, their loss of know-how in relation to the embodied skill-sets of tools and equipment was less explicable. In the following section, I develop the argument that the movement of knowledge requires more than either written instructions or embodied skills, but also qualities of confidence and identity sustenance, attributes that are not easily stored or conveyed.
Bodies and Identities

During the training in India, each group of women is given several sets of tools that they learn to manipulate through repeated use. Through repeated practice and handling, the tools and their capacities, it is supposed, become embodied capabilities, transferred from location to location and expressed through mobile bodies and gestural actions. Such knowledge-sets, typically characterised as ‘know-how’, or the knowledge exercised in the performance of a task, are imagined as residing, or being embedded, not within words or texts, but as embodied properties of a bodily hexis. These skills and knowledges are learned and expressed by the women by way of corporeal sensations and feelings of muscular extension, contraction, force and pressure (Marchand 2010: 110). The knowledge and ability to use different kinds of tools is therefore a sensorial, spatial and somatic knowledge-set expressed through the performance of a sensori-motor system, coordinated movements, gestures and tools (Marchand 2008: 257). However, such knowledge-sets, I suggest, exist and are contingent upon not only regular enactments to sustain their robustness, but on the intangible qualities of the formation of the person, of status and of identity.

When the newly appointed BSEs arrive back home to their communities from India, it takes, as I noted above, between three to four months before the solar equipment is packed, shipped and delivered to the villages. The women arrive back to much fanfare in their villages; many of them are interviewed for local newspapers, others are greeted by government ministers in lavish welcoming ceremonies. During the interim period between arriving back and the equipment being delivered to their villages, the women adapt back to their previous roles in family and community life. In the Gambian case, all four women ran a household and worked on plots of family land. When the equipment does eventually arrive, the lack of regular exposure to system maintenance as the women take on the routines of their previous life: farming, maintaining a household, looking after children, means that much of their knowledge is gradually lost. The time lag between training and actualisation contributes to a loss of both gestural knowledge and confidence to perform. Without the regular performance of gestural actions in a scripted learning environment, both sensori-motor knowledge and confidence become
impoverished. The gestural knowledge learned by the women over the course of their six months training covered everything from knowing how to strip wires and solder, to more complicated tasks such as making choke coils and transformers, and assembling circuit boards. The women performed these actions and gestures regularly, six days a week, over the course of six months at the training centre in India. The knowledge required to carry out such tasks was expressed not only through muscles, memory and gestures, but was also distributed\(^{54}\) (Hutchins 1995) throughout the immediate working environment: through their peers, through the regular working practices, and through a constructed, yet fragile 'solar engineer' identity.

My argument leads to the conclusion that practical and skilful knowledge is not merely the execution of pre-established patterns of practice, embodied in muscles and memory, but is rather a dynamic performance, a generative 'dance' (Keller and Keller 1996) of both bodily gesture, identity, tool, and environment that cannot easily be stored or sustained either in symbols, bodies or objects. Rather, it is brought into being through the performative act itself. Its robustness and transferability is dependent on regular enactments that help harden and sustain its durability. The environment at the workshop in India, far away from their usual existence, helped foster the identity of the women as solar engineers, through communities of practice (Lave and Wenger 1991). Spending every day in a workshop, as the women did, assembling circuits and lantern bodies, making choke coils and transformers, with other women from other countries in Africa, not only furnishes the trainee with a dynamic and embodied skill-set, but also contributes to the identity construction of 'solar engineer'. Such an identity helps engender the confidence required to perform a role more usually allocated to men. This subject formation, however, is weak and precarious; it withers and wanes without regular enactments, and points to the uncertainty of subjectivities in the new knowledge economy.

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\(^{54}\) Distributed cognition is a theory developed by Edwin Hutchins that emphasises social aspects of knowledge, in particular the interaction between individuals, material artefacts and environment. Despite a cognitive bias, his framework is a useful reminder of the interactive elements involved in knowledge performance.
As Marchand (2001) notes in an ethnography on minaret building and apprenticeship among traditional stone masons in Yemen, the training of the mason does not simply involve the teaching of skills, but also, and more importantly, involves the formation of his person “for producing an individual who is capable of acting, thinking and understanding within the framework of their vocation” (2001: 182). Likewise, in a discussion on stone tool production in Irian Jaya, Stout (2002) observes that learning takes place in highly structured social and physical contexts that serve to provide “scaffolding” for learning to take place in, providing not only skills, but group membership also (2002: 694).

Thus, the replication of skills and solar projects requires a host of interacting and disparate elements, from working hardware, to transport lines, to receiving (and willing) communities and functioning bodies. These tangible qualities must also be complemented by the intangible qualities associated with identity construction and skill resilience comprising knowledge and nuances, identities and supportive communities. A lack of any one may lead to the collapse of the network and failure to replicate.

The above account of the failure of one of the Barefoot, ITEC financed solar programmes indicates that the transfer of knowledge, its movement and replication, is far from a simple matter, and is not amenable to a formula that can be followed. Rather, replication, as Shapin and Schaffer (1985) note, requires an immense amount of effort and labour, which is often concealed from view to protect its status as objective and universal fact. In the case of science, Knorr-Cetina (1999) and Sibum (1999) make similar claims regarding the dismissal of the scientist’s body, as a sensory body, and a skilled body respectively, in the work of laboratory practice, in order to preserve the objectivity of the scientific knowledge generated. Mosse (2005) makes comparable claims regarding the affirmation of a development project as a replicable model, which ultimately allowed potentially problematic local and institutional settings to be safely ignored (2005: 163). The Barefoot College’s own international replication programme, conducted in twenty-nine countries to date, must also hide from view the messy and locally contingent practices that make it possible. In the case we have described above, this has centred upon the fragility and precariousness of the knowledge carriers that the
projects rely upon. While this example cannot be taken as illustrative of the solar programme as a whole, it does expose the often times overlooked difficulties involved in the replication of development work to different locations.

**The Silences of Translation**

When I returned to India from the Gambia, I sat down in front of Bunker in his office in Tilonia, and outlined the situation to him. Bunker has his office space attached to his main dwelling which skirts the Barefoot campus. It is a light and airy and somewhat grand space compared to the rather austere campus buildings. A reception area staffed by his secretary and surrounded by filing cabinets and bookcases opens out to a large jade-green marble tiled chamber. Cushions line the border, a large rug in the centre, a bookcase to the left is lined with various hardback coffee-table books on the Barefoot College and other development initiatives. Bunker, on the days that he is present in Tilonia, can usually be found here, sitting to the back of the room, facing the entrance way, behind one of the distinctive low desks produced by the College, its desktop inlaid with redundant solar cells. Bunker himself, his generous frame propped up by two outsized cushions, legs and feet splayed out beneath the desk, sits, eyes peering over glasses, watching, listening, revealing little. I had sat, cross-legged, in front of this desk many times previously, scrawling down instructions on the latest report or proposal Bunker had me prepare. On this occasion, I summarised my fieldtrip to the Gambia; I outlined the problems concerning the non-functioning solar equipment, how the BSEs require immediate refresher training, ideally from someone within the College familiar with the solar configurations, Abdoulaye’s concerns relating to the sustainability of the venture and replacement parts that he had requested. In his typically laconic manner, Bunker nodded sagely. After some thought, he assured me that someone from the College would be sent to the Gambia to refresh the women’s solar training, and advised me to consult with another member of staff on replacement parts.

Despite Bunker’s pledges, to date, neither of these assurances have been fulfilled. However, the issue of fulfilment is not what concerns us here. Rather, I wish to address
the apparent disjuncture between representation and the reality of replication and how this is achieved. In a progress report sent to Bunker, in July 2009, regarding the latest solar installations in the villages of Bullengart and Kamwally, Abdoulaye sets out the main problems encountered in the project. In the report passed to me by Abdoulaye himself, he states categorically that the latest two BSEs trained from 2008-9 do not understand the systems and cannot make repairs or diagnose faults: “Bunkerji you know that I am not trained to be a solar engineer and the last two solar engineers trained are not capable of repairing or fabricating the systems when they have problems.” Further, he states in the letter, the first two BSEs trained from 2006-7 also cannot make repairs or diagnose faults. Abdoulaye, who installed many of the systems and marshalled the installation of others himself, emphasises to Bunker that he himself is not a solar engineer, and has no training in the systems, yet the two BSEs “always depend on me”. He therefore requests that “for the interest of the sustainability of the 189 solar system[s]” the College train someone locally in the Gambia to become a solar engineer “trainer” to assist the women. The letter concludes with a request that Bunker, and other College members, acknowledge all the e-mails sent by Abdoulaye regarding the solar project.

The failure to acknowledge Abdoulaye’s concerns mentioned in the concluding section of the letter, is pertinent, for it hints at how the official Barefoot narrative takes precedence over messy, ‘misbehaving’ realities. In Mosse’s (2005) seminal account of the dynamics between policy and practice in a DFID funded aid project in North-West India, the project, at one time the “jewel in the British aid crown” of participatory focused development (2005: 168) is ultimately deemed a failure, not because of a failure to deliver, but because of a shift in development policy. A project evaluation team, jointly assembled by the project and donor at its mid-term review, were the first to break ranks and challenge the assumptions of the project’s participatory development model. Secondly, the departure of key development brokers in the project’s partner agency in India disrupted the translation process that ordinarily produced coherence between the contingencies of practice and its representation. Lastly, a change of government in the UK brought a rival development policy into view, one that challenged the ring-fenced
project structure of the previous administration to one of working within state systems (2005: 193). This disarticulation between the preoccupations of the project and the new policy environment ultimately resulted in a “crisis of representation” for the project and the loss of the interpretive community that helped sustain it (2005: 179).

So why, it might be asked, have critical development evaluations such as the UNDP commissioned impact assessment report of the Ethiopian project summarised above, or RFHs concerns regarding the Gambian project, or the loss of know-how in the Benin project, not similarly resulted in a crisis of representation for the Barefoot College? The answer is not simply one of silence and ignorance, but also one of spectacle that helps translate the messiness of development practice into a coherent and bounded narrative.

While the projects in the Gambia, Ethiopia and Benin accounted for only a small proportion of the Barefoot solar projects undertaken worldwide, their failure to deliver should at least have given pause for thought at donor and partner level. The continued expansion of the Barefoot solar programme, however, indicates otherwise.

While Abdoulaye raised his concerns with Bunker regarding the sustainability of the project, he also continued (as per agreement) to send monthly reports back detailing the before and after effects of the introduction of the solar appliances. The reports detail the amount of money each family paid for kerosene, candles and torch batteries before the introduction of solar, and the subsequent savings made thereafter. Other quantifiable indicators of its impact detailed in the report include: the number of labour hours saved as a result, and the subsequent uses to which these have been put, plus reductions in snake and scorpion bites, and chest infections and falls. All of these impacts have subsequently made it into proposals, evaluation reports and videos produced by the College for partners and donors. They have been made robust and resilient through the translation efforts of the College.

However, during the course of translation - constructing and defining a situation, enrolling others to a cause, and acting as spokesperson for the collective effort of other actors - resistances must sometimes be overcome. Contrast the translation practices of the College as noted above, with the concerns thrown up by Abdoulaye to Bunker.
regarding the loss of skills and know-how of the BSEs, the breakdown of the solar equipment and the questionable sustainability of the project, and what we hear is silence. Likewise, the very worrying difficulties revealed by the UNDP report in Ethiopia, a report that not only raised the very real possibility of resource-based conflict as a result of the solar intervention, but noted in its concluding section that a rather “top-down approach” (2007: 55) had been undertaken in its implementation, contrary at every level, to the feted “bottom-up” Barefoot approach. Again, neither acknowledgement nor heed is shown, instead silence ensues. Thus, the translation of success depends not only on fragmenting reality and projecting it through spectacle, but also on ignoring those fragments that are left on the cutting room floor.

The translation efforts of the College were further aided by the unique structural conditions of the project. Unlike the DFID funded aid project examined by Mosse, the Barefoot College’s solar programme was funded by multiple donors. While the Indian Government funds the training and travel of the BSEs, funding for the solar hardware is met by various international partners. In the Gambian case, as I noted above, funding was provided by the Dutch development agency Stichting Het Groene Woudt and the North American based Skoll Foundation, while in Ethiopia funding was provided by the UNDP and Ethiopian Government. The College therefore operates on a decentralised logic, enrolling a wide network of internationally based supporters from a diversity of quarters. Without a central funding body dictating policy concerns or overseeing outcomes, it is easier for a Barefoot spectacle to sustain itself, even in light of apparent disjunctures.

Moreover, the vast expanse of the Barefoot solar network, as it replicates itself globally, provides tangible ‘proof’ in the eyes of supporters, that its model works. Each new solar project reifies the claims made by the College, thus providing further validation of its ‘success’. This is augmented by a strong overarching, predominantly visual spectacle that mystifies or black-boxes the messy and locally contingent processes involved, and instead presents a coherent vision of developmental change and transformation. The silences afforded such a spectacle by the subaltern selves of the illiterate African grandmothers from remote and inaccessible spaces only serves to strengthen the hand of the Barefoot
network. Thus, a combination of validation via replication, mobilisation of selective knowledges, structural organisation that pre-empts a comparative analysis emerging of the aggregate solar projects, a strong and robust narrative framework and the relative silence of competing accounts of project success, inevitably leads to a self-perpetuating Barefoot network capable of replicating itself even in light of conflicting accounts.

Concluding Remarks
In their study of an appropriate technology, de Laet and Mol (2000) suggest that its ‘appropriateness’ is defined by its ‘fluidity’, that is, of its boundaries, its working order, and its maker. Namely, despite its materiality, solidity and rigidity, the bush pump that the article is concerned with, is also fluid, flexible and, in a word, accommodating. Its adaptability in travelling to ‘unpredictable’ places depends on its ability to continue working when bits and pieces fall off, get worn down or are altogether replaced with different parts.

But this is not the end of the story, for this remarkable pump also helps in the process of nation-building through the development of an infrastructure for the distribution of clean water. Not only does it contribute to the health of a nation; it also generates a wide range of collaborative activities involving NGOs, government departments, universities, engineering companies, and of course the villagers themselves. The pump is thus a nation-builder, but the nation is also a pump-builder (2000: 236).

The Barefoot College’s solar lantern, however, can perhaps be likened to the anti-bush pump. Unlike the bush pump, when bits and pieces fall off, get worn down, or else are replaced altogether, the lantern is not amenable to ingenious patchwork repairs like our trustworthy bush pump. It is, in a word, unaccommodating to its users. The lantern was furthermore designed in such a way that pre-empted human intervention, particularly those qualities of ‘tinkering’ that contributed to the bush pump’s success as a ‘fluid’ technology. Moreover, as the Ethiopian case study demonstrated, the lantern became the anti-nation builder, contributing to increased levels of community tension and the very real threat of violence; quite a feat for our humble solar light.
However, a caveat might be inserted at this stage. Considering the lantern as merely an actor in a wider Barefoot solar network, one which seeks to scale regions, countries, globes, and people, then perhaps this broadened network might more closely resemble our fluid and flexible bush pump. When bits and pieces of its network fail to function, as the case studies described above reveal, the whole continues to hold its shape and function. The Barefoot solar replication programme is thus, an entirely fluid programme, one that manages to accommodate failing parts and unpredictable locations. By the same token, it also accommodates communities, by providing light temporarily at least – that helps engender an assorted array of collaborative activities between villagers, NGOs and governments. The flexibility of the solar programme thus generates its own robustness; neither failing batteries, absent skills, nor critical reports can dim its increasing glare.

This final chapter has explored the struggles and frustrations involved in the messy practice of replication and the movement of knowledge. I have considered not only the technical aspects involved, but the very human aspects involved in project failure, from misbehaving batteries, to misplaced skills, non-paying beneficiaries, and absent support networks. I have suggested, however, that successful replication is not bound by individual failings, but rather by the silence of those failings, the muting of some voices, and the consolidation of others, which in the process produces a coherent and mesmerising spectacle of success.

Postscript

I was recently in touch with Abdoulaye by internet telephone. We made small talk, caught up with each other’s news and enquired about work. Eventually, the subject of the solar programme came up. Abdoulaye mentioned that he had been out to the villages the previous week to check on the progress of the systems - the news was not good. Approximately sixty per cent of the systems installed in July 2009 are malfunctioning, he stated, with only one or two lanterns in each village still working from a total of 114. Abdoulaye reiterated that all four BSEs trained in solar maintenance
of the systems had lost all knowledge they had learned, with many of the villagers now coming to him to ask for his help in repairing the systems. Exasperated, he rhetorically asked me: “I know that they’re not working, but what can I do? I’m not trained in these things.”

In an unusually frank assessment, Abdoulaye proceeded to outline the main problems with the project as he saw it, including an inability to procure appropriate replacement parts for the faulty lanterns in the Gambia, and as before, the unsuitability of illiterate grandmothers to be trained as solar engineers. The Barefoot College in India, he stated, was his only contact for specific replacement parts, but which had, until very recently, failed to acknowledge his e-mails for help. Abdoulaye stated that previously, the College in Tilonia had ignored his requests for help, but that two months ago Bunker had contacted him to propose electrification of five more villages in the Gambia. Abdoulaye, somewhat incredulously, asked how he could propose a new programme of solar electrification when he is well aware of the shortcomings of the present one: “Why start something that doesn’t last?” He stated that he would only agree to the new proposal, if he could send literate, educated, young men and women. Abdoulaye then began to express his own views on the programme, and why such proposals were being mooted. He stated, rather forcefully, that Bunker “convinces the world to get the money”, further: “If he goes to the donor conferences, he convinces these people that he’s training these grandmothers as solar engineers. You train these women as solar engineers, and it’s a miracle they say!”
Conclusion

The Frayed Edges of the Spectacle

As Crush (1995) has perceptively noted, "Development discourse can do without its history but not its geography for, without geography, it would lack a great deal of its conviction and coherence" (1995: 14). In the movement of development knowledge, the ways and means by which it traverses cultural and spatial geographies, achieving different dimensions of resonance, a great deal of cultural work is needed for it to be both convincing and credible. Development work likewise relies upon particular images, metaphors and material mobilisations to define what it is and does, to convince and enrol others of its efficacy. In their quest for legitimacy, development organisations assemble and mobilise diverse arrays of materials, people, landscapes, territories, and concepts. Often, these resemble theatrical performances complete with stages, characters, plots and props. Through the assemblage of these different actors, their confluence through practice, they are made to perform different scripts and dramas reflecting and generating powerful hopes, dreams, desires and fears. Development work at the Barefoot College as enacted through marginalised persons and material orders, act to perform certain utopian visions of progress, enlightenment, social change and the nation-state. However, the Barefoot College as a development institute that relies on continued funding and support from globalised donors and interpretive communities (Mosse 2005) must also mobilise and make visible these heterotopias within different national and global spaces of becoming. I have argued that it achieves these effects through the spectacle of development, and the silence and ignorance that this spectacle entails.

Throughout this thesis, I have suggested that development knowledge is sustained though the material performance of objects, practices, narratives and people, and the ways in which they are mobilized and made coherent within historically and socially specific realities. However, such knowledge, I have argued, is also managed through the
concomitant spectacle, silence and ignorance of its diverse interlocutors. It is within these spaces, through the silence and ignorance of some voices, and the spectacle and elevation of others, that success is realised. Within the entanglements I have discussed so far, such success can perhaps be likened to occurring on the ‘frayed edges’ (Bray 2012 personal comm.) of the spectacle.

In the final chapter to this thesis, I referred to Anna Tsing’s (2005) account of the dramatic rise and downfall of Bre-X, a gold-prospecting company that invoked the hopes and dreams of investors through the dramatic spectacle and performance of the possibility of gold. In this “magic show” of meanings and symbols, masters of finance conjured up universal appeal and global scales of deployment (2005: 57). This thesis has similarly explored the conjuring of new worlds, new people, and new hopes. Not, in the main, for unrivalled profit, but rather, in the belief that progress and development is both imaginable and desirable. However, it is in the gaps and fractures of these worlds that this success was made possible. Spectacles and dramatizations tell only half of the story. Success, for the Barefoot College, was made possible on the frayed edges of such spaces; where hopes and dreams fall prey to ignorance and silence.

In modern day India, a land undergoing unprecedented social, economic and cultural changes, development efforts offer a particular kind of window through which to view and reflect upon these transformations. I have argued throughout this thesis that conceiving of the Barefoot College as a site that generates utopic spectacles, in the process connecting a diverse range of human, material and conceptual actors, which it then mobilises and deploys through different materialities, allows us to think about the kinds of dreams and desires that are being cultivated in this emerging space. In the following, I briefly summarise my arguments thus far and discuss what kinds of hopes and dreams are being made manifest, yet also ignored and silenced through the heterotopic entanglements of the Barefoot College.

In every culture, throughout history, Foucault states, there have existed heterotopias. Heterotopias enact the Other to everyday existence. They provide us with the hope and comfort that alternative social orderings and ways of being are possible. Heterotopias, thus, serve the purpose of reassurance. The Barefoot College is one such place. It
reminds its audiences in India and beyond that notions such as caste and gender equality, social transformation and self-empowerment are possible and worth pursuing. However, heterotopias as demarcated sites existing on the frayed edges of society are only able to perform this function because of their marginality and Otherness. They are permitted to perform this role, because ultimately they do not pose a threat to the existing social order. It is enough that they are seen to enact a possible utopia, an alternative way of being, and through this we can safely invest within them our hopes and dreams of a better future. The audiences of the Barefoot College, their donors and funders, in a way need to believe that their investments are sound and secure, and through that need, through that want, cracks and fissures go unnoticed and ignored.

For Foucault, the heterotopia can be likened to a mirror. The mirror, he states, is in a sense a utopia, for it is a placeless place, an unreal place, a place that produces a virtual space of representation and surface reflection, one that cannot be grasped, but one that has effects on our bearing (1986: 24). However, the mirror also exists in reality, as a material device generating a parallel and converse position to the subject standing before it. It is from the mirror that the subject discovers both absence and presence, revealing at once the unreality of the image, yet also disclosing the material worlds surrounding and framing it. The heterotopia of development at the Barefoot College is likewise comprised of images, reflections, and representations, but also of material assemblages of persons, things, technologies, practices and concepts that extend outwardly through spectacle, connecting the nation, the development world, the market, the environment, public consciousness, past, present and future (Venkatesan 2009: 92).

However, heterotopias such as the Barefoot College must also circulate and make known its visions and dreams to wider audiences, it must translate and mobilise these enterprises to attract donors and supporters. I have suggested that the College reflects back these more global and universal concerns from self-transformation and social change, to the replication of knowledge and energy production through a spectacle of development. The College, in this way, is a purveyor of hopes and dreams. Like a mirror reflection, however, something is always lost and gained in the spectacle. To achieve its resonant effects, the spectacle, like a mirror, must frame and hence cut out certain
features in order to detach itself from the local conditions of its production, and make itself applicable across different spaces and domains. The spectacle that is mobilised, then, is always a partial spectacle, the networks of which it is a part, from local ways of doing, national infrastructures, politics and economics, must be screened out and left behind. Everything beyond the frame of the mirror must be denied its place in the spectacle, if it is to achieve significance and authority for different audiences. Such framings echo Ferguson’s (1994) account of development as the production of depoliticized technical solutions that screen out wider structural realities. In reference to “undeveloped” regions of the world, Debord similarly notes that the spectacle does not just dominate these areas economically; it also dominates them as the “society of the spectacle ... to invade the social surface of every continent” (1967 section: 57). Through the framing of indigenous agendas, pseudogoods to be coveted, and the intimation of false models of revolution, all are part of a global spectacle that shapes and preserves the existing order as a whole. Thus, as Debord notes, even dissatisfaction with this order becomes a commodity with the spectacle providing the illusory and commodified means with which to address it (section: 59).

I have also stated that in the production and mobilisation of spectacles, something is gained as well as lost. The spectacle, as I noted in the introduction, is not simply a collection of images, but also a social relation between people mediated by images. When heterotopias are then mobilised through materialities and modes of representation, something is also transformed in the audiences of such spectacles. The spectacle, I have suggested, is not simply an illusion, but is rather a complex assemblage of different materialities that reconstitutes and re-shapes relations between its audiences, producing real and distinct effects. The spectacle, amongst other things, produces myriad financial flows and movements; it generates people, technologies, and development programmes, in the process eliciting money, hope, promises, and controversy; the spectacle, in short, acts. However, in viewing these heterotopic spectacles, investing them with our hopes and dreams and fears, we allay our own anxieties about “what is to be done” (Ferguson 1994) and in that process, in that space that is just out of reach, yet which seems so close and affective because of the spectacle,
the status quo remains. The spectacle, thus, as a mediator of heterotopias of
development, allows its audiences to be within touching distance of social change, and
yet pre-empts any realistic means by which it can be achieved.

Of course, theoretical formulations are never impermeable; generative power lies in their
potential for revision and modification. I have suggested that through a reconsideration
and expansion of spectacle to encompass the materialites, hopes, dreams, and silences of
development, new and novel ways for thinking about development may be deduced.
The question remains, however, what has my account of these spaces of spectacle and
silence done to advance the study of development?

Perhaps, first and foremost, I suggest that this thesis has advanced new ways for thinking
about the study of development as an anthropological subject, rather than as a purely
developmental concern. Following Venkatesan and Yarrow (2012), I hope that this
thesis has revealed the limits of an anthropology of development conceived in such
terms, and instead has demonstrated the heterogeneous ways in which development may
be approached by anthropology, and what anthropology may do to elucidate its
endeavours (2012: 16). Attending to the complexities of development through
anthropological understandings, in this case, a focus on the materialities of development
offers up, I suggest, a more nuanced account of the ways in which development is made
to work. As also suggested by the authors above, moving beyond "ideologically charged
rhetoric" to consider what development can mean in different scenarios, may lead to
more productive insights into what shapes and moves it (2012: 17). Thus, I have
attempted to account for the making yet also the meaning of development through
heterotopic spectacles, which builds upon and expands previous work on the discursive
constructions of development, its dreams, ideals, and imaginings, and complements this
with the methods and materialities by which such constructions are given shape and
vitality. This thesis, I suggest then, offers new descriptive and analytic potentials for the
ways in which development may be thought about and approached (how it works, how
it is sustained, and what makes it successful). As Yarrow (2011) notes, post-development
scholars have mostly attempted to elucidate the political and discursive processes by
which development occurs, thus uncovering the external realities and backdrops that act
to shape and govern it. This thesis has attempted something more modest, yet, at the same time, something that I hope will have an effect on existing formulations of development. Through my own 'uncovering', I have tried to demonstrate not a singular or definitive 'truth'; rather, I have striven to show the means and ends through which different assemblages of people, materials, and concepts are mustered together in the name of development, and how this generates the success required to maintain it. Perceiving development not as an abstract or overarching body of knowledge, but rather as a materially constituted spectacle comprised of an assemblage of different things and people, serves, I propose, to call attention to the grist yet also the mill of development work and the generative potential that actors and actions play in its composition.

The Barefoot College is not unique in its strategies and practices; the use of various forms of media and materialities to publicise work done is common to most development organisations today, indeed, it is this common thread that allows this research to be applicable in different areas. However, conceiving of the College as a spectacle making heterotopia highlights the ways in which a nexus of civil society organisations, private enterprise, the state, and the media are beginning to play an increasingly prominent and interwoven role in the design and implementation of aid strategies of the future. In this conceptualisation, development becomes progressively ensnared within ever-denser networks of technology, mass-market consumerism and market-driven approaches to poverty alleviation. In terms of the future impact of the spectacle, the Barefoot College can thus perhaps be seen as at the vanguard of a new phase in development, one in which media-rich spectacles help to reconceive the disenfranchised and poor of the world not as victims in need of aid, but as empowered consumers for emerging new markets.

Indeed, this is the thrust of C.K Prahalad's argument in his highly influential book *The Fortune at the Bottom of the Pyramid* (2005). Prahalad suggests that the four billion people of the world living on less than two dollars a day - the so called "Bottom of the Pyramid" (BoP) could conceivably be approached by large multi-national corporations (MNCs) as a potential multi-trillion dollar market, as customers on an equal footing and in the process create needs and products around the predicaments of poverty.
Prahalad terms this a “win-win” (2005: 3) scenario, partnering the innovation and distribution networks of the private sector to the needs and desires of the global poor, at once providing appropriate solutions to poverty and generating immense corporate profit. An important component of this new economic model, Prahalad argues, is the role that NGOs play in unlocking these new markets. NGOs, he suggests, have deep local knowledge and awareness of how these potential new consumers think and act. They act at the interface between the poor and needy and private sector interests, providing authority, credibility, competence and commitment. Taken together, these interconnected parties, the consumer, the private-sector firm and the NGO form an “ecosystem” of market development “converting the poor into consumers” (2006: 16).

Thus, the heterotopic development spectacles, as produced by the likes of the Barefoot College, may be seen as merely the tipping point for a new, market-driven approach to development, one that acts to commodify previously non-colonized aspects of social life (Best & Kellner 1999: 133). Such processes are propelled by a commercialized media culture, one whose spectacular claims serve at once to pacify and depoliticise the subjects and problems of development. The spectacle then, as Debord foresaw, constantly expands the profits and reach of capitalism, mollifying and distracting its subjects with new products, new needs, and ultimately new anxieties.

In thinking about what my own theoretical formulations may have contributed to an anthropology of development, how might notions of the heterotopic spectacle contribute to, or throw new light, on studies of development? Perhaps the most obvious example to turn to is David Mosse’s Cultivating Development (2005), an ethnography of a development institute that also explored the production and management of success, and one that this thesis not only drew upon, but hopefully augmented. Mosse, as noted previously, provides an ethnographic account of the establishment and development of a ten-year aid project in India funded by DFID (the UK Department for International Development) and charts the implementation of the project from its design, through to field practices and evaluative outcomes. His conclusion, in short, is that ‘success’ is generated through a stabilized narrative of events via the enrolment and continued support of an ‘interpretive community’. When the frame of success changes,
as he describes in chapter eight, through a shift in UK development policy, key actors no longer have control over the representation of events, new networks must be forged, and in the disjuncture between policy and practice, the project is seen to fail. Failure, as Mosse states, “is not a failure to implement the plan, but a failure of interpretation” (2005: 182).

Mosse’s account has been recognised as providing perhaps one of the most comprehensive analyses of the web of social relations, power dynamics, and internal politics that help to shape and sustain international development policy. Nevertheless, his account perhaps overlooks to a degree the distinct role that material actors play in constructions of development success, the agency they display in convincing and enrolling supporters to a project’s cause, and the kinds of spectacles that they help to generate and project. Through the application of a heterotopic spectacle lens to the analysis, different imaginings may bring different elements, into, and out of, focus. For example, as I have suggested throughout this thesis, different materialities produce different effects, each has its own reach, influence and impact. As part of its repertoire of stabilisation, the project that Mosse was aligned with employed marketing tools, including posters, audio-visual productions, workshops and seminars, and structured visits to the project that convinced and helped verify donor personnel of its efficacy. As I documented, such tools and techniques were of course also common to the Barefoot College. However, first-person ‘witnessing’ of project success has a resolutely dissimilar reach to written materials; likewise, electronic resources circulate to a far greater degree than pamphlets and brochures do. Furthermore, the project incorporated into its repertoire of solutions to development, various technical improvements: seed treatment, methods of fertiliser cultivation, crop protection, water conservation techniques, and irrigation efficiency. Attending to the spectacle that such objects generate, and to the heterotopic meanings they prompt and provoke, would perhaps provide innovative ways for thinking about the entanglements of material objects and the ways in which they act to shape and circulate constructions of development success.

Likewise, adoption of a heterotopic framework may have enabled further examination of the aid recipients themselves, the Bhil villagers, and the kinds of utopian dreams that
they were drawn into. Mosse shows how the stereotypes and simplifications by which the project approached the villagers, from a ‘wild’ and uncultured “people of the forest”, to marginal and excluded people worth protecting, were a product of historically constituted representations forged by dominant others, including colonial administrators, Gandhian nationalists, contemporary politicians, and rural development agents (2005: 54). Following Venkatesan (2009), analysing these constructions as a heterotopia, allows an understanding of how certain assemblages of people, environments, and things are brought together and contrasted to the “problems” that they seek to address (2009: 79). Thus, the Bhil people, conceived as a heterotopia, served a variety of interests and agendas throughout history, reflecting the changing visions and discourses of dominant people and institutions. Furthermore, exploring how these assemblages are projected and circulated as spectacle highlights the ways in which such visions are made to move and travel and thus gain currency as part of national and global imaginaries.

Similarly, conceiving of the fieldwork site as a heterotopia that encompassed new and expanding forms of governance, partnership, modernisation, market building, and nation building also brings to light the various institutions that are assembled in the name of utopian visions of progress and development. These actors included: international aid, cultures of expertise, and new forms of managerialism (DFID); private enterprise as partners in rural development (KBCL, a national fertiliser cooperative); the intended recipients of the project itself (the Bhil villagers); and the Indian state. This one site contained a diversity of actors, each with their own interests, hopes, dreams, and desires. Lastly, the kinds of silences that these complex assemblages produce that structurally and impersonally mute some groups (e.g. the Bhil people), whilst giving prominence to others, might further have been probed.

Indeed, this last point highlights the tensions inherent to the theoretical framework of this thesis and development institutions more generally. That is, how Foucauldian forms of discursive power interpenetrate with the structurating silences of the spectacle, which enables some social actors, such as Bunker Roy (the “masters of finance” in Tsing’s (2005) terms), to mobilise and modify the historical conditions within which they
operate. Such tensions, however, between the acting social agent and determining structural context, only exist when such dualisms are adhered to. As the chapters in this thesis have demonstrated, and as I noted above, employing such binary divisions does a disservice to the complex assemblages, the impure entities, and the fibrous webs of humans and material objects that extend out and fill the voids between these domains. These proliferating entities are made and remade, expanding and contracting in response to changing circumstances and configurations. However, as I have tried to show, some actors are, to a degree, able to pull the strings themselves, identifying opportunities and circumstances, and persuading other actors to share and defend their goals. Different chapters of this thesis have demonstrated the strategies that these actors employ, from the translation of an architectural project, to the reassembly of history, and from the retelling of a domestic solar narrative to the transformation of subaltern women to modern-day village entrepreneurs. Attending to the ways in which these dramas are made and re-made by utilising various forms of media, materialities, images, narrative, and silences, highlights the range of devices employed by contemporary development institutes and the active role they play in constructions of success.

This thesis has argued that through the spectacle of these assemblages, through their dissemination by an electronic media culture, the disordered and chaotic spaces of development are fragmented and concealed from view. However, this thesis is also part of the spectacle. As Mosse (2005) has noted, ethnographic representations are also part of the world they describe, contributing to the conceptual and interpretative work of development (2005: xii). As performative devices, they contribute to the spectacle and in that process also cut and fragment particular viewpoints. What then are the limits to this thesis? Which spaces have I left behind in my own framings?

One area in particular that I have not addressed and that points simultaneously to the bounds of this thesis, as well as future research possibilities, is audience receptivity to the spectacle of development. This thesis was relatively site specific, and themes were explored from the particular position of understanding the spectacle through the unveiling of it. An assessment from the position of the audience receiving the spectacle was therefore beyond the frame of this research. The College's success as a purveyor of
spectacles of development was apparent through funding, adulation, multiple awards, and its ability to keep functioning in light of conflicting evidence; as such, audience receptivity to its spectacle was manifest and self-evident. However, why this was so, what elements were deemed attractive to donors, funders, and supporters was not explored due to my own choices and framings. Of course, part of the success of a development organisation, as this thesis has argued, is down to the extension of networks and the enrolment of people and their interests. However, as Mosse (2005) so ably demonstrated, when individuals disconnect their interests from the interpretation of the problem as posed by the development body, failure is seen to result. Thus, development audiences can also reject the interpretations offered by organisations. Further inquiries into the spectacle of development would benefit from a consideration of why certain development projects are deemed attractive and deserving of funds, and indeed, why others are not. Such funds of course contribute to the success of the College, further reifying and augmenting its place in the spectacle of development. Why this was the case, what desires and hopes moved its audience of funders and supporters would be a question for future research.

In conclusion, this thesis has argued that the Barefoot College managed and maintained a construction of success through heterotopic spectacles that helped to validate, authorise and augment its operations for the continued expansion and reification of its claims. Supporters are enrolled, scripts are determined, and dominant narratives are mobilised through the translation of on-the-ground actualities. However, the success of such efforts was predicated upon the silence of certain interlocutors which allowed a dominant institutional spectacle to emerge. Despite the fact that the knowledge performances claimed by the College were regularly found to be wanting, in the workshop and in their enactments on the ground in India and Africa, the College continued to be represented as a model development provider of skills training and sustainability.

Through the ordering and re-constitution of marginalised persons and materials by the College, new assemblages were re-defined and connected to 'distant' and global concerns of underdevelopment, empowerment, social change, and environmental destruction.
The Barefoot College is a site that skilfully interweaves these themes side-by-side, not only reflecting, but also enacting shifting development discourses and changing political landscapes. At different points in time, the College has reflected different priorities and policies, and yet has also amalgamated and re-constituted these within the specific material relations produced by its heterotopia of development. Thus, in the conjuring of new worlds, ideas of development, progress, self-reliance, and technology for change are made manifest and visible to viewing audiences reflecting back their hopes and wants, yet also concealing their fears and despairs.

I discussed earlier the mirror-like qualities of heterotopias, their ability to reflect and frame partial cut-outs of broader society to reveal the other worlds of our existence. Spectacles are also imbued with reflective characteristics that serve to produce and mobilise fragmented views of reality. However, whereas Debord saw the spectacle as a sleep-inducing pacifier, keeping individuals passive and submissive rather than active and reactive, the spectacle today, augmented by new social participatory technologies and shifting political, social, and economic realities is by contrast more interactive and collaborative than ever before. Through my own re-reading of Debord’s spectacle, I have suggested that such fragments do not induce a passive acceptance to be viewed rather than engaged with (Debord 1967 section: 2), but rather act to mobilise, circulate and reassemble complex new pathways that may have unforeseen and unexpected results. The task for future anthropologies of development, for any anthropology for that matter, is to expose and reveal the frayed edges of these new assemblages.
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Appendices

Appendix A

BAREFOOT MODEL RURAL ELECTRONIC WORKSHOP (REW)
(Solar power supply of 300 Watts plus fabrication tools and testing equipment. Stocking of electronic components for repair and maintenance of 100 solar lighting units and 100 solar lanterns for 5 years).

<table>
<thead>
<tr>
<th>Solar Items</th>
<th>Specifications</th>
<th>Unit Cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>300W Solar Power Supply</td>
<td>300W 12V DC/ 220V AC 4 SPV Panels of 75 W each, 4 Tubular Batteries 12V 75 Ah, Electronic Charge Controller, Inverter and others</td>
</tr>
<tr>
<td>2</td>
<td>2 Set Tool - Kits</td>
<td>4 Multimeters, 2 Mini-tool kits, Circuit Testing machines, Jigs, Solder Irons</td>
</tr>
<tr>
<td>3</td>
<td>Electronic components</td>
<td>Spares for 100 houses solar lighting units and solar lanterns</td>
</tr>
</tbody>
</table>

UNIT COST OF REW $ 5,007

REW – Rural Electric Workshop: Solar Power Supply & Equipment Breakdown:

1. SPV Module 12 V 80 Wp
2. Battery 2 V 600AH
3. Inverter 48 V/ 220 V 3 KVA
4. PV Stand
5. Electronic Charge Controller 48V 40 Amp
6. Wiring Kit, Junction box, MCB, Lugs Plug point
7. Spanner Adjustable
8. Nut Driver 7.0 mm
9. Nut Driver 5.5 mm
10. Component Rake 24 drawers
11. Testing Machine DC Power Supply
12. PCB Assembly Jig ISO2

Items
1. Electronic Blast 15 W
2. Hydrometer
3. Soldering Iron (230V AC)
4. Spanner Set 16/17
5. Spanner Set 12/13
6. Spanner Set 10/11
7. Spanner Adjustable
8. Wire Cutter 06
9. Wire Stripper & Cutter
10. Utility Cutter (Knife)
11. Long Nose Plier
12. De-soldering Pump
13. Screw Driver Set Taparia 840

Mini Tool Kit BSE
1. Multimeter Digital Meco 801-L
2. Plier 1621-6 Taparia
3. Tweezer
4. Taparia
5. Wire Stripper & Cutter
6. Long Nose Plier
7. Utility Cutter (Knife)
8. De-soldering Pump
9. Screw Driver Set Taparia 840
Appendix B

Barefoot College Tilonia
(SWRC)
Trainee Profile

Profile Photo

1. International: National

2. Country: Course: ITEC SOLAR TRAINING

Period of Training (Date/Month/Year):

3. Sent by (Name of Organisation):

4. Full Postal Address:

5. Contact Person:

6. E-Mail: _____________________ Phone:

7. Name of Trainee:

8. Age: Ethnic/Tribe/Education:

9. Language(s) Spoken:

10. Name of Village: Region:
11. Husband's Name: 

12. Occupation: 

13. Annual Income: Source________________________ 

14. Land: DRY LAND/WET LAND  House: STONE Mud__________ 

15. Children (How many): Grandchildren: 

16. Going to School (How many)_________ Not Going________________________ 

17. Animals (Cow): Goats: 

18. Unskilled Wages paid per day 

19. Drinking water Source Wells______ Ponds______ Hand pump______ Tap: 

20. Distance from house__________ 

21. Distance of Village from Electricity Grid________________________ 

22. Distance from Capital__________________ 

23. Cost of kerosene in the village________________________ 

24. Any other relevant information__________________________________________ 

__________________________________________ 

__________________________________________ 

__________________________________________ 

25. Name of Person who filled the Form__________________________________________ 

Date:_________________________ Signature 

ITEC 
VILLAGE SURVEY 

BASICS 
VILLAGE NAME: ______________________ DISTRICT: 

303
STATE/REGION:          COUNTRY:
CURRENCY:            VILLAGE CHIEF:
TRIBE:                LANGUAGES SPOKEN:
NUMBER OF CLUSTERS:  HUTS PER  
CLUSTER(AVERAGE):
THATCHED:  TIN:
NUMBER OF FAMILIES:  MEN:
WOMEN:
HOUSES ELECTRIFIED:  NON ELECTRIFIED:

SERVICES
NO. RWH STRUCTURES IN SCHOOL:
SCHOOL (PRIMARY/SECONDARY):
CHILDREN COME FROM WHICH VILLAGE(S):
HEALTH CENTRE HOW FAR:  POST OFFICE:
BUS CONNECTION:  MOBILES:
WHERE CHARGED:  DISTANCE:
DIESEL PUMP:  DIESEL GENERATOR:
COST OF DIESEL:  DISTANCE FROM VILLAGE:
TELEVISION SETS:

WATER
MAIN SOURCE OF DRINKING WATER:
(OPEN WELL/RIVER/CANAL/HANDPUMP)

RAINY SEASON:

LIGHTING
<table>
<thead>
<tr>
<th>NAME OF OIL LAMP:</th>
<th>LANGUAGE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEROSENE CONSUMPTION MONTH/FAMILY (LITRES):</td>
<td>DISTANCE FROM VILLAGE:</td>
</tr>
<tr>
<td>COST LITRE/BOTTLE:</td>
<td>SOURCE:</td>
</tr>
<tr>
<td>WOOD CONSUMPTION/MONTH:</td>
<td>COST:</td>
</tr>
<tr>
<td>TORCH BATTERIES:</td>
<td>COST:</td>
</tr>
<tr>
<td>CANDLES:</td>
<td>COST:</td>
</tr>
<tr>
<td>HOW FAR TO ELECTRIFIED VILLAGE:</td>
<td>COST PER UNIT:</td>
</tr>
<tr>
<td>NAME:</td>
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<tr>
<td>ADDITIONAL INFO:</td>
<td></td>
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</tbody>
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Appendix C

TRAINING CURRICULUM: for BSEs

A six month Solar Energy Curriculum of solar electrification of poor remote households for Domestic Lighting in remote inaccessible rural areas.

The trainees and trainers are self-taught at the Barefoot College. The following is a six month solar electrification practical syllabus is to be learned by the rural semiliterate women in the World:

1st Month:

- Introduction of Solar Panel (SPV) lighting system, Rural Electronic Workshop (REW) tools and equipment.
- General concept of SPV Panel- generates electricity for lighting when it is exposed to sun light and maintenance of the battery is a essential component of Solar Unit to accumulate solar power for lighting in the night.
- Proper Connections of SPV to Battery and electronic charge controllers (Parallel & Series).
- Knowledge of Printed Circuit Boards (PCB) for lamp inverter to change Direct Current (DC to Alternate Current ( AC) for CFL tubes and charge controller for controlling under and above current supply to battery and lighting units.
- Fabrication of the lamp Inverter circuit and function of the various components of the lamp.
- Winding transformer coil, fixing electronic components on the inverter of PCB, soldering PCB connections and its efficiency testing of required flow of current in the circuit for charging CFL tube.
- Setting-up of solar power supply unit of 300Watts for Rural Electronic Workshop (REW), using regulated power supply and its general regular repair and maintenance.
- Functioning and use of the Multimeter and Circuit Testing Unit
- Familiarization with the maintenance of the Solar Power Plant.
  Cleaning the solar panels and battery. Measuring gravity of the battery’s acid.

2nd Month:

- Training on the fabrication of Solar Lantern-and its circuit, circuit of CFL’s
  Knowledge of the components in the Solar Lantern
- Understanding of the Colour coding scheme for finding resistance Circuit in the Solar Lantern
- Testing the circuit of the CFL and the Solar Lantern
- Repair and maintenance of the Solar Lantern in the field
The trainees fabricate a total of 100 circuits for the solar lanterns

3rd Month:
- Training on Solar Fixed Unit- Panel, Battery, Lamp.
- Understanding of Volts and Ampere and how to measure it.
- Exercises on parallel and series connections.
- The trainees fabricate a total of 100 circuits for the CFL

4th Month:
- Fabrication of the circuit for the Solar Lantern
- Familiarization with the fault-finding process of the Solar Lantern
- Charging of the battery

5th Month:
- Fabrication of Charge Controller circuit of 12V 8Ampere
- Assembling and testing the Charge Controller
- Familiarization with the fault-finding process of the Charge Controller

6th Month:
- Practical installation of the solar panels and connections to the battery through Charge Controller
- Practical training in connecting charge controllers and invertors
- How to establish a Rural Electronic Workshop(REW)
- Operation and maintenance of the REW

Note: No CERTIFICATE will be issued to the trained BSE.