LOCAL BACTERIA, TRANSNATIONAL LABORATORY: THE POLITICS OF CHOLERA RESEARCH IN BANGLADESH

by

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ABSTRACT

This work explores ways in which a situation of endemic cholera, the emergence of humanitarian science and the marginality of nation-state are mutually constitutive in Bangladesh. Reconstructing parallel histories of pain and suffering of a cholera stricken population and humanitarian science, I have argued that violence and vivisection is endemic to this co-construction process. I examine the paradoxes of humanitarianism and contradictions of public health policies at length, looking particularly the promotion of bacteriologically safe water and its consequences. I suggest that the structural condition under which a cholera epidemic becomes a manageable health problem itself inflicts an unmanageable health problem – the arsenic disaster. In Bangladesh, the declining of child mortality due to diarrhoea coincides with a biosocial situation in which incidences of arsenicosis alarmingly increases. I have shown here that scientific discovery happen in the postcolonial context at the cost of creating new forms of social suffering.

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Most probably it was 1996, Mirza Taslima Sultana and Sayeed Ferdous, faculty members of department of anthropology, presented a paper on the politics of research of the International Center for Diarrhea Disease Research, Bangladesh (ICDDR,B) drawing from their experience as researcher with the Center. The paper was presented in the weekly departmental seminar. My interest in this research project grew out of the many conversations took place in that afternoon seminar. I am thankful to the presenter and all the participants of the seminar for introducing the research subject, a social issue that I have become so passionate about over years.

My commitment to anthropological research and ability to envision a research with socio-political significance comes from the training I had in the Department of Anthropology, Jahangirnagar University. Rahnuma Ahmed, my mentor and *sakhi,* introduced me with many social theorists, it is with her I have learned how to act, negotiate activist, non-western agendas in the academia which is solely a western enterprise. My life in anthropology and my life in everyday world has become possible because she shared her's with me. Without, Shahidul Alam and Rahnuma Ahmed in my life, I could not complete any project.

This was a research project that I always wanted to pursue, but in the beginning, my thoughts about the project were scattered and disorganized. My supervisors, Dr. Stacy Pigg and Dr. Cindy Patton trusted me, read through many drafts of the research prospectus. When I came back from the archive with many ethical dilemmas, they shared

my anxieties and provided me with the academic techniques and tools to deal with the situation. Writing in colonial language was something that I have suffered most in the process of completing this thesis. During this anxiety-stricken process, they have been very patient and supportive. At the peak of writing this thesis, I had to rush back to Bangladesh because my mother was sick. Dara Culhane, Graduate Program Chair of the Department was supportive at that time. I am thankful to all of them.

Completing this thesis was one of the hard challenges of my life for many reasons and living away from Bangladesh is hardest of all. This distance was not difficult just for me; it was difficult for everyone important in my life. I took longer than they have expected me to finish this degree and during this prolonged writing process they all, my mother, my brother, Lupia, Khala, Jamal, Shilpi Apa and Chompaboti have been patiently waiting for my return. Without the loving support of my mother and my three sisters (Shomapu, Asfia and Lupia) it would not have been possible for me to finish this project.

In Vancouver, when I was packing my bags almost everyday to return to Bangladesh without finishing the degree, I met Usamah. His presence in my life in Vancouver fundamentally changed my experience and helped me to survive in a land where colonial language, in most cases, is the language of communication, where norms of the earlier colonizer are the standard of living. Then I met Kamal, Priti and Sandhya, their friendship and love made it possible to bear with the stress of writing a thesis.

During my archival work at the Center, staff from the library extended their help. It is with their support I found many rare historical documents otherwise hidden behind new publications. When I came back from the archive with handful of scientific reports, I

thought I would never be able to use and analyze these scientific texts. Harneet came to rescue me, he helped me every single time I needed help to understand a scientific or biomedical terms. Sometimes, he even looked at internet or in medical dictionaries and read through articles with me. It has been a long journey for me to finish this research project, on many occasions, I thought I will not be able to finish it, but Harneet never stopped trusting me. At the final stage of writing, Brian, my co-worker and friend, extended his help; practically did the formatting of the entire thesis.

During my stay in Vancouver, two women, Nasreen Huq and Anwara Mansoor, had died. Their life significantly influenced women's movements in Bangladesh. It was difficult to bear with this loss alone. What was even more sad that I was not there to mourn, to grief together with my friends, Shahidul and Rahnuma, whose life is deeply affected and changed by these losses. While writing this acknowledgement, I take a moment to remember them, to mourn for them.

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LIST OF ACRONYMS

AG	Awami League
AID	Agency for International Development Aid
BNP	Bangladesh Nationalist Party
BRAC	Bangladesh Rural Advancement Committee
CDD	Control of Diarrhoeal Disease (WHO)
DCH	Dhaka Community Hospital
DISC	Dissemination and Information Services Center
DPHE	Directorate of Public Health Engineering
HDSS	Health and Demographic Surveillance System
ICDDRB	International Center for Diarrhoea Disease Research, Bangladesh
ICMRT	Indian Center for Medical Research and Training
IPH	Institute of National Health
IRRI	International Rice Research Institute
IV	Intravenus
LGS	Lobon-Gur Solution
NAMRU	Naval Medical Research Unit
NIH	National Institute of Health
NIPSOM	National Institute of Preventive and Social Medicine
ORS	Oral Rehydration Saline
ORT	Oral Rehydration Therapy
PHSD	Public Health Science Division
PSCRL	Pakistan SEATO Cholera Research Laboratory
RDP	Rural Development Program
SAREC	SIDA's Department for Research and Cooperation
SEATO	South East Asia Treaty Organization
STD	Sexually Transmitted Disease
UBINIG	Policy Research and Development Alternative
UN	United Nations
UNICEF	United Nations Children's Development Fund
WHO	World Health Organization

GLOSSARY OF BENGALI WORDS

Anchar	pickle
Apa	sister
boroloker moylar baksho	garbage bin of the rich people. It is a satirical phrase used by urban proletariats to negotiate and explicate the structural inequalities.
Dajjal	impolite, harsh
Gamcha	a locally produced cotton fabric that working class men, particularly rickshaw pullers ties at their waist.
Ghomta	covering head with clothing
gur	local molasses, locally available brown sugar
jakkha	tuberculosis
jela	district
jibanu	bacteria
lobon	salt
ma	mother
Mama	uncle
mukti bahini	The armed liberation forces, which resisted Pakistani military aggression, consisted of commoners from all walks of life of the-then East Pakistan; they were known as the *Mukti Bahini*.
oshukh	illness
piri	wooden stool
sari	local women's everyday attire

sharbat	Home made cold beverages
Smritikotha	Notes from the memory
thana	Thana is a local administrative geographical unit that originated during the British colonial period.

PART I
INTRODUCTION

CHAPTER 1:
LOCAL BACTERIA, LOCAL PEOPLE

1.1 Setting up a Laboratory

"In this hospital we treat free of charge all patients with diarrhoea and study how to better treat and prevent cholera. All patients will take part in these studies for their own and their countrymen's benefit." So declared a banner at the inaugural ceremony for the Pakistan SEATO Cholera Research Laboratory. It was December 1960. Gathered at Dhaka's Institute of Public Health for the event were medical diplomats representing South East Asia Treaty Organization (SEATO) states as well as scientists from Japan and India.[1] They had come to attend a two-day conference organized in a "crusading spirit against cholera" (Conference on Cholera, 1960, p.5).

Scientists debated their views on the pathology and pathogenesis of cholera, medical diplomats shed light on why a defence organization was extending its hands to assist in the eradication of the disease,[2] and health bureaucrats of Pakistan expressed their gratitude to SEATO for regarding one of their health problems with such grave concern.[3] The banner displayed at the Laboratory's inauguration alerts us to the twin conceptual foundation of this enterprise: a promise to provide charity-based medical services on the one hand, and on the other hand, a call to cholera patients to participate in a research for the benefit of their countrymen. It is this relation between 'humanitarian science' (Greenough, 2004) and the development of the nation-state that I explore in this thesis. Both cholera and the science of cholera are localized, but the effects or 'benefits' are transnational.

Shortly after the formal inauguration of the Laboratory in Dhaka, scientists hurried to situate themselves in a second laboratory where they could study the disease in its "natural setting": remote villages. Laboratory workers in the lower ranks – whose only connection with the city was the job they had with the Laboratory, but were otherwise thoroughly rooted in village life – became instrumental in this voyage. It is through them the Dhaka Laboratory became linked to "the field" that would come to serve as a defacto second laboratory. After much discussion, the *thana* of Matlab was selected for this role. Matlab was considered an impoverished backwater. In 1963, when the national and U.S-based scientists started visiting Matlab frequently, there was minimum public health support; other privileges like electricity, primary education were available to a limited extent in the nearby districts. One of the Laboratory scientists, while describing his "first contact" (Smritikotha, 2003) with the Matalab field station, recalled, "if the speed boat that used to carry Dhaka team to Matlab ran out of fuel, we all had to manually row the boat to the shore and stay in the middle of nowhere waiting for the boatman to get some diesel from the nearest *Bazar*" (ibid, p. 51, 2003). A barge was used for the day-to-day management of cholera patients and conducting research activities, until a relatively rich resident of Matlab donated his land to the Laboratory.

From 1976 onward, visitors to the newly established Matlab field hospital of cholera research saw a metal signboard tied with a bamboo-beaded door reading: "This land is donated by Ahmed Ali Sarder to the Cholera Research Laboratory to establish a cholera hospital in Matlab. The Cholera Research Laboratory gratefully acknowledges his valuable contribution toward cholera research in Bangladesh." The gratitude

expressed to the donor for his contribution to cholera research activities in Bangladesh is a point that should be underscored.

People in remote villages like Matlab have hardly experienced any benefits of being the 'native subject' of a British colony. Their life struggles barely changed as the Raj moved from the colonial capital of Kolkata to the inter-colonial capital of Karachi. What association could they have had with the sovereign territory in order to decide on doing something for the sake of their country men's benefit? When the state is, in its citizens' imagination, still shapeless, what drives them to be part of a scientific project that has little pragmatic value for them?

It is this question that leads me to place state formation and emergence of the humanitarian science in the same analytical landscape. I have tried to understand how a situation of endemic cholera, the scientific advancement, and the marginality of Bangladesh as a nation-state are fundamentally interconnected. Rather than seeing any one of these phenomenon as a precondition for the development of another I treat them as each co-constitutive the other. Together they make each other.

1.2 Cholera and Colonial Governance

Historians of colonial science and medicine (Arnold, 1993; Harrison, 1994; Misra, 2000) show that in colonial India, epidemic disease became the locus for both scientific and administrative intervention. Warwick Anderson shows this for a later period in the Philippines (Anderson, 1995, 1998b). These historiographical works argue against accounts of colonial medicine either as pinnacle of colonial benevolence or as just another tool of empire (Ramasubban, 1988, Bala, 1991).[4] Instead, they attempt to unravel the interwoven history of colonial authority and the emergence of new disease theories

and sciences by engaging with the politico-administrative, scientific and clinical responses to epidemic diseases, particularly the cholera epidemic of the 18th and 19th centuries. David Arnold's monumental historiography *Colonizing the Body (1993)* is particularly revealing. Arnold shows that there was a traffic between India and the colonial metropole via western medicine. Medicine was integral to colonial conquest; mainly through the application of sanitary science, India had a role to play in the emergence of biomedical disease theory through tropical medicine. But for Arnold, explanations of colonial coercion are conceptually inadequate to understand the simultaneous (re)crafting of the colonizing process and the subjection of the 'native' body, an event that was instigated from the introduction and imposition of colonial medicine in India. "Colonial medicine," for him, "is an authoritative vehicle not just for the transmission of western ideas and practices to India but also for the generation and propagation of Western ideas about India (ibid, p. 291)."[5]

In colonial India, recurring cholera epidemics were at one level, a crisis for colonial administration. Its inability to protect its subjects was painfully evident in the high mortality rate within British army. Uncertainty among medical scientists and colonial administrators about the etiology of cholera exacerbated through the 19th century. At another level, the cholera epidemics became occasions for subjection and resistance – both transforming the native body as a site of biomedical intervention, and organizing local response to this assault on body (Arnold, 1993; Harrison, 1994; Das, Dasgupta, 2000a and Das, Das, Coutinho, 2000b). Robert Koch's discovery of comma bacillus on December, 1883 at Sealdah Hospital morgue (Brock, 1988) brought John Snow's theory of cholera into the center-stage of colonial governance (Speck, 1993;

Eyler,2001) resulting into the decline of quarantine sanitation policy in the colonial territories (Prasad, 1994). Sanitary science, tropical medicine and bacteriology – intellectual enterprises of the British colony – were gaining currency (Worboys, 2000). Colonial authority and power entered new territories and devised new means of exercising power on its subjects (Arnold, 1993; Prakash, 1997).[6] Local practices like *mela*, large gatherings for religious rituals brought under the sanitary panopticon, as authorities tried to control the mobility of *vibrio cholerae* by limiting the mobility of local people.

Global power dynamics changed with the end of British colonialism. The colonial epidemiologic site of the earlier eras was silently transferred to the hands of US scientists; with decolonization, state-authority was nationalized. The international development apparatus organized agents who became major players in governing cholera prevention/control programs. In Bangladesh, the Cholera Research Laboratory (CRL) took shape within these transformations – dismantling and reconstitution – that marked the decolonized era from its colonial predecessor. This thesis documents the complex processes that brought science and nation together in a particular way.

1.3 The Decolonized Sovereignty

The decolonization period for Bangladesh was prolonged. With the collapse of British colonialism, what is now Bangladesh entered into the regime of internal colonialism under Pakistan as East Pakistan.[7] The continued economic exploitation and brutal deployment of military forces revolutionized East Pakistan, leading to the war of independence of 1971. The legacy of colonial governance continued throughout the protracted period of decolonization. Public health continued to be the prime nexus of

governance for both the inter-colonial and independent state regime. However, the nature of governance and control was not identical in the two eras. The change that demarcates the postcolonial episode of public health from its predecessor is the political arrangement whereby state sovereignty and international governing bodies like World Health Organizations (WHO) and United Nations (UN) can coexist. In the context of cold-war political economy, execution of a new model of global governance was instrumental for US to sustain the colonial hierarchies but reconfigure the modalities of power (Escobar, 1995). The establishment of Pakistan SEATO Cholera Research Laboratory was part of this evolving political process. In addition, the Laboratory – through its systematic production of knowledge – not only ensured a western presence in Bangladesh but also circulated, made available language, vocabulary and rules of interpreting its political economic condition. In his critique of developmentalism, Escobar conceives this production of discursive strategies communicating with the past, present and future of a third world nation-state as the execution of regimes of representation – 'as places of encounter of languages of the past and languages of the present' (Rojas de Ferro, 1994 cited in Escobar, 1995, p.10).

During the intercolonial period, the official discourse of cholera was structured around three administrative and scientific concerns: installing an effective sanitation system, providing safe water, and improving scientific knowledge about cholera. From its early days, the Laboratory continued to produce detailed statistical and epidemiologic accounts of cholera, vital events of village life and its seasonal occurrences. This new set of statistical information did not comply with the discourse of "body odor or filth of the native subjects" (Prasad, 1997, p.243) characteristics of British colonial era; instead it

followed the discourses of international development. Safe water use, hand washing/soap use and defecation practices become the new parameters of understanding the status of local development.[8] Scientific and economic interventions like PL 480[9] and SEATO politically was rationalized through the production of this poverty narrative. The local experience of illness was exposed to particular interpretation and people in Matlab became subject to the production of these narratives. The development experience of Bangladesh was eventually considered as the master narrative of third world poverty. In other words, making its territory and citizens available for global scientific and development interventions and providing the global with the standardized language and vocabulary to tell stories of third world poverty, Bangladesh gained political legitimacy as a newly independent state. In the award ceremony of the first-ever Gates Foundation Global Health Award 2003, [10] it was claimed that the science of the Laboratory was a 'unique example of western science in a third world site' (ICDDRB Annual Report, 2003). It was also claimed that Bangladesh, as the host nation of this exemplary scientific institute including many other successful development models like Bangladesh Rural Advancement Committee (BRAC)[11] and Grameen Bank,[12] was becoming "the learning site for keeping the hopes alive for other equally less fortunate post-colonial societies with adverse initial conditions" (UNDP Millennium Development Goal, 1999).[13] It is the ability of Bangladesh to keep the hope alive for other newly independent states that defined the nature of decolonized sovereignty for it. In this thesis, through examining the ways in which the Laboratory gave meaning to cholera epidemic in Bangladesh and negotiated political legitimacy for Bangladesh, I have documented the affect of colonial governance in the formation of decolonized sovereignty.

1.4 Bangladesh: The Test Case of Development

In 1972, Henry Kissinger, President for National Security Affairs of United States, visited the newly independent Bangladesh; after his visit, he compared the situation of Bangladesh with a bottomless basket: not even a mouthful of international development investment could not change the future of Bangladesh. Many thought that this statement was the infelicitous remarks of a US security officer; the United States supported the Pakstani military regime during the war and opposed the idea of a Bangladesh state (Chowdhury, 1975). Conversely, international development activists like Faaland and Parkinson (1976) considered the socio-economic situation in Bangladesh as "a test case" to prove that development aid could bring positive changes, eradicate poverty if administered in a "constructive way" (ibid, p. ix). Local poverty, illness and social suffering appeared as a productive force that defined the nation-state and provided the Laboratory with scientific rationale to continue its international(colonial) presence. In the following chapters, I argue that Bangladesh, as a 'successful developing state' and the Laboratory, as a unique example of humanitarian science was co-produced and co-constructed. Documenting the paradoxes of humanitarianism and prosperity in Bangladesh, I show how social suffering has mediated these processes of co-construction.

My use of the analytical tool co-construction derives from Hacking's (1999) criticism of social constructionism. He argues that often social constructionist works are conceptually inadequate to accommodate the social processes that inform a constructed category. In his theorization construction is a "process takes place in time" (ibid, 37). In an allied way, I argue, in a given moment and context, a series of event constructs and

categorizes Bangladesh as a 'successful developing state' and this categorization propagates a series of consequences. It internationalizes the Laboratory into a third world population health research center, it turns a socio-political unit *thana,* Matlab into a scientific unit. Yet, authorities embedded within this category are momentary, temporal. Bangladesh's legitimacy in the global hierarchy as a successful developing nation is paradoxical. In the post-US invasion (2001) of Afghanistan, BRAC earned approval from global authorities to set up a BRAC Afghanistan. This act uplifts Bangladesh's political status in the global political hierarchy, because it is the beginning of an international non-governmental organization of third world origin. However, the recent uprising of Islamic militants in Bangladesh outshined the development successes, destabilizing its authority to speak over the future of other 'developing, underdeveloped nation-states'.

What is even more paradoxical in this celebratory idea of Bangladesh is that it accommodates elements of modernity and tradition, science and superstition, economic development and corruption at the same time. In this thesis, I will examine the role of the Laboratory in the constitution of the very idea of Bangladesh. To speak of the formation of India as a nation-state in its relationship to colonial science, Gyan Prakash, in his work *Another Reason (1999)*, addressed similar analytical concern. The constitutive relationship between colonial science and the Indian nation remained the mainstay of his historiographical account. Prakash's work documented the processes through which western scientific reasons are reinscribed in the local traditions to produce a unique Indian modernity. Both Prakash (1999) and Arnold (1993) underscored the point that the hegemonic affect of colonial science is locally specific, making an argument opposed to many studies of the hegemony of colonial and/or western science (for instance, Alvares

1988; Third World Network, 1993). These latter studies undermine the complicity of local elites and subaltern resistances in shaping the colonizing, hegemonic processes. The emergence of humanitarian science in Bangladesh, I argue, is not utter biomedical conquest of the local; rather my work shows how in actuality the biomedicalization is ruptured in nature.

On the question of local specificity of colonizing process, a debate took place within the history of colonial medicine. This debate enabled me to situate my work beyond the boundaries of geo-political territories of Bangladesh and allowed me to document the effects of humanitarian science for other donor and developing nation states. Warwick Anderson (1998a) asked whether by returning to the specific context of colonial science, we are "implicitly building a disciplinary enclave of nationalist historians of medicine" (ibid, p. 522). In the context of this disciplinary debate, it could be hesitantly said that in their works, Arnold and Prakash analytically restricted themselves to the national boundary determined by the same colonizing process that they criticize. In their theorization, the flow of science and technology is rather bilateral - from colonial metropole to colonized territory. The empirical reality in my research shows that the mobility of colonial science and technology follows a multilateral complex web. The discussion in the following chapters will describe the global transportability of ideas, practices, practitioners, disease and biological samples facilitated by colonizing and imperial process.

In keeping with this premise, science studies' critique of social constructionism made a particularly notable appearance. I consider the prodigious work of Bruno Latour, *Science in Action* (1987) as foundational in this theoretical development.[14] To

underscore the critical need of attention to 'science in the making' Latour outlined the rules of studying science. His proposition to follow science and scientists methodologically indicates ways to understand the relations of disjuncture between past and present, local and distant situations. Long before joining the team at Dhaka Laboratory, Robert Allan Philips, a US Naval officer worked with cholera patients in Egypt and the Philippines. In the Philippines, his experiment of rehydration therapy killed five patients; the loss of life made him apathetic to his experiment and he chose to discontinue. Several years later at the Dhaka Laboratory he resumed his research. Latour's suggestion to "knock the backdoor of science in the making not through the more grandiose entrance of readymade science" (ibid, p. 4) provided me with the analytical framework to understand this deterritorialized production of scientific facts (Appadurai, 1996).[15]

Latour, however, in his rules of studying science depicted an ideal, generalizable situation of performing Western science which doesn't explicitly take into account the transnational processes that *precedes* these scientific actions. I argue that biomedical research in the postcolonial context is quite distant from his ideal situation of scientific practices. I would further like to argue that while creating theoretical distance from constructionist dogma and romanticism of realism, his work may have proposed a methodological strategy which itself homogenizes scientific actions and science as a field of knowledge. The chapter that follows this discussion will elaborate my point on the theoretical inadequacies of his methodological propositions, but here I would like to underscore my main concerns about his work. His conclusion differs from his own framework of mutual production; in his empirical discussion he does not give equal

importance to the reciprocated process of science and modernity in the making. Scientific developments, in his analysis, outdo socio-political formations that accompany the former. Disregarding the possibilities of theoretical collaboration between social constructionism and science studies perspective, Latour has fostered an epistemic enclave which segregates the narrative of scientific enterprise from the narrative of other socio-political formations – most specifically, state formation itself, the mainstay of my study. Echoing Patrick Carroll (1996) here I would like to emphasize that the relationship between state formation and scientific enterprise has largely been ignored in science studies.[16]

Informed by the writings of science studies and the postcolonial history of science and medicine, in this thesis I describe the political order and the transnational scientific infrastructure through which humanitarian science, the postcolonial nation-state and a bacteria-dwelling subjectivity emerged in Bangladesh. To reconstruct the historical moments of cholera research I have conducted archival research at the Dissemination and Information Services Center (DISC) [17], the information storage system of the Laboratory (for a detail description of the data collection process, see appendix A). Upon entering the DISC, I realized the information storage system is itself the story that I wanted tell. Which documents collected dust inside the DISC and which documents graced the public discourse? This is the question that defined my interpretive quest inside the archive. My aim has been to read the story the archive is trying to tell by withholding and disclosing scientific information.

CHAPTER 2:
ARCHIVE AS MASTER NARRATIVE

2.1 History, Scientific Discovery and Archiving Practices

In an autumn afternoon of 2004, after crossing one of the busy traffic areas of Dhaka city, my auto rickshaw dropped me off at the large white entrance of the International Center for Diarrhoeal Disease Research, Bangladesh (ICDDRB). The Center is a kind of a misfit in that social space. Its main entrance faces the Institute of Public Health (IPH), a relatively old building with greenish algae on its wall. The algae and long-faded wall colors stands there as the proof of government and donor lack of interest in the development of a nationalized public health institute. The other entrance is for the Center's cholera hospital adjacent to Mohakhali slum. A very alert private sector security guard welcomes you on your first step inside the Center premise. Leaving both the IPH and the slum behind the wall, I entered the Center, and its spacious premises. The separate buildings centering the wide-open yard comes as something of a surprise to me when I compare it to my experience of IPH, where officers work in small rooms, at tables crammed one after another in a row. The security guard, satisfied with my answers, the security guard showed me the way to the DISC. There, another security guard was sitting at the front door with a register. I wrote down my name, institutional affiliation and finally entered the Library and the information repository of the Center.

The DISC is located right in the ground floor of one of the few buildings of the Center. In a big hall to one side is displayed the most recent publications of the Center and the latest collection in the library; on the other side of this big hall there are three

small rooms; one is occupied by the Head of DISC who is also the signing authority for approving Library memberships. The Head saw my membership form, accompanied with the letter confirming my graduate student status from Simon Fraser University, as I waited outside, near the reception desk. After a while, the library assistant from the front desk called my name and told me that the Head wants to meet me and I was directed to his office. He asked me a few questions about my university in Canada and the objective of my research, information that was also written in the letter. He was particularly interested to know what I meant when I said that in my research I wanted to understand the relationship between science and society. Over a cup of tea, we discussed my research project. He asked, if by placing science and society in the same analytical framework, was I querying about how science was contributing to the advancement of our society. I was nervous while responding, as I was aware of the hearsay that the DISC is cautious and meticulous in giving outside researcher access to its facility. But it was not necessary that my answer satisfy him, for my North American graduate studentship had already proven me to be an obvious ally of the Center. He did not wait for my answer; he just signed the form. And I gained permission to use the services it offered to the public health researcher community.

The other two small rooms of the DISC was used for the management of ongoing publications as well as the storage of scientific protocols, copies of scientific report series published by the Laboratory. There was another room, sort of an extension of the main library hall with a few computers. Since 1997, this small internet window has been giving users access to electronic databases like MEDLINE, AIDS and AHEAD; locally this access is scarce. Talking to different staff of the DISC, I started listing down names and

titles of documents published by the Laboratory, all three Library staff were guiding me to different shelves and showing me their publications. Our work was interrupted every time there was a library-user looking for the most recent issue of some journal, or a scientist from the Laboratory looking for a previous scientific protocol. While the library assistants were attending either a foreigner scientist from the Center or a Bengali student from the National Institute of Preventive and Social Medicine (NIPSOM), I was noticing the varied use of DISC resources.

A western laboratory and library in Bangladesh inflames among the scientists a desire to revitalize the past scientific moments and connect with distant locales. The angst of a foreign scientist, white or non white, to revisit some of the previous scientific protocols and the desire of a Bengali student to connect with the results of scientific research conducted elsewhere demonstrates the attributes of this scientific information repository. Its vast collection of western and Bangladeshi public health and biomedical journals signifies its ability to connect the local with the distant, past with present. Locally, this very ability to connect confirms the Center's authority. However, it is not an open gateway of information by any means, filtering access is part of its information dissemination practice. The scientific protocols of past research of the Laboratory are not generally available to the public; their access is limited to a particular segment of the Center staff. Such staff as those responsible for designing, planning and evaluating scientific result of a study can access these informal documents. These underlined principles of archiving historical documents and controlling its (in)accessibility not only epitomizes who the Laboratory authorizes to dig its history and what is being made

public but also shows its contextualizing desire to construct particular historical narrative of its scientific discovery (Axel, 2002).

Therefore, in this research I do not conceptualize archives as physical sites where historical facts and events are merely stored and preserved, instead I have conceptualized *archiving practices* themselves as a form of narrative (Dirk, 1999). I conceived the DISC itself is a story. This particular conceptualization is fostered from the position argued as the margins of historical anthropology (Axel, 2002).[18] In the context of colonial rule and state power, this position locates the history writing project as a principal form of governmentality[19] where archiving practices are a reflection of the state's archiving desire to produce time, space and people of a particular category.[20] Employing this conceptual framework, I suggest that the archiving practice of the Center categorized the science of cholera, Bangladesh and its citizens in particular way. In this narrative, the science of cholera is pursued as humanitarian science and the participants of these humanitarian scientific experiments are understood as bacteria-dwelling human subjects.

2.2 Master Narrative, Memory and Facts in the Margin

In 2003, the Laboratory celebrated its silver jubilee with much festivity. It reunited Laboratory alumni from abroad with those who are local, organizing international conference and publishing an institutional memoir of the Center was also part of the celebration. Among all the festive activities, digging into memory added a particular color to the celebration. Scientists, community health workers, security personnel, maintenance workers – staff from all walks of the Laboratory hierarchy – were invited to write their experiences. As for those staff who had died, either their sons or daughter were requested to reflect on their parents' commitment and work experience in

the Center. They all remembered particular historical moments – the Laboratory's first contact with the Matlab (1963), the devastating cyclone (1970), the war of independence (1971) and the military coup (1975). This publication intrigued me, for it was the epitome of archival practice of the Center. Even more intriguing is that irrespective of class-color-gendered social differences among the writers their invocation of past is identical. This identical recollection of the past enabled me to identify the dominant narrative embedded within the archival practice. The practice that approves a specific selection, ways of sequencing and preserving the past events – what is precisely in Hayden White's (1987) word 'emplotment' of past stories into history (White, 1987).[21] Examining the discontinuous and fractured set of facts (data), I found that in this emplotment institutional biography, nationalist history and personal memory complemented each other.

Several historical factors created a context where particular interpretation of these discontinuous facts is favored over other interpretations and emplotments: Bangladesh desperately needing to be recognized by imperial states; the air of illegitimacy attached to its existence because of its alleged Soviet connection; and the nationalist distrust towards western scientific establishment. More importantly, the historical belief among the scientists that, if the problem (the cholera epidemic) originated from this land, then the scientific solution may as well can be found here, has been influencing this context of emplotment. The range of documents I have reviewed in this research not only refer to the successful experiments conducted during colonial, inter-colonial and independent state regimes but also refer to the controversy between scientists during the internationalization of the Laboratory. There are books telling the victorious story of

ORS. I have also come across works of local health activists, journalists exposing the Center's unethical research practices (for a complete list of documents reviewed and analyzed in this research see, appendix A and C). However, the story of the Center's triumph over cholera epidemic cries aloud and continues to dominate.

Narrotologists (Beard, 2003; Lawless, 2003; Linde, 2002) interested in the narrative representation of past and present borrowed the term master narrative from Jean-Francois Lyotard (1984) to identify this privileged interpretation. Lyotard coined the term grand narrative to pursue his incredulity towards totalitarian narratives of enlightenment projects that for him marked the condition of postmodernity.[22] However, their use of the term is different than that of Lyotard. They use the term to refer to pre-existent socio-cultural forms of interpretation (Linde, 2001) and as a cognitive apparatuses for conceptualizing the past in culturally constituted ways. In other words, they argue, a master narrative provides practical means of stating, revisiting and contesting the past (Werstch, 1999; White, 2001). Identifying the archival practices of the Laboratory as part of the master narrative, I show what counts as part of the dominant narrative and what remains at the margins. The depiction of humanitarian science through its archiving practices is the modernist-triumphalist narrative as opposed to the anti-imperial nationalist but modernist narrative of local health activists. However, the dominant narrative is a historically changing thing; actors who make this narrative are heterogeneous, since their social positions are differentiated. The reconstructed historical events in the following chapters will show that despite its anti-imperialist trajectory, the future envisioned for Bangladesh in the marginal narrative echoes the authoritative one. Both share the modernist path. In the context of this heterogeneity and homology of

narratives, the methodological challenge is to convene a mode of representation that disrupts the all-pervading master narrative at the same time that it identifies the shared domains where the dominant and the marginal collate. I emphasize the role of these narratives in the scientific-political formation of the Laboratory and the nation-state. This remains at the core of my argument.

It is not my intention here to dichotomize heterogeneous narratives into master and marginal, contested and consensual memories (Burgoyne, 2003). I would like to emphasize that the facts (data) I am (re)reading in this research are already implicated in the discursive strategies, strategies that patterns the national pasts and constitutes the international stature of the Center (White, 2001). Essentially, my work of retrieving and reading is an active engagement with these already existing narrativizing processes.[23] But this is merely a rhetorical question for me. This narrativizing process clearly outlines the principles of disconnecting and correlating scientific events. Some correlations are hypothesized and some are conceived as inherently unrelated. Statistics showed that for decades, in Bangladesh, tuberculosis is equally fatal disease; yet the problem of diarrhoea dominated the public health initiatives. Therefore, what is even more pivotal for me is to explore the ethical implications of these deceptive practices embedded within the master narrative.

PART II
SITUATED RESEARCH, SITUATED ETHICS

CHAPTER 3:
STRUCTURAL DECEPTIONS

3.1 Structural Deception I

Although the mission of the DISC indicates public accessibility through its promises of diffusing global results of health, nutrition and population research, the stored information remains inaccessible in multiple ways.[24] The rate chart of library use indicates target users who are more likely national and international expatriates working in the field of international health and development. Reports, documents and publications of various sorts stored here contain specialized knowledge; often, these can only be decoded by the scientific/expatriate community. In principle, the facts about the scientific project carried out by the laboratory are publicly available, yet they are inaccessible. This inaccessibility emerges from the deceptive practices of the Laboratory, practices which I would call as *structural deception.*

Since its inception, the governing body of the Laboratory has always been locally ambiguous. The undefined power structure of East Pakistan partly contributed to this lack of accountability; its scientific activities were mostly documented in the form of scientific protocols or annual reports submitted to US funding bodies or research institutes like National Institute of Health (NIH) or Johns Hopkins University. Afterwards, the Laboratory's internationalization formed a board of trustees comprised of experts from different donor and developing states. Nationalization of the state hardly made the Center accountable to the Government of Bangladesh. In essence, the scientific goal, objectives and research results are always shadowy to the public.

The results of cholera research are published in scientific journals and these are also available in the DISC. However, to engage with this body of literature one has to acquire a proficiency in scientific comprehension and rigor. The undoing of boundaries of 'pure sciences' was never the mission of DISC; instead maintaining these margins and the tension of objectivity, value-neutrality, it persuade its knowledge claims (Bazerman, 1988; Gross, 1990, 2006).[25] The lack of local level unaccountability, coupled with publicly inaccessible expert scientific language conspires to make the Laboratory as a foreign-unknown locale within the sovereign territory of Bangladesh. Therefore, my argument is that inaccessibility is structurally determined; the deception that prevails is historically configured. In the face of this structural deception, my knowledge about the Laboratory/Center was, like that of most other Bangladeshis, very scanty.

The Center's deceitful practice on disclosure of information prolonged my data collection process and compelled me to make research decisions where ethical choices are predetermined by the existing institutional research ethics and intellectual property rights: what should be the ethical stand with regards to the intellectual property law when information about the scientific activities of the Center are only available in the forms of expert opinions (intellectual property)? Is any ethical position practically possible, given the heterogeneously unequal relations that preexist any research situation between human subject (people of Matlab)-author (multi)national scientists)-reader of these texts? The Center itself did not claim the copyright of the scientific reports it has published; rather intellectual right remained with each individual author-researcher. A copyright disclaimer in the first page of these publications was attention-grabbing – "views expressed in the scientific reports are those of authors and do not necessarily represent views of the CRL.

They should not be quoted without the permission of author."[26] People's experience of cholera or of the microbe's response to anti-bacterial drugs appeared in the form of copyrighted expert scientific opinion/knowledge. The reproduction of these opinions in any form is subject to the permission of the author. This creates an unusual research situation where I have accessed information but the extent to which I would use-quote-disclose it is constrained by the intellectual property law and DISC's membership policy.

The transformation of scientific knowledge into economic activity in this case barely follows the conventional patterns of relationships between science, academia, university and industry (Etzkowitz and Webster, 1995).[27] Clearly, the underlined logic for this disclaimer is not only to protect the intellectual property rights of the Center scientists, but also to create a site where the relations of owner(ship), author(ship) and beneficiaries of its science is defined and negotiated (Biaglio and Galison, 2003).[28] In the network of global political economy of public health research, people of Matlab are left with no other option than to 'embrace' the beneficiary identity. To what extent and in what manner they should become the beneficiary is laid out in this particular site of scientific research and knowledge production.[29] The millennium goal stated in the strategic plan to the year 2010 clearly described this hierarchical network and the strategies to maintain this unequal research situation (ICDDRB Strategic Plan to the Year 2010). In addition, this disclaimer ensures institutional distance from the scientific opinions expressed when controversies sprung up regarding its scientific mission in Bangladesh.

3.2 Structural Deception II

While reviewing documents I realized studies and events contradicting and contesting the scientific mission of the Center are archived despite the institutional desire to hide there. Controversies, conversation and competition between different Laboratories, scientists and public health administrators exist before a scientific truth is claimed. Many competing hypothesis about the correlation between access to bacteriologically safe water and prevention of diarrhoeal disease existed; however, these are buried underneath a scientific discovery. The scientific ritual of burying a hypothesis invalidated by the already established scientific fact is what I argue as another form of *structural deception* or *systematic erasure*. Bruno Latour's reference to the term *blackboxing*, an expression from the sociology of science, substantiates my argument here and provides methodological ways to bring back abandoned scientific events into the broader historical canvas. Latour describes blackboxing as a scientific moment "when a matter of fact is settled, one need focus only on its inputs and outputs and not on its internal complexity. Thus, paradoxically, the more science and technology succeed the more opaque and obscure they become (Latour, 1999, p. 304)."[30] I will draw the specific example of John Snow's hypothesis to elaborate this ritual and the ethical implications of this scientific practice.

Since John Snow put forth the hypothesis of cholera as water-borne disease, indigenous drinking water sources and water use practices had become the subject of constant scientific, administrative surveillance. Both the colonial and postcolonial public health administrators made it their priority to provide access to bacteriologically safe drinking water. Under the mandate of this program, an intermediate water technology

tubewell was introduced, replacing all the existing indigenous water technologies. The absolute correlation between access to safe water and the decrease in the incidence of diarrhoea was taken as scientific approval of these public health interventions. However there were studies from the Center that were unsure of this absolute correlation (Curlin, Aziz and Khan, 1977; Black, 1990).[31] These studies argued that access to safe water alone could not decrease the incidence of diarrhoea because it is still uncertain whether the amount of exposure to *vibrio cholerae* through drinking water is enough to provoke the symptoms of diarrhoea. Clearly, two different assumptions existed within the works of the Center: one was a doctrine of specific etiology; the other articulated a rather holistic approach. The latter position suggested that the use of surface water is an integral part of culture in Bangladesh, and the small amount of protection afforded by drinking bacteriologically safe water may be outweighed by the exposure to polluted surface water through bathing, food preparation, and utensil washing (Curlin et al., 1977).

In the critical political moments, when Bangladesh was desperately seeking diplomatic status in the global political hierarchy and the Laboratory was anxious to resume the temporarily withheld financial support from the National Institutes of Health in US, it became obvious to support an absolute correlation between safe drinking water and the incidence of diarrhoea. Transnational bodies like World Health Organization (WHO) and United Nations Children's Development Fund (UNICEF) had already approved the absolute correlation and started their campaign against the traditional/local water technologies. Supporting this hypothesis was not merely a question of providing access to safe water to rural poor, it was rather a question of gaining or maintaining transnational access to different localities: Bangladesh gained access to a global political

network; UNICEF continued its international(colonial) presence in Bangladesh; the Laboratory secured US funding as well as indefinite access to the Matlab. Inevitably, studies, which failed to establish this correlation in Matlab, were collecting dust inside the DISC and sidelined. Meanwhile, a flawed scientific proposition was established as scientific fact, and the result was that local water sources like dug wells were filled or abandoned. People quickly accepted the new water technology and every village *bazaar* started having tube well stores. Unplanned installation of tubewells continued. In a decade, almost every neighborhood in rural Bangladesh owned more than one tube well. The major focus of public health program and scientific research was providing bacteriologically safe drinking water; any long term biosocial consequences of this unplanned installation of the technology was sidestepped. And that is where the ethical implication of this deceptive practice lies.

3.3 Deception and Ethics

The accumulation of anomaly, error and incommensurability in the invention of scientific fact has been a vexing question for sociology of knowledge and science since its formative stage; the works of Ludwick Fleck (1935), Thomas H Kuhn (1962) and Robert K Merton (1970) are representative of this epistemological tradition.[32] Latour revitalizes this question and relocates historical value to the contradictory and competing scientific propositions as he proposes to open up the blackboxes (Latour, 1987). Latour sees this as the Janus-face of science, on the one side "science in the making", on the other side "ready made science" (1987, p 4). Taking similar detour in this research it becomes possible for me to recount an apparently irrelevant scientific hypothesis, and the disparate events that contributed to the making of humanitarian science in Bangladesh.

Instead of looking at the orderly pattern of scientific methods and rationales sketched out by the Center, Latour's analytical framework (ibid, p.15) helps reveal the 'disorderly mixture' of scientific activities during the settlement processes ranging from anti-cholera vaccine trials, scientific conferences, the writing of articles, the scientific diplomacy between the Government of Bangladesh and US research funding bodies, and the hushing up of the local controversy around its scientific mission in Bangladesh.

However, Latour's implicit theoretical insistence that rules of studying 'science in the making' is more or less similar for any science analytically implies that science is a homogenized knowledge system. Even a cursory inspection of his empirical example of the controversy among the scientists on the double helix DNA model (Latour, 1987, ch. 1) and the controversy around John Snow's hypothesis shows that the emergence of genetics and bacteriology are historically the consequence of utterly different combinations of disorderly mixture of facts and events. In the making of humanitarian science in Bangladesh, which scientific proposition is systematically erased, which is blackboxed and which gains currency in the public health discourse has direct biosocial consequence. I will go on to suggest that the structural conditions under which a cholera epidemic becomes a manageable health problem, inflicts an unmanageable health problem – the arsenic disaster. In Bangladesh, the decline of child mortality rate from diarrhoea produced a biosocial situation where incidences of arsenicosis (a form of skin cancer) amongst the rural mothers are alarmingly increasing.

On the eve of new millennium, a press release from WHO endorsed epidemiologist Alan H Smith's statement that arsenic contamination in the drinking water sources of Bangladesh is "the largest mass poisoning of a population in history...the

scale of this environmental disaster is greater than any seen before. It is beyond the accidents at Bhopal, India, in 1984, and Chernobyl, Ukraine, in 1986" (Smith, 2000). Opening up the blackbox, therefore, is not merely a question of rendering the Janus-face of humanitarian science or a methodological choice that often social constructionist refused to take (Latour, 1987, p.21). In my research context, facts that are concealed or erased have pragmatic value or immediate implication on the public health planning. How the ritual of black boxing has effected people's life who are assumed and constituted as the beneficiaries of science seems an insignificant question in Latour's studies of science-in-the-making. It is not enough to argue that accumulation of error is contributing in the making of humanitarian science, or deceptions described above are structural conditions of the science of cholera practiced in the Center. Violence and vivisection is endemic to this process of science in the making and the arsenic disaster in Bangladesh proved this point.

Before I move to the next Part of my thesis, I would like to discuss the narrative strategies for the remainder of this thesis. In the following parts of the thesis, I have presented my argument in multiple but complementary narratives. On the one hand, I have reconstructed what I call critical historical events and scientists' historical diaries of cholera research in the region. These reconstructed events are represented in a story telling mode. On the other hand, theoretical conversations particularly those with science studies, historians of science and scholars from the Alternative Science Movement in India, are incorporated in the analytical narrative. The reason behind writing these parts in multiple narratives is two fold: firstly, the multiple narratives are my analytical way of recognizing the socially differentiated audiences/readers of this work. Local health

activists, journalists and even academicians may find my theoretical dialogues irrelevant in the local negotiations with western scientific and international development establishments. Writing in multiple narratives, I have tried to negotiate with the existing disparities between activist and academic scholarly work. Secondly, adopting a more journalistic and story-telling narrative style, my reconstruction of historical events are a way to underscore the need of attention toward these very stories. Some of the facts narrated here are either intentionally concealed from public or they are presented in a manner that suppress other possibilities of interpretations. The work of this thesis is to provide readers with an alternative emplotment of the history of cholera research in Bangladesh. These distinct narratives are organized in a way that reader could leave out the theoretical conversation but still follow the story of cholera research in Bangladesh.

I have used an idiosyncratic form of referencing in the chapters that present these historically reconstructed events. In these reconstructed pieces, I have knit together events from different pieces of documents, personal narratives and anecdotes scientific reports. The voice of authority-loyalty to the Laboratory articulated in the biographical pieces, institutional memoirs or even in scientific journal is the embodiment of social differences amongst the scientist-technician-administrator-layman at work. In the order that I have put them together are my subjective understanding of the relations between apparently disparate events. The role these scientific texts played in my story was as socio-scientific clue. To acknowledge the differentiated voices of actors and to keep record of the socio-scientific clues in these texts, I have assigned labels A, B, C to each of the texts. A complete list of documents used to reconstruct the historical events is compiled in Appendix C.[33]

PART III
THE BIRTH OF BANGLADESH

CHAPTER 4:
CRITICAL JUNCTURES, 1971-1986

4.1 Critical Junctures, 1971: The War of 1971

In late 60s when the political antagonism between the West and the-then East Pakistan ripened, continual strikes, road blocks and rallies were disrupting the routine work of the CRL [A]. At that time, the Laboratory was involved in two main research activities; one was to conduct a longitudinal cholera vaccine trial in the Matlab field station and the other was to study the loss of electrolytes* (scientific terms identified in with an asterisk sign are brief defined in the Appendix E) in cholera patients [B]. The vaccine trial was designed to go beyond the limited investigation of vaccine efficacy. It explored the usefulness of average antigenic potency* when applied in a continuing program with annual reimmunization. The study was carried out among 40,000 children of Matlab; local women were trained as community health workers to keep track of children in the cohort; national scientists and medical practitioners supervised field level activities which included collecting blood samples, and rectal swabs [C]. A team of foreign scientists comprising of an epidemiologist, a clinician and a bacteriologist was also in the field. Robert Allan Philips, a retired US Navy medical officer was in charge of the team. They were studying the balance of output and intake of bodily fluid and electrolytes among those cholera patients who had been admitted to the field hospital and the cholera ward in Dhaka.

Apart from the Bacteriology unit, the core teams of scientists in the Laboratory were white only. It is probably A K Mansur's discovery of Mansur's sugar* and

recognition of his scientific excellence by the international community that allowed him to become the head of bacteriology unit [B]. His admission to the previously inadmissible space and his achievements heightened the thirst of national scientists to pursue a career in cholera related science. Cholera patients admitted to the field hospital and the Dhaka Cholera Hospital were dying; or, sometimes they happened to be miraculously saved; if one group of immunized children showed resistance, another group happened to be easily infected by *vibrio cholera*. The achievements and results of the laboratory were not persistent [D]. Yet, the daily activity in the cholera ward, the rhythm of diesel operated speedboats carrying medicines, doctors and foreign scientists from the provincial capital city of Dhaka to Matlab, whetted the national staff's appetite for scientific discovery. Wearing their white laboratory coats, dragging the vaccinator or holding a notebook while walking on muddy roads along white, foreign scientists, they became committed to the scientific voyage of the laboratory [A, D]. The war of 1971 broke this scientific routine and rhythm [A].

The war situation dispersed the children in the vaccine trial cohort. The communication between the field hospital and central laboratory became infrequent; the monthly paycheck could not reach the field staff on time. Some of the Hindu staff of the laboratory left the city, some moved from their home to the storeroom of the Dhaka laboratory [A].[34] For the most part, the Pakistani Army took over the streets of the major cities; those slaughtered by them within Dhaka University campus were buried in a mass grave within campus premises. The Hotel Intercontinental and the US embassy in the city of Dhaka was still, a safe place for white expatriates, and those who had not already left the country, took shelter there. Only ambulance and vehicles flying the flag of the Red

Cross or the United States of America were safe. W. Henry Mosley, the Head of Epidemiology unit and Mark Tucker, the Head of Maintenance unit, were among the few foreign nationals who chose to stay back in the war-stricken Dhaka and took the risk of traveling outside the capital city. In early May of 1971, they went to Matlab, carried the cash with them to avoid the closure of the field hospital [A]. As the Pakistani army continued burning down slums in Dhaka, the number of people fleeing from Dhaka was increasing everyday. Mosley's household servant Alfred's slum was among one of them, Alfred requested Mosley's help. Mosley hid his camera inside the medicine box of the ambulance, went to the slum to distribute food and medicine. A few days later he went back to the slum more as a scientist than as relief worker; this time with his Laboratory team he vaccinated around 5000 people [A]. (I have not been able to find out why they were vaccinated, or which vaccine it was that Mosley had suggested). He secretly sent the photographs of massacre to Washington DC, and extended his support to the Bangladesh movement. As the monsoon approached the resistance of the *Mukti Bahini* gained strength; in response, military operations of the Pakistan army also intensified. They killed whoever they thought was involved in the insurgency. People fled for their lives towards the Indian border [D]. However, the laboratory continued to work in Dhaka and in the Matlab hospital. Some of the local staff joined the armed struggle of the *Mukti Bahini*; some stayed back to took care of the injured, the casualties of war. The political crisis of 1971 disrupted the routine work of the laboratory but it never ceased its operations; the refrigerator with biological samples was always turned on, even when a citywide blackout prevailed [B].

On a sultry June evening in 1971, Thomas Simpson and his wife Doris had celebrated their 30th wedding anniversary with a lively dinner in the private garden of their flat in Calcutta, India. Both American and local Indian staff from the Johns Hopkins International Center for Medical Research and Training (ICMRT) [35] in Kolkata was celebrating with them. While the occasion for the dinner was a happy one, much of the night's discussion was not. The discussion at the dinner centered on reports from the refugee camps. Refugees had no shelter from the monsoon rains. Some families were constructing houses from sections of sewer pipes. "There was nothing but privation and injuries" recollects one of the Center's staff members [J]. Worst of all, the annual cholera epidemic had already started. Since its inception in 1960, the Center's main research focus had been cholera and over time they had been able to prove the efficacy of the intravenous (IV) fluid treatment of cholera. That evening the guests had discussed how the chaotic, destitute and nearly inaccessible camps precluded treating the outbreak of cholera among the refugees with IV fluids. At night, Simpson went to bed with much despair. Suddenly, he remembered the results of the test conducted in the CRL at Dhaka. The team there had completed a clinical test of an oral, rather than an intravenous treatment for cholera. The Dhaka team's experiment had been conducted under much more favorable controlled conditions; hence, no one at the dinner table drew a link between the clinical trial's result and the refugee crisis. The morning after Simpson's revelatory night, he called his colleague Dr. Dilip Mahalnobish, the Center's cholera expert. He shared his idea of using the as-yet experimental oral fluid therapy in the refugee camps with him.

Dr. Philip Mahalnobish, with the help of a few paramedics, set up a medical facility in one of the refugee camps near Bangaon. Patients of all ages were lying all over the field on cots, on the floor of a tent, or under the shade of trees. Family members or local volunteers were feeding the oral rehydration fluid. Some of the evacuee scientists from the Dhaka laboratory joined hands with this relief and experimental work. There was no recording system in the relief camp hospital, even though the decrease in the number of case fatalities was recognizably significant [A]. Scientists interested in the area of communicable disease, cholera eradication projects and vaccine research visited the Bongaon setup, and later on replicated the experiment of oral rehydration saline in Africa and the Philippines. An experiment conducted with humanitarian thrust in chaotic refugee camp later came to be considered one of the foundational research moments in the development of ORS.

In 1971, the political identity of the laboratory was dubious. The US nationals in Dhaka supported Bangladesh movement whereas the United States backed the ruling Pakistani regime. This crisis continued even after the independence of Bangladesh. It was not until May 1972 that United States officially recognized Bangladesh as an independent state. Hence, financial and institutional support for the laboratory had been suspended for a while [B]. The laboratory had been established under the SEATO agreement between Pakistan and SEATO states. This had allowed a flow of foreign experts to enter the country and ensured access to 'local human subjects.' After independence, when Bangladesh started negotiating, and reorganizing its diplomatic relations with other states, the SEATO treaty and international agenda of the organization became a matter of debate. Consequently, Bangladesh proposed that the Laboratory be nationalized.

Scientists in the Laboratory got involved in medical diplomacy at both national and international levels. With Dr. Hare as the Director of the Laboratory, the staff at the laboratory continued to work in the laboratory without pay. Nationalist sentiment played a vital role in creating this extent of involvement among the staff as they thought a scientific institution of this standard would make their nation very proud [A].

The negotiations went on and the laboratory continued its activities through an interim agreement between the government of Bangladesh and the National Institutes of Health in United States. The post-war agreement made provisions for the participation of other nations, as well as United Nations organizations, if they so wished. Medical diplomats, representatives of US funding bodies visited Bangladesh to meet with officials of the Ministry of Health. Even after several visits and meetings a consensus about the organizational structure of the Laboratory appeared something unattainable. K. A. Mansur, who was once the head of the Bacteriology unit of the Laboratory, partly coordinated the discussion. He was very explicit that the government wanted a greater role in the management, as well as in the decision making process of scientific programs at the laboratory, in accordance with the general national policy of independence. This policy had been achieved after two hundred years of British colonialism, and twenty-four years of internal colonialism of the-then West Pakistan [B].

4.2 Critical Junctures, 1978: The Internationalization of the Laboratory

India was Bangladesh's closest political ally during the war of independence. In the cold war political economy, this alliance put Bangladesh in a politically awkward situation [D].[36] In 1975, a military coup took place in Bangladesh, leaving the Prime

Minister Skeikh Mujibur Rahman assassinated; with his killing the alleged political connection with the Soviet bloc died down and the coup helped to reorganize Bangladesh's diplomatic relations with the United States. This political event influenced the internationalization process of the Laboratory [A].

At the time of negotiations, the international body proposed the institutional model of the International Rice Research Institute (IRRI) for the Laboratory to follow. While envisioning the internationalized structure, the US-based scientists found the mission statement of the IRRI and their proposed center alike. Both promised to transport specialized knowledge "produced in the advanced societies to the underdeveloped country" [E]. In the Philippines, the mission of IRRI was to aid farmers in developing countries to produce high yielding crops on limited land while using less labor, water and cheap chemical additives. In the modernist narrative of the Green Revolution, the role of this institute is considered monumental, even though critics often call it "the curse to the farmer".[37] It was claimed that the institute had taken advanced agricultural technology and knowledge from centers to remote areas; similarly, the Laboratory wanted "to take medical technology developed in sophisticated institute to diffuse out to benefit the local" [I].

Some white scientists/expatriates of US nationality from the Laboratory challenged the objectives of the proposed international health research center. A series of letters was published in the acclaimed medical science research journal the Lancet (1978) engaging in a debate over its institutional control by donor-states and the bioethical practices of the Laboratory [I]. Collin MacCord, one of the scientist then working in the laboratory wrote an article in the journal providing examples from the recent past of the

Laboratory. The letter disproved the stated mission of internationalization. His concerns primarily centered around the issues of bioethics, empowerment of local scientists and incorporation of local health concerns. Since its inception, MacCord asserts, the Laboratory had mostly remained a training facility for young U.S scientists. Experiments done in the Laboratory displayed little regard for local health concerns, occasionally the health of research participants/human subjects itself was put at risk. He found the advice given by members of the international body to contradict its stated mission, he questioned – why would the segregation of primary health care from the family planning program be main prerequisite for the improvement of public health?[38] John Briscoe, another scientist from the Laboratory echoed MacCord on this point. He argued that the main aim of population studies at the new center seemed to be to "prove that population growth can be reduced without any change in the health conditions, poverty or social (in)justice" [F].

National scientists and medical practitioners shared many of these concerns raised above, but they delved more deeply into the inequitable relations between the expatriate communities and the national scientists. In this series of letters to the editor, the last one was from a group of national health activists who held distinguished positions in different national public health institutes. Like Colin McCord, they did not oppose the internationalization of the Laboratory. Considering the unequal relationship between donor and 'developing states' they defined internationalization as the transfer of control from US-based scientists to the scientific communities of developing states.[39] They claimed that scientific practices occur beyond the territory that is understood as the West. This claim was even more evident in their demand that individual scientists be included from Western European countries, socialist countries and China. They demanded the

enactment of a proper bioethical code and emphasized that research in the areas of fertility, nutrition and clinical medicine should be done under the direct control of national institutes. They exposed the disparate salary structure segregating the international and national staff that made the Laboratory a financial attraction for white expatriate scientists in the past. In their portrayal of the new center, a lucrative salary should not be the reason for international scientists to come to Bangladesh; rather the center should look for commitment of scientists in the health problems of developing states.[40] On facing opposition and protracted negotiations, the international donors and scientists started considering shifting the laboratory from Dhaka to Kolkata where a partner laboratory, ICMRT was based.

National scientists and staff working in the laboratory became nervous, predicting a lay off, and got frustrated about the possible disruption to their cholera research. The rumor of relocating the center to India was more disappointing in the particular political moment. Late 1970s was a transient political era for Bangladesh in terms of reorganizing the logics of national politics. Ziaur Rahman formed a new political party, Bangladesh National Party (BNP) and used its preference of Islam over secular political statements of previous political party in government, Awami League (AG). To politically corner AG as atheist, communist, and more importantly loyal to a Hindu state (India) the new party infiltrated an anti-Indian sentiment in the public discourse. In this context, the idea of relocating the Laboratory from Bangladesh to India probably was upsetting for some. Local staff felt the need to intervene. Dr. K. M.S Aziz once the Head of Field Surveillance Branch in Matlab and later Senior Research Investigator of the Laboratory approached one of the board of trustees of the Laboratory, Major M.R. Chowdhury.

Major Chowdhury at that time happened to be a close political ally and personal physician of the-then military ruler and the President of Bangladesh, Major General Ziaur Rahman. As his son recalls, Major Chowdhury called the President and spoke to him about the proposal "he [Major Chowdhury] proposed that International Center for Diarrhoea Disease Research (ICDDR) should stay in Bangladesh, there is a conspiracy going on to take it to India. He also mentioned that if ICDDR stays in Bangladesh, lot of people of Bangladesh would be benefited by doing research and getting job nationally and internationally. Moreover, Bangladesh will come to the focus of world attention because ICDDR is the one and only of these kind in the world. Bangladesh will be benefited and world in general" [A, translated from Bangla].

It was the day after this phone conversation, Major General Ziaur Rahman declared that he had decided the ICDDR will stay in Bangladesh and be known as ICDDR Bangladesh [A]. Although the ordinance of ICDDR,B had been signed by all parties in December 1978, the official declaration of ICDDR,B took place in June 1979. In a festive mood the President formally inaugurated the Center at the Dhaka Laboratory premises by uttering these words, "I am very happy to have the privilege of inaugurating the ICDDR,B. This institution has been engaged in the research of cholera and cholera-related diseases since it was established in 1960. The government has taken the decision to transform it into an international center so that results achieved from the research carried out in the institution can be utilized not only in Bangladesh but also in other developing countries" [G].

4.3 Critical Junctures, 1986: Accusation of Violating Bioethical Code

The internationalization of the Laboratory also coincided with the monumental scientific advancement in cholera research. Throughout the 70s, the laboratory concentrated its focus on the development of Oral Rehydration Therapy (ORT)* and the success of this research brought recognition to the Laboratory both locally and globally. The national non-governmental organizations joined hands with the Laboratory to disseminate scientific knowledge of ORT to villagers [H]. The opposition to the Laboratory that had surfaced during the moves for internationalization lost momentum as the Laboratory began cultivating strong local collaborators [D].

But the water got clouded again in 1985 for the Laboratory. A local private limited development organization called UBINIG (Policy Research for Development Alternative) challenged its research practices on grounds of violating the bioethical code.[41] At that juncture, the Laboratory conducted an oral cholera vaccine trial sponsored by the World Health Organization (WHO). The vaccine consisted of a combination of B-subnuit of the cholera toxin-killed V Cholera cells* and the trial included a placebo* vaccine. Eighty four thousand men, women and children from Matlab participated in the trial. Fr. Jan Holmgren and his wife Ann-Mari Svennerholm were the principal research investigators and the French pharmaceutical company Bio Merieux of Lyon assisted them. The preliminary protection study of the vaccine was carried out on 11 volunteers at the Center for Vaccine Development, Baltimore, Maryland. According to Farida Akhtar the efficacy of the vaccine was moderate and required further laboratory work before it was tried out on Bangladeshi villagers. Akhtar was part of an evaluation team hired by the Swedish Agency for Research Cooperation (SAREC). Swedish Scientists, Prof. Alf

Lindberg and Dr. Stig Wall, the first a microbiologist and the other, an epidemiologist were the other two members of the team. During the evaluation Akhtar became gravely concerned about the social and ethical issues of biomedical research undertaken by the Laboratory [M]. Apart from UBINIG, one of the leading national dailies also reported adverse reactions to the vaccine. UBINIG took immediate steps to inform the public and demanded a government investigation of the violation of the Helsinki bioethical declaration. Civil society bodies and intellectuals from Bangladesh sent petitions to the Swedish government. UBINIG also hold a protest in Sweden. An interview with Farida Akhter, Dr. Wall and Dr. Lindberg was broadcasted on November, 1986 on the National Radio Broadcasting Station in Umea. In the interview, both of them denied Akhter's grievances on the ground that her ethical review of the trial was more on speculation than based on scientific procedure [I].

CHAPTER 5:
FORMATION OF BANGLADESH, INTERNATIONALIZATION OF THE LABORATORY

5.1 (Dis)jointed Histories

Culled from a wide range of documents, the preceding chapter, weaves fragments of facts to narrate the interpolating histories of cholera epidemic, the science of cholera and the nation building process in Bangladesh. The relocation of these factual fragments into a historically determinate national landscape is a methodological challenge. In their rapprochement of ethnography and historical anthropology, Comaroff and Comarroff (1992) raise a similar question: how can fragmentary realities speak for totality? What do we do to ensure their intelligibility? How are disjointed stories woven into or removed from the master narrative? Defining the task of the ethnographer as one of intersubjective translation, they resolved this tension of totality-fragments, because they claim, ethnographer needs to understand "the dialectics in space and time, of societies and selves, persons and places, orders and events" (ibid, 34).[42] Along similar lines, by recapturing the critical historical moments, I have interrogated specific sets of connections and disjoints, the exercise of dialectics between time and localities – distant and nearest through which the history of the Laboratory is fixed in social memory.[43]

Different institutes and individuals are telling the story of the Laboratory at both global and local levels, however their monologues portray the Laboratory either as a noble savior whose scientific voyage to Bangladesh saved millions in the world from the killer disease of cholera/diarrhoea (Heyningen, 1983) or as a hideous collective of

scientists whose experiments are founded on the idea of Bangladeshi people as "their guinea pigs" (Akhter, 1996; Hartman, 1995). The reconstructed historical events presented in the previous chapter contradict this representation of the Laboratory based on the binary opposition of (savior) good and (exploiter) evil. The crisis of 1971 as narrated in the previous chapter unfolds how the triumphalist monologue of the war of independence dominated social memory and overshadowed all other events. This nationalist depiction is appropriative and legitimizing in nature, it appropriates other ways of envisioning the moment and acknowledges the existence of only those social actors who can fit into this story. The historical events that hold the possibility of deglorifying the creation of an independent state, the ambiguity of state power are eliminated from the nationalist strategy of history-writing. The story of Bangladesh's independence is hardly ever spoken of within the framework of the cold-war global economy; the legacy of cholera research is rarely disentangled from the novel mission of the Center. In crafting its institutional history, the Laboratory has articulated the nationalist strategy; the individual scientist's radical roles during the Bangladesh movement have become monumental in this depiction. The history of nationalist aspirations has subordinated the parallel history of cholera research and history of pain, suffering and death-toll of cholera stricken population. Some colors, some fragments of the history are blurred and washed-out from the nationalist historical canvas; such is how the dominant public discourse has been constituted.

The narrative here further shows how the counter public discourse overrides the existing social differences (class-race-national-religious). The American scientists consciously disobeyed the political position of their nation on the Bangladesh movement,

but remained loyal to its scientific mission. During his dangerous visit to Alfred's slum, Mosley did not forget to administer vaccines. This indicates that at any given moment in time identities are not static constructions; identities manifest authorities in different ways and undergo constant reorganization (Hacking, 1999) as we have seen in the context of 1971. It goes without saying that the white expatriates were not a homogenous whole. Scientists who had entered the East Pakistan from Soviet Russia and those from the SEATO treaty states received dissimilar diplomatic attention from the Government of Pakistan (Heyningen, 1983). Moreover, there is no reason to assume that the scientific and ideological position of all international scientists is identical; this becomes more evident in the debate between scientists during the internationalization process. Indeed, the claim of the counter discourse that white imperial scientists invaded the villages of Matlab with their alien science is restricting; it damages the conceptual possibilities of raising critical questions like what is the role of the Laboratory (western science) in postcolonial nation building. How has a western scientific establishment in a given local context negotiated the structure of a postcolonial state?

5.2 Postcolonial Nation Building

The scars of the history of colonization in Bangladesh are far removed from the other colonized territories of British India. It was a neglected colonial territory and later, it was exploited under the internal colonialism of Pakistan (Sobhan, 1968; 1982; Griffin and Khan, 1972). Therefore, in the historical context of South Asia, the problem of state formation in Bangladesh is unique. Anti-colonial struggles mediated the formation of Indian modernity, a modernity, Gyan Prakash has called a hybrid of traditional and colonial (Prakash, 1999). However, the effect of the anti-colonial struggle in the

development of nationalist imagination is not seamless across an entire colonized region. The social processes of class formation, technological development that occurred in the colonized core i.e.; Kolkata, Delhi, Lahore were delayed in the East Bengal, neglected colonial territory. The colonial administration's divisive policy mediated the emergence of a largely Hindu middle class whose presence was equally instrumental in the continued existence of the colonial administration and the development of a nationalist struggle. In East Bengal, predominantly known as a Muslim district, the evolving Bengali nationalism was fractured along religious lines. Therefore, the social infrastructure to facilitate and entertain the imagination of the future was immature during colonial and intercolonial regimes. I am not arguing that Bangladesh was not part of this process of cultivating nationalized modernity; instead, my emphasis is on the manifested difference that marked its postcolonial existence.

The problem of existence became even more shaky after the independence. India's involvement in the war of independence and its alleged alliance with the Soviet Bloc made Bangladesh into a state of no strategic importance. The political history of the region could better explain the global denial of its existence but the scope of current discussion doesn't permit a detail reflection to this history.[44] Precisely, in the cold war political economy there was no coherent reason available for the state to exist. To put this proposition in another way, the early postcolonial moment for Bangladesh was invested in defining the purpose of the state. Determining a unified goal, a mission to evoke an imaginary bond, belongingness and citizenry responsibilities to the newly defined map and sovereign state became crucial to the local leadership, otherwise it was shapeless and futile for most of its population. The leaders from *muktibahini*, the newly formed

government, local elites, politicians and international development experts took up this task of determining a reason for the state; they engaged themselves in interpreting the socio-economic situation. The dominant discourse derived from this effort became a catalogue of hopelessness and woes: constant food shortage and recurrent famine, devastating flood and cyclone, an uncontrollable population growth, a malfunctioning economy beset with economic crisis and bankruptcy (Faaland and Parkinson, 1976).

Locally, specific consequences of colonial experience resulted in a lack of formation of modernist imagination of the future; globally, the end of colonization and emergence of the international development sector discovered a unique political role for Bangladesh which is to "make itself available as a possible test bench of development" (Faaland and Parkinson, 1976).[45] The political **raison d'etre** for the state is to become open to foreign intervention. The fundamental assumption of this reasoning was that if development experiments, with the assistance of donor-states could resolve the poverty of Bangladesh, there could be reasonable confidence in the possibility of solving the problem of global poverty. The relative successes and failures of the two major international development enterprises, the 'Food for Peace Program,' later known as the 'Comilla Model'[46] and the Laboratory became referents in the making of Bangladesh into an experimental ground. Local hesitation around the political consequences of aid-dependency and the famine of 1974 which for many was a direct affect of cold-war political economy, had created hurdles and delayed donor intervention in the economic/rural development sector (Alamgir, 1980).[47] However, local resistance in negotiating the aid-relationship was much relaxed in the cases of advancing scientific knowledge.

Despite the fact that the Laboratory was established under the rubric of a military defense treaty (SEATO defense treaty), the opposition that it faced during the internationalization process of the Laboratory was not primarily against foreign intervention on cholera research; instead, local concerns were voiced against the bioethical practices of the Laboratory. The contesting voices accepted the donor intervention for scientific purposes aimed at producing knowledge. What was stressed was the unequal relationship that preexist this scientific collaboration. The authority of Western science and the territorialization of disease (Packard, 1989; Vaughan, 1991; Anderson, 1998b; Worboy, 2000) remained covert. In a newly- decolonized state, such approval of western science is, in Fanon's apt phrase, the "individual's frank recognition of what is positive in the dominators action" (Fanon, 1965, p.125).[48] He argues that it is the colonial structure which creates mistrust, not medical science itself. This argument outlines certain social positions about colonial science within the nationalist/anti-colonial struggle and resembles the positions formed during the internationalization debate in Bangladesh. The international body of scientists and national health activists shared the same scientific assumption that the socio-economic situation of Bangladesh provides a natural setting for cholera research to the scientist; treatment of Matlab as experimental site was vital for all actors. Even the unripe imagination of the future approved the advancement of the science of cholera; "taking science to where there is diarrhoea" (Rhode and Northrup, 1976, p.339) was the goal for all participants in the debate. Therefore, the inclusion of the nationalist agenda within the proposed structure was the concern. The plan propagated by the international body to have a health and population

research center in a natural setting where the problem persists did not collide with the nationalist desire to host a unique scientific research institute.

Before I proceed to further map out the role of the Laboratory in the making of Bangladesh, I would like to briefly mention the sociological attributes of this debate. The analytical significance of the debate in my work does not necessarily indicate its prominence locally and globally. This debate was neither a remarkable event at the national level, nor it was an influential force in the internationalization process of the Laboratory. The voices that were raised remained marginal within or outside the hierarchy of the negotiation process. However, the opposing voices demonstrate the socially available ways of opposing scientific activities in a given historical moment. The contestations are framed following the principles of scientific and international legal frameworks of bioethics, which approve some of the basic scientific assumption that reinforces the authority of science over 'third world populations.' The biomedical intervention on people living in Matlab was approved. I am not arguing that public health interventions were not needed in the endemic areas; my focus is on the tactics of these contestations and its failure to understand the disruptive and structurally violent affects of this intervention.

At the time, when cholera research laboratory was installed in Bangladesh not many practicing indigenous/traditional medical science survived, as was the case in India. Therefore, negotiation did not necessarily take place between tradition and modernity, it was between science with a western agenda and science with a nationalist agenda. It was the negotiation between two ideological oppositions, one was the aspiring educated middle class imitating the role of white expatriate-scientists, and the other believed in the

principles of barefoot doctor.[49] The nationalist agenda equally prioritized the production of cholera-related knowledge from the villages and reorganization of life in the endemic areas in accordance with western scientific norms. It approved scientific intervention, experiments as long as it maintains the international bioethical code. Within the global scientific community, purity and authenticity of scientific research is questioned in partisan research. The fate of pre-perestroika Russian science is an example such reservation to partisan research (Stone, 2001). Indeed, the partisan scientific practices of the Laboratory were much lauded. When the laboratory transgressed the regime of pure science and articulated third world developmentalism as its ideology, its science has not been challenged. On the contrary, it is rewarded as 'humanitarian science'. Indeed, the simultaneity of improving the scientific understanding of the disease and providing medical care to the poor cholera victims within the laboratory structure provided an example to the global scientific community for what western science in third world set-ups should look like. Recall the telephone conversation between the President and the Laboratory's trustee shows, participation in this international scientific enterprise became an opportunity for a postcolonial state like Bangladesh to make itself visible in the global hierarchy. This paradox showed in the contradictory ways science, nationalism and development apparatuses operated in shaping a postcolonial state, and facilitate the triumph of Bangladesh over its hopelessness (Prakash, 1999).

5.3 Contructing the Pathology of Bangladesh

In Bangladesh, the patterns of resistance and critiques that evolved around the scientific activities of the Laboratory, is momentary. One could see it in the narrative of critical junctures in the previous chapter. The dominant tendency in local contestations

has been to stress the alienating and destructive force of Western science. The local resistance to western science largely echoed the works from the Alternative Science Movement in India (Nandy, 1980; Uberoi, 1984; Sardar, 1988; Vishvanathan, 1988; Alvares, 1992; Shiva, 1999). The proponents of this movement are concerned about the destructive effect of western and/or national scientific projects in Indian society. In their work they often proposed a violence-conquest framework of analysis (Nandy, 1986; Alvares, 1992; Shiva, 1999).[50] Within a hegemonic structure the violence of science is obvious, but Prakash's analytical framework shows how science constitutes the nationalist imagination; for him it is not a bilateral interaction between state and science where each becomes the weapon of the other, rather, he emphasizes the interplay between different social fields.

Gyan Praksh's (1999) work on colonial science and the formation of Indian modernity best exemplifies the interplay between science, nationalism and modernity. In his skillfully crafted work, he examines science's cultural authority in state formation as the legitimating sign of rationality and progress; his analytical emphasis on the process of reinscription, translation and transgression brings attention to the colonial configuration of the imagination of Indian nationhood. As he argues, in the colonial context translation of western science means trafficking between alien and the indigenous, forcing negotiation between modernity and tradition. Consequently, the idea of India as a nation in the nationalist movement is not a negation of the colonial configuration of territory, but a reinscription of the authority of science within the unique terms of Indian tradition. Because of this reinscription, Hindu science and religion transgress divisions between state, religion, and culture; they all run into each other to claim a modernity unique to

Indian tradition, and not an imitation of the West. A paradoxical interplay occurs between science, religion and nationalism to configure the state power of decolonized India.[51]

Employing Prakash's framework, I argue against conceptualizing the science of the Laboratory as a destructive force. Instead, I propose that such an understanding disregards the power of science to make, unmake and remake Bangladesh. The exercise of power beyond the legal framework remains uninvestigated in the critiques that are framed within the international bioethical code. Either the glowing success stories of the Laboratory or the vilification of it overshadowed the routine activities of the science practiced here. The Center began its operation as a laboratory with medical service provisions for cholera patients, but in terms of its practices, the concept of laboratory is unable to hold the manifold functions that it performs in the locality.

Since its emergence, every year the Laboratory has been producing Health and Demographic Surveillance System (HDSS) reports documenting periodic censuses, socioeconomic surveys, and a continuous registration of vital events that take place in Matlab. The work of scientists is not limited to clinical experimentation of cholera but has also been expanded to include the observation of pathological environmental and social-behavioral factors that may have effects in the causation of enteric diseases. The Public Health Science Division (PHSD) has research programs for reproductive health, child health, social and behavioral science, epidemic control preparedness, and health economics to apparently address the epidemiological patterns of ill health, transmission of infections, modification of risk behaviors, and vaccine trials. To argue against the violence-conquest dichotomy here I will elaborate the role of the Center in production of

numeric facts about people of Matlab and show how its statistical strategies appeared as the meaningful way to communicate with the socio-economic realities in Bangladesh.

In 1966, the epidemiology unit of the Laboratory initiated a survey to gather demographic information about the people living in the Matlab field station. Local young men who had at least some secondary school education were trained on the how and what of survey. The epidemiologists were nervous about how this novice surveyors would perform. The surveyors' efficiency proved them wrong. Since the quality and the usefulness of the data gathered by them appeared immensely important for the laboratory, a continuous data collection system was planned; this was named the epidemiological surveillance system. Through internationalization, this became the PHSD to comply with the ideological principles of the global health paradigm. Since 1963, it has continued to document the cases of enteric diseases, reproductive and sanitation behavior, household patterns (female headed, nuclear or extended), socio-economic conditions, and migration as well as registering all cases of birth, death and divorces. Every ten years a census has been conducted. Results published in the demographic surveillance reports of 1993, 1994, and 2001 were structured in the following manner: cases of diarrhoea, disease pattern, infant mortality rate, maternal mortality rate, patterns of mortality and morbidity as a whole, percentage of sanitation behavior and measurement of all other risky behavior (what is counted as risky and what is not counted as risky, this is not static in this measurement scale, it changed along with ideological shifts of the global health paradigm), ecological susceptibility, number of villagers who visited the health care system. According to the Center, the utility of this longitudinal information was that it provided scientists and policy makers with reliable markers to measure change after each

intervention. The proposal to segregate family planning programs from the primary health care system in Bangladesh was validated in Matlab during the late 70s as comparison of data 'before and after' segregation was possible here inside the surveillance system (Hartman, 1995). The reason behind repeated anti-cholera vaccine trial is also the same, because a control and non-control group is readily available with ample amount of longitudinal epidemiological information. Drawing conclusions about the efficacy of any drug is presumably effortless in such natural but scientific social setting. In 2001, when the Laboratory was awarded the first ever Gates Foundation Award for its significant contribution to global health, Melinda Gates described the HDSS as "a unique site where science is practiced harmoniously in a natural social setting, where science and everyday life speak to each other" (ICDDRB Annual Report, 2002, p.4).

However, the role of this surveillance system is not limited to program evaluation, or to its availability as an ideal ground for drug testing. Neither the excellence in producing accurate statistical and numeric facts makes its establishment unique. By the early 1960s, conducting survey and census had become a common ritual in many decolonized governments in the region. As the colonial attention towards East Bengal was inconsistent, the production of district gazetteers describing and defining each district in statistical terms was delayed. The Pakistani rule was considerably immature and it lost control of East Pakistan before achieving the British colonial aptitude and sophistication of ruling through knowledge production. Bernard Cohn, in his work on the production of colonial district gazetteers argues that these statistical categories of 'native population' are not merely a mode of representation, but an instrument of regulation

(Cohn, 1987). In the modernizing/globalizing context of the Indian state, Appadurai has extended this argument (Appadurai, 1996). In his historical exposition of the theory of statistical probability, Hacking explicitly makes the connection that statistical knowledge and statistical reasoning is the central way of conceptualizing modern day hopes and woes (Hacking, 1990). The role that statistical probability and prediction of the Center played in communicating the war torn Bangladesh and its situation substantiates his argument again.

As I said earlier, production of statistical information of the region was fractured in both the colonial and inter-colonial regimes, and whatever existed got burnt during the war of 1971. The Pakistani Military set fire to the crucial administrative buildings including the East Pakistan archive. Locally, the mode of understanding the socio-economic situation was dispersed. The wave of Maoism in the North-western region adopted class structure/mode of production interpretation, whereas the Awami League since its establishment was ideologically nationalist-reformist. Consequently, in war-torn Bangladesh, the surveillance system seemed to be the only available rhetorical structure to produce as well as to act on the catalogue of hopelessness and woes. Immediately after independence, the national government, policy planners, and development workers adopted the projected predictions, probability and patterns based on Matlab information. To comprehend the newly independent state and its status, statistical concepts like maternal mortality, infant mortality, or the incidence of diarrhoea became common signifiers. Transcribing the marginality of Bangladesh in terms of the 'physiological-biological' parameters of its populace, in this rhetorical structure the nation state is conceived as a diseased body, the representative sample from Matlab constitutes the

collective health status of its citizens. The implicit practice of pathologization of Bangladesh disjoints the complex process of nation-state building from its global and historical context. The same biomedical principle which individualize the diseased body was applied to the state itself. It becomes difficult to comprehend the marginality of the nation-state in its relationship with larger context rather treated as a localized-dehistoricized biological entity. Also, it further served to draw unseen comparisons between diseased (Bangladesh) and healthy (western-donor) states which aid the modernization process. In the context of the emerging neo-liberal health economy, people's experience of poverty and illness gains political economic value. Through pathologization or standardization of experience, Bangladesh provides the world means to understand this value, thus finds strategic importance, defined its postcolonial existence. In other words, poverty becomes a productive force in the making of Bangladesh and the emergence of new global governance.

PART IV
THE BIRTH OF THE HUMANITARIAN SCIENCE

CHAPTER 6:
SCIENTISTS' HISTORICAL DIARY, 1849-2003

6.1 Scientists' Historical Diary: British Colonial Period, 1849-1947

Historical Diary August, 1849:
John Snow's Water Borne Theory

Between 1830 and 1850, scientists and medical practitioners were still to discover the etiology of the cholera epidemic [A]. Miasmatic theories of cholera were dominating the intellectual climate of the time, which believed that the primary cause of the epidemic was the inhalation of poisons. This etiological assumption led to the medical belief that administering the inhalation of chloroform as long as the symptoms of cholera recurred would cure the patient [A, D].[52] At that time, John Snow (1813-1858) had already proved his expertise in the field of anesthesia [C]. None of his biographers are certain about what exactly brought him into cholera research. The author of this most recent biography (2003) speculates that Snow's theoretical breakthroughs in anesthesia, extensions of his experimental research in respiratory physiology and the properties of inhaled gas made him reject the effluvial theory of cholera. [53] He believed that cholera was a local disease of the gut, since the abdominal symptoms suggested that the disease was caused by a morbid material, or a poison which acted locally as an irritant on the surface of the stomach and intestine producing pain, vomiting, diarrhoea and dehydration [A,B,C]. He also thought that since the morbid material multiplied in the body of one who was sick with cholera, its poison must be present in the intestinal discharge of the cholera victim. In his book, *On the Mode of Communication of Cholera (1849)* he presented evidence to prove this pathological inference about cholera, providing statistical information which

linked the incidence of cholera to the household consumption of water from a specific pump in an English city [A,B].

Historical Diary 1857:
William Farr's Miasma Theory and the Indian Mutiny/ Rebellion of 1857

William Farr (1807-1883), the Statistical Superintendent of the General Register Office in England and a member of the Committee of Scientific Inquiries in 1854, devoted much attention to cholera and published important studies of three of England's cholera epidemics. His work fueled the miasma theory of cholera. He believed that the geographic concentration of cholera proved meteorological conditions as the key determinants of it. Dr. James Lumsdaine Bryden, the first statistical officer of the newly formed Sanitary Department of colonial India was also a follower of Farr and remained convinced that cholera was an airborne disease. Probably, their privileged administrative positions allowed them to produce more detail statistical accounts as compared to Snow's hypothesis, which was based on scanty information. In colonial India, Bryden administered a cordon and quarantine sanitation. During the 1857 mutiny the British troops were severely affected by the cholera epidemic, and the East India Company had anticipated unwanted consequence of epidemic in their trade economy. These effects likely hurried the process of forming a sanitation commission in colonial territories [F,G]. Farr's theory and quarantine sanitary regime continued to rule, yet it is indeterminate whether it was the prevailing colonial tensions or the concrete mathematic reasoning of Farr and Bryden's theory favored the intellectual environment for the miasma theory [E].

Historical Diary December11, 1883:
Robert Koch Isolated Fresh Comma Bacillus in Kolkata

John Snow's theory of cholera transmission failed to achieve recognition from his scientific contemporaries because his theory inconclusively identified a cholera poison in the intestine of the victim. Opponents of Snow denounced his theory claiming that his epidemiological study was methodologically erroneous [A,B,C]. Only when Robert Koch (1843-1910) a German bacteriologist from Reich-Gesundheitsamt (Imperial Health Bureau) in Egypt identified a comma shaped organism as a vector of the disease did Snow's theory of cholera gained currency among the scientific community. He first identified the organism in Egypt; however, the cessation of the epidemic soon after his arrival prevent him from conducting any decisive experiments. On the eve of his 40th birthday, Koch and his team arrived in Kolkata. They isolated a comma bacillus morphologically identical to the one they had found in intestinal materials from cholera patients in Egypt. The first isolate came from a 22-year old man who died only 10 hours after the onset of the infection. In less than three hours after the death, the body was autopsied at Sealdah Hospital. According to his biographer, Koch was rather lucky in Kolkata and 'the secret was the fresh material.' Availability of fresh material, in other words, availability of unidentified dead bodies of cholera victims in the morgues allowed Koch to confirm the vector of cholera – *vibrio cholera*, the comma bacillus [H, I].

Historical Diary March, 1893:
W.M. W Haffkine Arrived in Kolkata with his Anti-Cholera Vaccine

Being faithful to Pasteur's method of vaccine preparation, Waldermar Haffkine (1860-1930), a Russian-Jewish zoologist started working on the development of anti cholera vaccine in Emile Roux's Laboratory at the Pasteur Institute. In the first stage of

his experiment, he developed a 'fixed virus'* by acclimatizing the *vibrio* to grow in the serum. His fixed virus killed guinea pig in six hours. This result was encouraging enough to start his second phase when he started inoculating attenuated *vibrio* in different doses into his experimental guinea pigs. In May 1892, his cholera-infected guinea pigs showed immunity.[54] Haffkine's animal model of experiment stirred skepticism among the scientific community, many thought that his attenuated vibrio may not manifest similar symptoms in human physiology as it had showed in guinea pig. Skepticism and debate continued. To prove the efficacy of his vaccine on human beings he inoculated himself, and randomly vaccinated volunteers who had trust in his work: his Russian colleagues in the Laboratory, a journalist from the New York Herald who was anticipating a visit to cholera affected cities; the British bacteriologist E. H Hankin, who had just been nominated as the government bacteriologist of north-west province of colonial India. The inoculation of the British bacteriologist appeared vital in his career. With the political support of Hankin, Haffkine arrived in Kolkata on the March of 1893 and immediately began a large scale anti cholera vaccination campaign. Different sources said that he had vaccinated more than 40,000 Indians including inmates of colonial prisons at Gaya and Darbhanga Jail [J,K].

Historical Diary, 1935:
The Continued Trial of Cholera Vaccine in the Sub-Continent

As a Russian émigré in France, Haffkine wanted to achieve immediate recognition in the European scientific establishment. This drive for recognition affected his experiments since he rushed towards conducting large scale trials of his vaccine. In a debate before the Calcutta Corporation in 1896, the opponents of his campaign claimed his vaccine campaign was illegal experimentation on humans because the results of his

animal model were not confirmed. Besides, local volunteers were often hostile towards the vaccination process. The preparation of the live vaccine* itself was an obstacle; it was almost like carrying the laboratory from one end to the other end of colonial India. His trial gave him little of substance which could help decide on the efficacy of his vaccine [J,K].[55] But scattered efforts of cholera vaccination continued between the years of 1930-1935, conducted either indigenous scientists trained in colonial science or colonial scientists themselves. In 1931, a population of 256,249 was inoculated in Faridpur district of the-then East Bengal. In another corner of colonial India, Kashmir, around 16,000 villagers were inoculated with a killed vaccine* as oppose to Haffkine's live vaccine. The results of these experiments often showed differences in the attack rates of those sections of the population who had been immunized, and those who had not [L,M]. However, the efficacy of the vaccine was still unresolved, because these studies were either conducted during an outbreak or the control and non-control groups were not comparable. On the scientific front of cholera vaccine research, the situation remained immobile for decades, but local resistance towards inoculation as the violation of the body died down [E].

Historical Diary, 1949:
Commander Robert Allan Philip's Rehydration Research in Egypt

The fall of the British colony in India did not necessarily interrupt the scientific investigation of cholera. Locally, the national scientists continued their work. Research on the problem of cholera simultaneously but independently took place in N.K Dutta's laboratory at the Haffkine Institute in Mumbai and in S.N De's Department of Pathology at Nilratan Sircar Medical College in Kolkata [I]. The collapse of European colonialism transferred the control of geo-political epidemic sites to US and it was maintained through institutional bodies like: the United Nations (UN), National Institutes of Health

(NIH) and Naval Medical Research Units (NAMRU), World Health Organization (WHO). It was obvious that the history of cholera research after 1947 was dominated by US scientific enterprises. NAMRU played a vital role in the making of this history.[56] In December 1942, it established research laboratories in Eastern Europe and Egypt [N,I]. Two years later, Captain Robert Allan Philips joined the team in Egypt, he later become one of the historical figures of cholera research in Bangladesh. In Egypt, he got involved in a study looking at the problem of body fluid balance in connection with blood substitutes for transfusion of wounded soldiers suffering from blood loss [I]. His first encounter with cholera epidemic however didn't happen until 1947. His scientific interest on the problem of body fluid balance prompted him to investigate loss of bodily fluid in cholera patient admitted to the Abasia Fever Hospital. He wanted to determine accurately the loss of water and the amount of salt dissolved in the blood of cholera patients [N,O,P].[57]

6.2 Scientists' Historical Diary: Intercolonial Pakistani Period, 1960-1970

Historical Diary August 1962: Death of Five Filipinos in a Controlled Trial of Oral Solution

By the early 60s, scientists were coming to the conclusion that the *vibrio* no longer played any part once the symptoms of diarrhoea had been initiated. It was the rapid loss of electrolytes that causied death and an effective rehydration procedure could decrease the case fatalities. Consequently, the cholera and diarrhoea research shifted its major focus from vaccine studies to the development of an effective remedy. However, scientific understanding of the glucose, sodium and water transport in body fluids across the intestine was ill developed at that time. In September 1961, a cholera pandemic broke

out in the Philippines and Captain Philip decided to conduct his rehydration study. For two patients he prescribed a high concentration of sugar and sodium orally and the effect of it on the patient was significant. This result prompted him to the sodium pump hypothesis that assumes the cholera patient's intestinal sodium pump gets poisoned, implying that sodium, instead of getting absorbed in blood, comes out with feces. He believed that a high concentration of the oral solution would unpoison the pump [O,N]. In August 1962, his team conducted a clinical trial among thirty patients in Manila; among them, 5 patients died. Since his oral solutions were three times isotonic in concentration and intravenous fluid was co-administered, fluid overload occurred and led to a congestive heart failure. The death of five Filipinos halted the scientific march to discover the oral rehydration therapy for both Captain Philip and NAMRU [I,P].

Historical Diary 1963:
Cholera Vaccine Trial in SEATO Cholera Research Laboratory

The unstated competitive relationship between different laboratories structured along the lines of scientific positions, political alliances and national identities of scientists resulted in ill-coordinated cholera research projects being drawn up in different epidemic sites around the world.[58] Medical historian Ruxin's (1994) historical exposition of the oral rehydration saline (ORS) indicates that had there been better communication between Philip's endeavor and the work done by Harvard Biophysics laboratory, the mistakes in Manila could have been avoided. Meanwhile, National Institutes of Health (NIH) revitalized its strategic interests in the development of an oral therapy of diarrhoea, presumably for its military troops out on duty in tropical areas. NIH came to know of the progress of Captain Philip's team and delegated Dr. David B Sachar to verify Philip's sodium pump hypothesis [I,O,P]. David Sachar's research in the CRL proved that the

intestinal sodium pump did not become poisoned, however he found the concept of isotonic oral solution propagated by Captain Philip to be effective. Sachar's experiment modified the oral solution indicating that glucose possibly improved sodium and water absorption in a cholera patient. Though the rehydration research overshadowed the history of cholera research at this historical juncture, the discovery of cholera toxin by S.N De possibly generated hope on the anti-cholera vaccine development. The field station of the CRL provided the researcher with an ideal ground for conducting clinical trials of cholera vaccine. Both anti-bacterial immunization and anti-toxic immunization trials were continuously conducted since the emergence of the laboratory (for a detailed account of the cholera vaccine trials conducted in Bangladesh see Annex- C).

Historical Diary, 1950-60:
The Safe Water Campaign and Tubewells

The concern of the colonial metropole about the health of British troops serving in the colony and the local threat to the colonial power for not being able to protect its subjects from a deadly disease created an awkward crisis for the local colonial body. The repercussions from the sanitation measures like segregating the 'native' from the white enclave and forced vaccinations in the pilgrims further heightened this tension. The hesitant results of scientific experimentation helped fuel controversies, instead of securing colonial administrative steps. As there was no coherent position from the colonial administrative hierarchy, flawed sanitation and public health programs were introduced, with contradictory ideological connotations. Based on the assumption that access to safe water would decrease the rate of water borne diseases, the rural water supply program was introduced. The geomorphological analysis, in addition, disbanded indigenous surface water as a source of safe drinking water and suggested tapping ground

water from the alluvial soils of the region. According to a UNICEF report, even before 1948, 50,000 tubewells* were constructed under the authority of 20 colonial district administrations. During the early 50s, through the establishment of the Directorate of Public Health Engineering (DPHE), the installation of this water technology was decentralized. During 60s, the PL 480 funded rural development program took the responsibility and the implementation of safe water programs continued under the rubric of international development in Bangladesh.

6.3 Scientists' Historical Diary: Independent Bangladesh Period, 1971-2003

Historical Diary, 1970:
First ORT Control Trial and Cyclone Catastrophe

On the night of 12 November 1970, a catastrophic cyclone struck the coast and off-shore islands of Bangladesh, killing 300,000 people. The scientists from the laboratory switched their roles, they joined hands with the Red Cross and local relief teams, and became engaged in massive aid diplomacy and managed to bring relief money, and goods from different US-based aid agencies. A lot of attention of the Laboratory was forwarded to the catastrophic site; the significant consequence of this involvement was the expanding access to other epidemic sites of the country [Q]. At Matlab, the first controlled clinical trial of ORT was organized and conducted. Before the scientists could proceed with the results and present it to the scientific community, the war of 1971 broke out.

The cyclone of 1970 weakened the local resistance to global aid politics. For many middleclass Bengali young men, whether ideologically motivated by the Maoist revolution in the continent or simply left leaning, this was a difficult moment. The

volatile provincial government of East Pakistan made practically no to improve the devastating situation in the cyclone-affected areas. These men felt that they were left with no option but to accepting foreign aid and join hands with the Red Cross, and the PSCRL team. It was still not the budding moment of international development in Bangladesh. The famine of 1974, countless corpses of poor landless people in street corners of the metropolitan cities (Dhaka, Chittagong, and more particularly Khulna) was another moment of contradiction that the newly born nation-state experienced. One side of the coin shows its ambiguous diplomatic status, the strong presence of Maoist rebels in the northwestern region of the country. On the other side of the coin, we see how the famine, compelled the government and local faction of leftist groups to comply with the preconditions of the aid-flow. The famine of 1974 was the decisive moment for international development work in Bangladesh. To name a few from these local factions, we find Fazle Hasan Abed and Dr. Younus representing two globally recognized development initiatives BRAC and Grameen Bank respectively, both of these initiatives gained momentum during this famine.[59]

Historical Diary, 1974:
Famine, Vaccine Trial and Family Planning Programs

Not only were Laboratory funds constrained, the US was also hesitant to commit any food aid because of Bangladesh's policy of exporting jute to Cuba. In 1974, US sanctions created a famine situation as the economy: already devastated by war; ravaged by heavy monsoons; and flooding wiped out much of what was left. Over a million people died between July 1974 and January 1975. A field trial of glutaraldehyde cholera toxoid* involving 92,838 volunteers from Matlab and a water use study (determining the correlation between water use behavior and the incidence of diarrhoea, in the famine

affected relief camps of Dhaka city) were the two significant studies that the Laboratory was involved in during the famine [T,U]. The result of the trial was later cautiously presented at the 12th Joint Conference by the US Japan Cooperative Medical Science Program, Cholera Panel, 1976, where it was stated that "the field trial was conducted under a period of extreme food deprivation, when a nutritional status does different things" [Q]. White women, wives of scientists working in the Laboratory, joined hands with a few Bangladeshi women, members of Dhaka Lions club and developed a family planning program which received financial support from the Laboratory. Often national and foreign employees of the Laboratory are found squabbling with other public health stakeholders on the question whether this is the first-ever effective family planning program in Bangladesh or not.

Historical Diary, 1977:
Studying the Correlation of Access to Safe Water and the Incidence of Cholera/Diarrhoea

During the process of internationalization, the Laboratory explored extending the institutional relationship with funding bodies like UNICEF to possibly manage the funding crisis it was encountering. In consequence, UNICEF asked the Laboratory to evaluate the impact of existing tube-wells on the enteric disease rates. In their case presentation at the US Japan cholera symposium, investigators, recalling John Snow, argued that though it had been established that water has a role in the transmission of cholera, but to what extent and how it transmitted the disease was not clearly known [I]. The study result conducted in 20 villages of Matlab field station with access to tube-well water failed to detect a consistent pattern that showed that drinking tube well water reduced the diarrhoea rate. The proposition that safe drinking water will decrease

diarrhoea cases and the successes of the national safe water program based on this proposition, as the researcher of this evaluation study argued it is not scientifically confirmed. They suggest that in the context of Bangladesh, surface water is an integral part of culture, and the small amount of protection afforded by drinking bacteriologically safe water may be overwhelmed by the exposure to polluted surface water through bathing, food preparation, and utensil washing. The Laboratory continually expanded its collaboration with local and international development organizations, alongside their regular scientific activities. The efficacy of oral solution was confirmed over time and modifications of the proved oral solution continued.

Historical Diary, 1979:
Mr. Abed's Kitchen Experiment of Lobon-Gur Solution (LGS)

By then the efficacy of ORS was proven, and the question was how to better inform medical practitioners, and health care providers? A debate occurred around this question, some arguing that treatment should be confined to the trained physicians and nurses whereas some proposed that training should even be given to traditional medical practitioners. BRAC was already in the field trying to integrate primary healthcare with their Rural Development Program (RDP). They were providing training to community health workers/'mini doctors' following the principles of barefoot doctor. From BRAC operation areas, concerns were repeatedly voiced to the BRAC Dhaka headquarter regarding the high rate of child mortality due to diarrhoea. BRAC decided to train mothers on the preparation of ORS. The Control of the Diarrhoeal Disease (CDD), a program of WHO, however, opposed the idea of making the solution available other than through a health facility.[60] BRAC was determined to continue with the program. Conveying the scientific message in common language appeared as the big challenge:

how the scientific measurement of salt and sugar can be accurately communicated to the unlettered mother so that she can produce the standard solution. Mr. Abed, the executive director of BRAC, conducted an experiment in his kitchen, using his fingers and locally available pots for measurement. It was found that a solution made with one pinch of *lobon* (local salt), two scoops of *gur* (locally available forms of brown sugar) with half a seer of water gave the best results with the sodium content closest to that of the WHO standard. This solution later came to be known as the lobon gur solution. At about the same time, ICDDR,B conducted a clinical experiment to test the efficacy of the lobon gur solution and recommended it as a best available substitute to the WHO standardized solution [V].

Historical Diary, 1977-85:
Studying Travelers' Diarrhoea

In the early 1980's the tension that arose from the internationalization debate toned down.The internal staffs' anxiety around the possible closure of the Laboratory eased somewhat and it started further expanding its programs and activities. Among the first few of these collaborations was joining hands with BRAC to launch a nation-wide campaign to introduce ORS. A longitudinal study (1980) was initiated to study the high rate of diarrhoea among travelers to Bangladesh (mostly white expatriates from the West) [X]. In Matlab, the Center together with government bodies and BRAC had conducted an experiment (1981) to prove the developmentalist assumption that family planning programs are more effective if segregated from the primary health care support system [Q]. In 1985, the Center again became the subject of controversy when it performed a clinical trial to determine the ability of a new cholera vaccine candidate immunogen –

purified B subnuit – to induce an immune response in Bangladeshi volunteers[Y] (See, Annex B for details about the trial.

Historical Diary December, 1992:
Vibrio Cholera 0139 Synonym Bengal Found

In December 1992, a cholera like epidemic broke out in southern Bangladesh and then spread throughout the country. By the end of March, 107,297 cases of diarrhoea and 1,473 deaths were reported. According to the scientists from the Center, the disease was indistinguishable from cholera in its clinical features and in response to treatment. Most of the cases were in adults which suggest that the population had no previous immunological experience of the organism. At two centers 375 (40%) of 938 and 236 (48%) of 492 rectal swabs were positive for V cholerae non-01, as were 54 water samples. 55 isolates of the V cholerae non-01 were studied in detail by the Center. The strain did not resemble any of 138 known V cholerae sero groups; so a new serogroup 0139 with the suggested name Bengal was proposed by the Center scientists [AA].

Historical Diary, 1993: Twenty-fifth Anniversary of ORS

BRAC's program of taking the fruits of scientific discovery from the Laboratory to the doorstep of the people became a success by the late 1980s. Apart from the Chittagong Hill Tracts (CHT) (where there were national level informal economic sanctions and military rule to silence the voices of the ethnic minorities of Bangladesh), the mother's training program to make ORS widely and effectively acceptable was completed in Bangladesh, by the year 1990.[61] In 1993, along with BRAC, the Center celebrated twenty five years of ORS. A conference was organized at the Center embodying all modes of festivity for providing the global health a model of "science reasonable to the poor" and a model of health education program that successfully

translated advanced scientific knowledge into everyday language [AB, AC]. In 1996, on the eve of the Silver Jubilee celebration of Bangladesh, the government declared a near hundred percent coverage of safe water through the installation of hand-pumps. The success story of access to safe water did not persist as the reported number of arsenicosis patients began increasing. The stories of arsenic contamination in tubewell water started overriding the hue-and-cry of the safe-water campaign.

Historical Diary, 2000-2003: Silver Jubilee of the Center, First Ever Gates Award and Antibiotic Resistant Vibrio Cholerae 01

In 2001, the Center was awarded the first ever Gates Awards for Global Health. Two years later it celebrated the 25 years of western "scientific excellence in a third world socio-economic context" [AD]. Since the early 1990s, in a scattered manner the Center was documenting cases of bacteria resistant vibrio but in 2003 it isolated a vibrio cholerae which was resistant to tetracycline, trimethoprimsulfamethoxazole, Furazolidone, erythromycin resistant. These anti bacterial medicines had been prescribed in severe cases of diarrhoea [AE].

CHAPTER 7:
PARADOXES OF HUMANITARIANISM

7.1 Scientists' Historical Diary

Reconstructing the scientists' historical diary, I have attempted to record the scientific events incommensurable with the victorious history of the science of cholera. By providing historical detail, I do not intend to inauthenticate available versions of histories; rather, I have argued that omission of scientific events and actions incongruent to the master narrative is inherent in scientific culture. During the early stage of scientific experimentation of ORT, five Filipino cholera victims died in a control trial of oral rehydration therapy (Phillips, 1964; Ruxin, 1994) but the master narrative abandoned these scientific events from its depiction since that particular scientific moment was the moment of embarrassment and disappointment for western scientists.[62] In addition, it happened in a distant locality. Therefore, the scientific ritual of omitting historical events is an act that also serves to contain the mobility of Western scientists and their laboratory setups within the national boundaries, thereby denying the connection between states in the margin.

By insisting that there is a scientific ritual of effacing incommensurable scientific events within its epic stories, I am not saying that scientific practice is ahistorical. Instead referring to reconstructed scientists' historical diary, I have demonstrated here how historicity is construed within the scientific culture through a particular kind of disengagement with the larger societal context. Since historicity-ahistoricity of science has been the subject of critical analysis for variegated set of intellectual enterprise, it is

vital to engage myself with these works and develop a framework which equally emphasizes the internal processes and larger socio-economic context of scientific knowledge production. Post-Kuhnian science studies have shown the degree to which modern sciences are historically integrated with the rest of the economic, political and social relations of their era (Hess, 1995; Harding, 1998).[63] Drawing attention to the correlations between the emergence of science and European expansion, historians of colonial science emphasized the falsity of universal and appropriating epistemological claims of Western science (MacLeod, 1987; Kumar 1997; 2001). Aside from these theoretical developments in the Western academic discourses, scholars and activist from postcolonial locations, referring to the experience of state development projects, critically examined the objectivity and ahistoricity of scientific enterprise (The Penang Declaration on Science and Technology, 1986; Third World Network, 1993). Literatures produced by the Alternative Science Movements in India are an example of such critical account (Nandy, 1980; Uberoi, 1984; Sardar, 1988; Vishvanathan, 1988; Alvares, 1992; Shiva, 1999). Since the arguments of Alternative Science Movement of India are echoed in the critique of international aid-dependent scientific projects in Bangladesh (Akhter, 1996), once again I will refer to the their work to develop my position on the historicity of science.

During early 1980s, diverse group of scholars in India lent their critical voices to the various grassroots movements actively opposing the state models of development. Coming from an eclectic ranges of academic backgrounds such as social anthropology, history, psychology and philosophy, these scholars, activists shared a common ground. Their critical opposition to the techno-cultural divide between West and non-West

(Prasad, 2006) and their politico-theoretical thrust for an alternative democratic science bound them together (Rajan, 2005). In their critique of national development programs like mass sterilization, large dam development, the green revolution or even the nuclear science projects they challenged the nationalist imposition-imitation of Western science and the inevitable violent-disruptive consequences of this process of indigenous ways of life and knowledge systems. Precisely, the alternative science movement of India, invoking the role of science in the nation building project, argued that violence and ahistoricity is entrenched in the style of scientific thinking (ibid, 2005). My analysis that follows both converged with and diverged from alternative science movement in India. Science in nature vivisectionalist and performs epistemic violence are the analytical spaces of convergence for me, however in my analysis the 'dehistoricizing tendency' and 'ahistoricity' of science is not conceptually interchangeable.

I argue the dehistoricizing tendencies of science are attached to its rhetorical strategy. The works of first generation rhetoricians of science, Charles Bazerman (1988) and Alan Gross (1990, 2006) informed my rhetorical perspective of science. Charles Bazerman in his rhetorical enterprise, *Shaping Written Knowledge* (1988) demonstrated the rhetorical characters of scientific language and argued that rhetoric is constitutive of scientific knowledge. Allan Gross, on the other hands, in his work *The Rhetoric of Science* (1999) explored rhetoric as the technique of persuasion of scientific knowledge claims. Consequently, the question rhetoricians raised is what rhetorical technique scientists adopt to facilitate the consensus formation processes firstly, among the scientists community and later to the people who consumes the scientific knowledge.[64]

There is a tendency in the Center's scientific literature to dehistoricize knowledge claims. This is a persuasive technique that augments the aura of scientific authority. The disjuncture and distance from the scientific errors of W.M.Haffkine's cholera vaccine trials in India is essential to preserve ultimate value-neutrality of truth claims. A context stripping, dehistoricization happens to conserve the authority of scientific fact.[65] Haffkine's connections with the colonial bacteriologist and the controversy within the colonial administration about his vaccine trial was removed to create an unquestionable historical slate, a rhetorical *tabula rosa* where the Center could commence new episodes of anti-cholera vaccine trials. Unfolding the rhetorical strategies of science, here I explore the ways scientists practice *historicism within.*[66] In conversation with the previous scientific excellence or errors, past is lived in the present scientific activities. Scientists' historical reasoning counts on its own historical diary. Apparently, Haffkine conducted his vaccine trial in India on 1893, but the error of his trial revived in the historical consciousness of scientists at several points and time. Often scientists designing new vaccine trials in Bangladesh or elsewhere in the third world territory referred and reviewed his mistakes. Scientific practices may prefer to disengage with the political economic context but it has internal processes to revive its own history. Instead of ascribing overarching ahistoricity to science, an exploration of its rhetorical structure and *historicism within* provided me with the analytical framework to interpret apparently ahistorical, utterly numeric scientific literatures of the Center and reconstruct the scientists' historical diary.

Both rhetoricians of science and science studies emphasized the significance of the rhetorical techniques of persuasion in the stabilization of scientific facts. However,

heterogeneous and yet intercommunicating ontological properties of science is trivialized in their epistemological structures. Scientists as semiotic actors alone cannot contend the complex emergence of the Center. It emerged by a series of associations between events distributed along a number of different dimensions, with different histories, different conditions of possibilities (Rose, 1998). The scientists' historical diary intersecting with the history of social sufferings, scientific discovery, and nation state building projects proves this critique of rhetoric of science. The reconstructed diary describes the complex processes within which place, person and population were become subject of scientific and biomedical attention and transforms Bangladesh as a site for the production and deployment of diverse forms of expertise. The heterogeneous state and non-state apparatuses are established. Starting from Haffkine (1893) to Sack (2003), the current executive director of the Center, the traffic of scientists from the Colony/West to the region, not only documents the advancement in scientific understanding of cholera, but also suggests how these scientific activities change the life of the multitude in Bangladesh. Therefore, I seek to investigate *science-as-technology (of governance)-in-action*. In the following sections of this chapter, I will discuss two distinct but related processes to elaborate my particular conceptualization of science: cultivation of transnational epidemiological site; and the ruptured biomedicalization. The reinculcation of colonial logics is common to both. I consider these processes fundamental in characterizing the birth of the humanitarian science in Bangladesh.

7.2 Cultivating Transnational Epidemiological Site

In late 1950s, when NAMRU-3 medical officers and SEATO diplomats were discussing different geographical sites to establish a cholera research laboratory, neither

Europe nor US was considered as a possible epidemiological site. By then several episodes of cholera epidemic struck Europe and North America and historians of public health already proved that working class people, particularly black neighbourhoods in America had been affected by the disease persistently, yet diarrhoea is not historically attached with this geographic region (Reverby and Rosner, 1979). Due to the way the idea of cholera, its etiological explanation historically evolved the disease is intimately tied with Asia, Gangetic delta in particular. Naming of the disease, as Asiatic cholera is one example of such historically conditioned geographical distribution of disease and ideologically motivated construction of local public health concerns.[67] Considering the obscure knowledge about the pre-colonial episodes of cholera epidemic in India, Kavita Misra's (2000) historical study of cholera inoculation further explains this point. She argued that the cartographic descriptions of India are informed by the colonial discourses. The calculation of medical diplomats and the scientific preference to establish the Laboratory in the East Pakistan is embedded within this colonial discursive domain. Therefore, the treatment of the region as a pathological site is not a new phenomenon. How the Center inculcates this colonial logic to cultivate similar epidemiological site in the postcolonial moment is what characterizes the uniqueness of the Center, the third world-ness of the Center science.

The Center became an infrastructure to (re)produce a transnational epidemiological site without disrupting the territorial sovereignty and local-ness of Bangladesh. It has provided all actors with the model through which *deterritorizliazed-territorial sovereignty* can be maintained.[68] Here, I will elaborate my argument using the examples from the myriad of ways the Center claimed its 'international excellence.' In

the particular historical context, the Center promises 'to produce knowledge about health and diseases for the poor people in Bangladesh and other settings.'[69] This mission reveals the international nature and reach of its scientific work. How does the work of the Center achieve internationality and what does it claim by this? On the one hand, the ICDDRB asserts that its standard of work is comparable to other laboratories located in the west; on the other hand, it claims that "science can benefit the entire third world susceptible to diarrhoea" (Watts, 2003, p.327). The most recent annual reports of the Center has started publishing a world map showing its scientific and medical activities world-wide to prove its international outreach (ICDDRB Annual Report, 1993; 1995; 1997; 2000; 2003). A disparate transnational process is at work behind this international excellence.

The fundamental rationale that the Laboratory presented during the internationalization process in the negotiation table was that it will create a formal transnational infrastructure for global transaction of science, scientists, and biological things/objects/specimens and ultimately will generate a knowledge flow from the natural epidemic site (ICDDRB Annual Report, 1980; Heyningen, 1983). Analyzing the work of microbiologists and sanitation advisors of the Center (where each becomes the interlocutor of other's work), I have documented a system of transgression that materializes this transnational governance: firstly, it assumes that the fact revealed from the laboratory examination of blood samples and rectal swabs of a poor Bangladeshi cholera victim can also reveal facts of all victims inhabiting similar 'unhygienic' places. Consequently, the affect of blood sample transgresses geographical boundaries; a sample collected from Bangladesh can speak for all other cholera prone developing countries. Secondly, this scientific opportunity of standardizing bodily experience of cholera for

'third world' turns Bangladesh into a sample ground of conducting experiments to understand either bacteria's resistance to vaccine or to record the affectivity of particular pharmaceutical products. This connects the sample Bangladeshi village with the international laboratory, national boundaries become fragile, and the distinction between ordinary life of rural people and their being human subjects of international scientific projects becomes inseparable. The global transportability of blood samples or scientists, the standardization of 'third world' bodily experience, local human subjects serving a global scientific purpose ultimately unravels a political order in which territorial sovereignty is maintained through deterritorialization. Ferguson and Gupta (2002) refer to this global process as an emerging system of transnational governmentality. [70] In this particular case, Nguyen and Peschard (2003) and Peter Redfield (2005) has termed this transnational variant of governmentality as humanitarian one that dominates the political rationalities of state and its subjects through discourses of medical humanitarianism like risk, sanitations, personal hygiene, and healthy citizen.

The emergence of the Center as a non-state transnational actor confounds the conventional understanding of modern state. For Haffkine and Koch, within a colonial governmental system, access to colonial prison or a local morgue in India was apparently obvious; ideally, these accesses in decolonized states should not be hassle-free. In Center's historical journey, from Robert Allan Philip to David Sack, scientific expedition of imperial nature deemed negotiable. The integrity of the nation state is accommodated through deterritorializing practices of the non-state actors like the Center and many other organizations like Grameen Bank, BRAC or WHO. Boundaries become blurred to maintain itself. In neoliberal governance, flow and traffic (of knowledge, idea, goods,

labour, organism, organs, culture, community/ethnic groups) considered more instrumental than territorial integrity (Appadurai, 1996). New governmental technologies and political rationalities arose, new state and non-state apparatuses evolved disrupting, disabling the indigenous, local possibilities of life (Scott, 1995).[71]

7.3 Ruptured Biomedicalization

In 1975, the Laboratory advertised for woman field worker. Many graduates from the social welfare department of Dhaka University applied for the job. Suraiya Begum got the job and she still works for the Center. She also wrote a biographical piece for the silver jubilee publication. Her piece illuminates the social negotiations that occurred during biomedicalization of village life. She writes: "This was the first time I had gone to work in a village. I always lived and studied in *Zila* (district) towns. I faced a lot of issues at this job because we were the first female workers to work at the field level in Matlab. We tried to build trustworthy relationships with the village women so that they could mingle with us easily and we would not face problems gathering information from them. We would go to them wearing normal *saris* and using *ghomta* (covering our head). Mothers from the village were very simple. If you socialize with them honestly, they speak their minds freely. Most of us in our team were unmarried. The mothers would refuse to weigh themselves as they thought that family planning ingredients would enter their body through their feet when it touches the weighing machine" (ICDDRB Silver Jubellee Publication Smritikotha, 2003, p. 18, translated from Bangla is mine. For complete translation of her narrative, see Appendix D).

This snap shot of the early period of biomedicalization underscores the reality in postcolonial contexts where (bio)medicalization is synonymous to the modernization

process. The reinculcated colonial logic of tradition and modernity is her technique of representation; she adopts this technique to indicate the local 'barriers' of biomedicalization. The weight machine, injecting syringes, stethoscopes are the symbolic modernity brought to the locality by the scientists. They are the invisible protagonist in her narrative as oppose to the simple, innocent traditional mother. On the contrary, in her narrative, the innocent mothers reluctantly standing in front of the weight machine appeared as the antagonist of her invisible heroes. She describes her desire to disrupt the local, but disrupt with good intention, for the benevolence of the people in Matlab. In the context of emerging biomedicalization, Suraiya denied all other responses to weight machine but the welcoming one. Local ways of communicating with disease and health are constituted as the ineffective one. Echoing Asad (1992) and Scott (1995), I have called this process of disabling and destroying existing possibilities of actions as the new technologies of governments. However, the particular nature of biomedicalization in Bangladesh is such that some aspects of biosocial experiences always remain outside the surveillance.

The problem of defining biomedicalization in the context of Bangladesh is that it's always a work in progress. Neither colonial medicalization, nor the postcolonial biomedicalization was ever accomplished as a task. During the colonial period, inadequate infrastructure of medicalization left the work undone in the margins of colonial territories. In the decolonized era, international and national development apparatuses provided the infrastructure of biomedicalization. However, the contradictory public health policies and extreme proletarianization in the face of unequal process of globalization proved the task of biomedicalization as "a difficult job for development

professionals" (Huda and Mahmud, 1996, p.7). Scholars interested in the biomedicalization in its relationship to globalization have been talking about this local and historically specific biomedicalization (Ginsberg and Rapp, 1995; Van Hollen, 2003a, 2003b). I have argued the biomedicalization specific to Bangladesh as ruptured.

I will elaborate this ruptured process, using the example of the joint initiative of BRAC and ICDDRB of "teaching million mothers to treat diarrhoea in Bangladesh" (Cash and Chowdhury, 1996, p.9). In this program, rural women were provided with the basic knowledge about diarrhoea, preparation of oral saline and standard sanitation practices. The task of treating their children from diarrhoea in this manner was delegated to mothers. With participatory practices invading development interventions, a host of self technologies have been launched whereby mothers are suppose to constitute themselves as active and responsible subjects capable of taking charge of their lives and improving the well-being of their children and their community (Triantafillou, 2001). While millions of kitchens were transformed into an ORT production cell, mothers are empowered, but children continue to suffer from other diseases like tuberculosis and arsenicosis. The empowered mothers suffer from asthma or low BP syndrome. Since the independence of Bangladesh, the major public health spending was either on the prevention of diarrhoea or on the family planning programs. In the neo-liberal global health economy, improving people's perception of tuberculosis does not have equal political value. Conversely, interventions in people's everyday water use practices contribute in the making of scientifically illiterate population. In this scheme of political value, tuberculosis with its alarming rate of case fatality remained at the bottom of the list of disease demanding scientific-medical attention. Therefore, my reason to argue the

biomedicalization as ruptured is two-fold: firstly, the Center never intended to produce a biomedicalized Matlab, it only intended to biomdedicalize fragments of it. The reproductive behaviours and hand washing practices are a few of those fragments of life. It is not just the socio-economic conditions or lack of medical-infrastructure left the job incomplete, my argument is that biomedicalization in Bangladesh is designed in ruptured manner. Secondly, a unique governable subject is produced as result of this ruptured process. A subjective position to accommodate the split between superstitious and scientifically literate becomes possible. The superstitious element keeps the public health crisis alive and scientifically literate mother proves the success of humanitarian science.

7.4 Paradoxes of Humanitarianism

In an interview with the Star Magazine (2003, October 23), Mohammad Abdus Salam, Associate Director and the Head of Clinical Sciences Division of the Center, explained why vaccine studies are so important for the Center, "A particular vaccine does not remain effective for years on end. After a certain period the bacteria develops immunity against that vaccine and makes it ineffective. So, we always have to work on for developing new vaccines as replacements. But this is only possible there is a continuous flow of statistics and data so that the researcher can work accordingly. Matlab demographic surveillance system serves that purpose." In 2003, the Center has isolated new bacterial strain resistant to the existing antibacterial drugs. This perpetual need to develop new drugs brings the question of bioethics into the brunt. Veena Das (1999) described this situation as unintended consequences of human actions that may change the experience of disease in unpredictable ways. She argues that there are no ethical boundaries to control this uncontrolled exchange

genetic material or even to understand this changes occurring in nature. Her analysis not only shows the paradox of humanitarian science but also identifies the inadequacy of the existing bioethical frameworks.

The Center follows the WHO bioethical guideline. The responsibility of ethics board of the Center is to monitors whether the research projects are following the suggested guideline. However, there are examples which shows studies approved by the board violated the ethical principle. Collin MacCord (1978), a scientist from the Center, in his letter to the editor of *Lancet* described one such incidence. He wrote, "experiments have been done at the CRL which have paid little regard to the rights and needs of the subjects of research and which have been done without informed consent. The following experiments would not, in my opinion, have been passed by ethics committees elsewhere: (a) radioactive materials were given to cholera patients; (b) tubes were passed through the entire intestinal tract from mouth to anus to measure the "transmural electronic potential" in cholera patients" (ibid, p. 768). A question that inevitably arises is how far can a universal code of ethics protect the human subjects of rural Bangladesh? How will this universal code address the unequal relationships that pre-exist this code? How are questions of biomedical ethics dealt with by the Center?

In previous chapters, I have discussed other public health situations that have ethical implications but do not fall under the common categories of bioethical violations. Since the Center emerged as cholera research laboratory, its main research has always been diarrhoeaol diseases. It provide the public health administrator the scientific rationale to invest all its resources in preventing diarrhoea, people's suffering from all other disease are ignored as a result. The

Center claims that it has scientifically proved that a family planning program detached from the primary health care services performs better. Hartman (1995) challenged this claim. She questions how access to birth control pills alone can confirm the success of a public health program. The Center's scientific support to such kind of family planning program can be argued as support to the denial of basic health services. The Center ignored the research result that questions the absolute correlation between increased accesses to safe drinking water and decreased in incidence of diarrhoea. I have argued elsewhere in this thesis that had these research already been available in the public domain, the arsenic disaster in Bangladesh could have been avoided. Whether providing scientific support to a flawed development program or suppressing one public health concern over other is a question of bioethical violation or a question of local accountability of transnational research institute is a burning concern for anthropologist of bioethics (Das, 1999; Petryna, 2005). However, it is evident that in different ways these incidences inflict social suffering. In other words, the humanitarianism of western science in Bangladesh is developed through the register of local social suffering, the suffering of the diseased mass.

PART V
CONCLUSION

CHAPTER 8:
THE 'DISEASED MASSES'

8.1 "Life of Slum-dweller Moyna, Tarabanu, Alfu Mia and Us"

"Tarabanu fetched a pot of water to make *sharbat* (home made soft drinks). In the pot she squeezed a slice of lemon and the water become blackish. Why would the water become blackish! Lemon peelings do not have iron likewise unripe banana peelings! Tarabanu throw some *gur* (local molasses) in mixture and stirred it. Looking at Martina's eye immediately I sensed what's going on in her mind; she just murmured: Mr. Hamid, impossible. I did not encourage her to drink this *sharbat*. The bread-earner, Alfu Mia wiping the sweat from his forehead with a *gamcha* (a locally produced cotton fabric that working class men, particularly rickshaw pullers ties in their waist) slipped into the house. Using his *gamcha* as strainer Tarabanu quickly filtered the *sharbat* and offered them with *anchar* (pickle) to her guest... While the guests were trying to avoid drinking the *sharbat*, Tarabanu adamantly announced, "if you don't accept our hospitality, I am not going to the Center tomorrow with my daughter." There was no way we could negate her threat, because her daughter Moyna barely survived from her illness, risk was still there. Every week Tarabanu had to bring her in the nutrition rehabilitation Center of ICDDRB. Thus, I just closed my eyes and in a single breath drank the *sharbat*. Pointing my foreigner colleagues very politely I said, "They don't drink this kind of things. (Translation from Bangla is mine.)"

The above excerpt culled from the biographical piece of Sheikh Abdul Hamid, one of the administrators of ICDDRB published in the silver jubilee publication of the Center (ICDDRB, 2003). In this piece, Hamid was describing his experience of a monsoon afternoon in Hazaribag slum. Two scientists accompanied him, Martina, a nutritionist from Netherlands and a doctor, Dr. Paula Silverman from Columbia Hospital in New York. Despite the odd smell, filth of the slum and pouring rain they went to see Moyna who previously received medical treatment from the Center. It was not mentioned in his narrative when exactly this event took place and what Moyna was specifically suffering from.

8.2 The Bacteria-dwelling Subjectivities

In the summer of 2005, at the peak of my thesis writing, I had to rush back to Bangladesh from Vancouver. My mother was sick and she needed immediate medical attention. Upon her return from the hospital, every afternoon in our living room a crowd of working class women of different generation used to get together to comfort my mother with their very playful and witty conversations. All these women earned their living by working as housemaid in different apartments of our apartment complex. My mother's loosely defined class boundaries made them are very fond of her. One of these days, a regular member of this afternoon congregation was missing because her two-year-old daughter had diarrhoea. My research involvement with the cholera research in Bangladesh enabled me to develop such spontaneous bodily response that the moment I hear the word diarrhoea, cholera or ICDDRB my ears become alert and kin on listening.

As I was listening to them, I found the group response to this motherly action was paradoxical. Hamida shrugged and said, "this is just an excuse, its not *jakkha*

(tuberculosis) that you have to stay at home. It is just diarrhoea. Even her elder daughter could make saline." But Sufia disagreed with Hamida. She said that diarrhoea may be a common disease but it can be fatal. Golapir ma, she was the oldest in the group, may be in her late 60s, annoyingly said that "children falling sick is normal, in olden days children used to get diarrhoea every now and then.[72] That was normal and we used to think fighting a disease makes the body stronger. Now a day's falling ill or *oshukh* is just a source of terror." Sufia interrupted with further annoyance. Pointing to the class question involved, she said, "it is probably rich people who can live a fearless life, look at our risky living condition; we live in the *boroloker moylar baksho* (garbage bin of the rich people) in Dhaka city." My mother intervened with her supposed class wisdom and said, "Diarrhoea is curable and preventable disease but it requires lots of attention to cure and one has to maintain some level of cleanliness to prevent the disease. It can be fatal, I was almost loosing my son when he was 11 months old because his nanny never cleaned the feeder properly and the diarrhoea *jibanu* attacked."

My personal anecdote along with the excerpts from the silver jubilee publication presented in the preceding section elaborates hierarchical actors' networks that mediate the processes of achieving scientific literacy in Bangladesh (Star, 1991).[73] The proud executive director of the Center, William Greenough (2004) labeled this process as "taking science to the bedside of cholera victim."[74] Epiphenomenal to this process is the production of bacteria-dwelling locality and the constitution of new subjectivities is what I am interested to examine in this concluding chapter. However, this personal anecdote also mirrors the multiplicity of my social positions where marginal and privileged positions juxtaposed. The question of inaccessibility at the door-step of ICDDRB that I

have described elsewhere in this thesis cannot destabilize the class, gendered and ethnicized realities constitutive of my identities.

Examining the actor network model of Latour (1983) and Callon (1986), Susan Leigh Star's (1991) explored alternative model. Drawing on feminist theories she emphasized on heterogeneity and multiple memberships in its relationship to marginality. She argued people inhabit many different domains and occupy heterogeneous identities in the process of standardizing facts while "a set of uncertainties are translated into certainties: old identities discarded and the focus of world narrowed into a set of facts" (ibid, p. 47). Here, in my narration of the hierarchical actor network I have followed her point of departure. However, the disagreement among Sufia and Golapir Ma, their distinct subjective positions raise question about absolute translation of uncertainties into certainties. World can be narrowed and fact can be stabilized without subsuming the uncertainty into certainty. The sanitation regime informed by the scientific discourses on cholera and bacteria is established disrupting the old forms of explanations and responses to cholera, but the heterogeneity of subjectivity keeps uncertain or the old alive. Thus, it is the tension between scientific (modern) and non-scientific-locally situated (traditional) knowledge that stabilizes fact. This tension becomes the fundamental factors in shaping subjectivity. Indeed, power lies in the ability to disrupt the local, the existing not necessarily on the accuracy of translation.

All the actors in this hierarchical network – white women scientists (Martina, Dr. Silverman)-administrator to the Center (Sheikh Abdul Hamid)-middle class house wife, (my mother)-working class housemaids or rickshaw puller (Tarabanu, Hamida, Korimon's ma, Alfu Mia) acquired some level of microscopic vision; they all saw what

the laboratory technician generally sees under the microscopic lens. The *vibrio cholerae* became the marker of the places where it exist and the places where it does not exist (Das and Das, 2006). Despite their social differences, they all contributed in the production of a bacteria-dwelling social space, similarities occur in the ways all actors respond to the presence of *vibrio cholera* in their social world. On the occasion, when Hamid, Martina and Dr. Silvarman visited Tarabanu's house, Tarabanu through her sincere act of hospitality, while preparing the *sharbat* totally disregarded the reality of bacteria. Conversely, Hamid for the good of Moyna's health drank the *sharbat* stirred with bacteria. Both Martina and Dr. Silverman thought drinking that beverage as an impossible act. The scientific effort, the microscopic vision creates a self-conscious subject who identifies and negotiates his or her subjectivity in and through biomedicalized sanitation practices (Pigg and Adams, 2005).[75] I have termed these new forms of subjectivities as bacteria-dwelling subjectivities. Closer inspection however reveals that the nature of autonomy and ability to negotiate is determined according to the locations of the actors in the network.

In complex ways, Sufia's subjective position conforms to the scientific construction of the bacteria-dwelling social space, yet she denies the scientific blame imposed on the social behavior of urban proletariats. Her metaphor '*boroloker moylar baksho* (garbage bin of the rich people)' proves her critical class position and dislocates the public health focus from individual's improved sanitation behavior to the questions of structural conditions. Scientific fact about diarrhea gains currency in Sufia's articulation because it allows her to challenge the existing social inequalities that mediate the experiences of illness in Bangladesh. Acknowledging the multiple memberships in many

worlds at once for each actor in a network, Susan Leigh Star (1991) argues that 'this multiple marginality is a source not only of monstrosity and impurity, but a power that resists violence and encompasses heterogeneity' (p. 30). Tarabanu's denial of *Ei Tor* or *Vibrio*, Golapir Ma's embracement of the olden days and Sufia's conformity to scientific facts from the margins of the network contributes to the stabilization of cholera-related scientific facts in Bangladesh and encompasses heterogeneous subjective position. In addition, this multivocality disrupts the ahistorical category of the 'diseased masses' produced in the scientific literature of the Center.[76] The 'diseased masses' denies the subjectivity of the people of Matlab who are participating in the scientific projects of the Center. It is a category that attempts to standardized people's experience of illness. Tarabanu or Golapir Ma disrupts this standardization process. When they are expected to be fearful about bacteria, they are just ignoring it.

My discussion on the formation of subjectivities requires further exploration, because the archival records I have used in this research are just the tip of iceberg considering what people in Matlab experienced in the last 40 years of biomedical interventions. However, even a cursory inspection of the heterogeneous subjectivities enable me to unmask the 'diseased masses' and allows me to raise question that are significant to my study but cannot be answered at great length. It is evident from the discussion in previous chapters that transformation of Matlab *thana*, a social unit into a scientific unit explicitly affected the socio-political processes nationally and globally. For the last four decades, how the people of Matlab is negotiating with this global and statist processes in their everyday life is part of the story that gives birth to the humanitarian science in Bangladesh, yet lacks exploration in my work. Implicated in this process, what

is that mediates their actions and enactment of particular subjective position requires further investigation. When a wage labourer from Matlab agrees to donate her blood to the Center or an affluent landowner decides to donate his land for a scientific laboratory and medical center in Matlab what socio-political and moral factors influences this action? This echoes the kind of question I have raised in the introductory discussion of this thesis - what really elicited the decision of remote villagers to imagine the country and its compatriots and then partake in a scientific experimentation? When the state in its citizens' imagination is still shapeless, what drives them to be part of a scientific project that has little pragmatic value for them? An oral historiographical networks analysis focusing on the heterogeneity of the actors and action from the margin will further show that stabilization of scientific facts about cholera, diarrhoea and bacteria in Bangladesh occur securing instability, tensions of tradition and modernity. It happened through the ephemeral but reiterative debates between nationalist and developmentalist-nationalist elites in Bangladesh as described in Chapter Two. This leaves us with the possibility that in postcolonial situations like Bangladesh, the stabilization of large-scale network is dependent on its cumulative accumulation of instability. In addition to my discussion on ruptured biomedicalization in Chapter Three, I suggest, a network analysis of stable-instabilization will further prove my argument and show in Bangladesh (re)generation of instability, chaos stabilized bacteria and the political order of the neo-liberal global health economy and co-produced a bacteria-dwelling nation-state and the humanitarian science.

8.3 Reading Power through Fragments, Ruptures and Instabilities

> Power is about *whose* metaphors brings worlds together, and holds them there.
>
> (Star, 1991, p.30)

> Independence changed the *actors* not the *script*.
>
> (Mignolo, 2005, p.112)

> "The changes [colonial to post colonial] do not reflect a simple expansion of ranges of individual choice, but the creation of conditions in which only new (i.e., modern) choices can be made.
>
> (Asad, 1992, p.337)

While consistently emphasizing on the instabilities, fragments, ruptures and disjoints, I have carried all along in my discussion the risk of reproducing a colonial, orientalist image of chaotic third world locality. My effort to disrupt the master narratives approving of nationalist and neoliberal/imperial political economy, my expose on the heterogeneity of postcolonial negotiations contain the possibility of being "mistaken for the postmodern pastiche" (Prakash, 1992,p. 15).[77] In my view, ruptures and instabilities are the modalities of colonial modern power (Hecht, 2002) and heterogeneous subjectivities are the affect of the relationship between that power and local experience (Star, 1991). In that particular afternoon, Tarbanu was unwilling to see *vibrio* in her *sharbat*. The denial of scientific fact here is merely nonconformity, rather one of the heterogeneous of subjective responses in its relationship to standardized sanitation practices. In other words, suggested sanitation practices or microscopic visions are the marker of her subjectivity, compliant or noncompliant. The metaphors microbiological and epidemiological studies

of cholera and diarrhoea organized the structure of Hamid's narrative and hold the unequal world of Martina, Dr. Silverman, Hamid, Alfu Mia, Tarabanu and Moyna together (Star, 1991).

In this work, I have considered ruptures, fragments, discontinuities as the local effect of unequal relations of power in the process of globalization. Reading these disjuncture and instabilities as the functional devices of colonial modern power, I have tried to examine the historical processes through which the marginality of nation state or political **raison d'etre** for the state and humanitarian science is coproduced in Bangladesh. At the Gates Global Health Award ceremony (2000), if the Executive Director, David Sack, had failed to portray chaotic political and crisis-ridden public health situations of Bangladesh, the production of neo-liberal desire for a humanitarian science would be at risk. The power of neo-liberal health economy lies on its ability to represent and regenerate an unstable fragmented local. And at the core of this production of instability or fragments are the political processes which reorganized the conceptual and institutional possibility of social actions (Scott, 2004) as discussed in Chapter Three.

The cyclone of 1970 and the famine of 1974 radically disrupted the structure of middle class actions, for many middleclass men progressive model of social change lost its vitality to the Red Cross model of relief work. Eventually this historical victory of Red Cross model gave birth to the NGO model of social change in Bangladesh. Not only NGO model of social work gained momentum and appeared as the only possible benevolent action for local actors, but also Bangladesh being labelled as the successful developing country, its model emerged as the possible framework of action or referent point for many other postcolonial states who shares the same historical experience.

During my archival work, a training program was organized for the field workers of the Center. One of the training participants from Matlab happened to be a friend of the library assistant. On lunch break, three of us were having a casual conversation. The field worker was curious about Canada and I was curious about her work in Matlab, while entertaining our reciprocal curiosity she said, "Initially women refused to bring their children to the clinic or they refused to come to the family planning meetings. The progress of our works happened piece-by-piece, fragments by fragments. After years of our hard work, they realized where their good future lies."[78] It is this appropriation of the future where the colonial modern power of the Center or all actors involved in the stated co-production remains (Scott, 2004).

The parallel history of cholera epidemic, cholera research and nation state building in Bangladesh shows that appropriation of future is not just the millennium development goals for Bangladesh; it is clearly the blueprint of future social suffering. Immediate after the independence, international development missions set the goal of providing access to safe water for Bangladesh and introduced a new water technology. Twenty-five years later, Bangladesh achieved nearly hundred percent accesses to safe water. Nevertheless, this twenty-five years of access to safe water turned out to be decades of arsenic poisoning of rural population. People drank arsenic contaminated water from tube well. Excessive and unplanned use of tube well increased the natural concentration of arsenic in ground water (Smith, Lingas and Rahman, 2000) and drinking this contaminated water people has started manifesting the symptoms of arsenicosis. While the declining of child mortality due to diarrhoea symbolizes Bangladesh as successful developing state, the alarmingly increasing incidences of arsenicosis confirms

Bangladesh's status as a state yet to be developed. This dialectical calculation of developing and underdeveloped maintains the global hierarchy and Bangladesh remains in the margin. The arsenic disaster as a metaphor, not even the suffering of rural people becomes a new parameter of this calculation.

In 2000, I was working in one of the first few arsenic clinics in Bangladesh. They hired me to document the classed and gendered nature of arsenicosis. The director of the clinic was in the forefront of a campaign against UNICEF for its unplanned introduction of a water technology (tubewell) and the genocidal consequence of it. Eventually, local and international health activist started showing support, the campaign gained momentum. At the height of this campaign, UNICEF representatives in Bangladesh expressed their interest to visit the clinic. When the UNICEF team arrived at the clinic, they were directly taken to the arsenic ward. They all stand still in front of a middle-aged woman's bed. In her case, arsenicosis has already become gangrenous and two of her toe fell off long before she came to know about this clinic. Her skin thickened and blackened all over. With a very cold and angry look, the director of the clinic said, "We used to treat diarrhoea patient, number of diarrhoea patient in my hospital still the same, we can treat even more diarrhoea patients, but with these arsenicosis patients, I don't even have the cure." The visit ended with awkward moments of silence while the woman was still lying in her bed. Her eyes were following the team as they were walking from one arsenicosis patient's bed to the other.

ENDNOTES

Chapter One

[1] South East Asian Treaty Organization (SEATO) was a military alliance of three Asian countries – the Philippines, Thailand and Pakistan – with the United States, United Kingdom, France, Australia and New Zealand. In 1958, SEATO expanded its mandate to include the socio-economic concerns of the time. The treaty then contained an additional article – Article 3. This article pledged the participating countries "to assist each other and by self help and mutual cooperative effort, to change standards of their own people and to bring economic and social progress to their countries" (Heningen and Seal, 1987, p. 95).

[2] In his inaugural address of the Laboratory, SEATO representative, Deputy Secretary General William Worth clarified the involvement of a defense organization in medical research. Later his speech was published in the conference proceedings of Pakistan SEATO Cholera Conference. A critical reading of this speech will identify the ideological shift that was taking place in the global political landscape at that time, the shift from strictly military governance toward a more social-welfare mode of governance.

> One of my friends in Bangkok said to me the other day when he knew I was coming here for this occasion, "what does SEATO have to do with cholera? SEATO is a defense organization; how does cholera come into it?"
> I think perhaps it might help us this morning if we think a moment or two about this question. It is said that SEATO is basically a mutual defense organization. It is based on a collective security pact which was signed in Manila in September, 1954, and its prime purpose is to defend the territories of its member countries against aggression. However, when the representative of the eight member ...(words here were blurred, hard to read) that the treaty included in it not only clauses which guaranteed mutual help in defense against aggression and also defense against subversion. They ...then included an additional article which was quite new in collective defense treaties. Under this article...to assist each other and, by self-help and mutual cooperative effort, to lift the standard of their... people and to bring economic and social progress in their country (Conference on Cholera, 1960, p.5).

[3] The rather long inaugural speech by Brigadier M. Sharif, Director General of Health, Ministry of Health, Government of Pakistan, elaborated the interpolating history of endemicity of cholera in the-then East Pakistan, the success of western scientific cholera research in the Indo-Gangetic delta region. Providing his audience and constituency with the historical account, he explains how the "sharp-killer" – the cholera vibrio is a local organism that needs to be defeated, he further expresses his 'gratefulness' to SEATO for taking part in this local struggle.

> But today when modern means of communication have reduced time and space into almost nothingness, the danger of spread within a matter of days and hours is to be reckoned with. The subject discussion, therefore, is vital importance to the health and well being not only of million people inhabiting this region of the globe but equally concerns the safety and security of the rest of the world. We, therefore, congratulate and thank the South East Asian Treaty Organization for selecting Dhaka for the establishment of the Cholera Research Laboratory which we have just dedicated to the noble cause. 1 would also like to thank U. S National Institute of Health for their material contribution towards this purpose (Conference on Cholera, 1960, p. 3).

[4] Randall Packard (1989) and John Farley (1991) make similar arguments in the context of Africa. From a political economic perspective Packard argues that "while South African experience with tuberculosis has been affected by the particularistic contours of South African history, both the epidemiology of the disease

and the history of efforts to control it can be best understood in terms of the same set of political and economic factors that have shaped the history of the disease in the west" (p. 5). Farley, in a historical account of imperial tropical medicine and bilharzia shows how aspects of European and American imperialism largely determined the nature of the tropical medicine.

[5] Arnold argues against the duality of coercion-contestation framework for understanding the colonizing process. He writes thus in his account:

> ...disease and medicine in nineteenth-century India has so far been concerned mainly with Western medicine as an imperial artifact, with the introduction and imposition of an alien and state oriented system of medical thought and practice, and with the contrasts, these presented to Indian attitudes and responses. The hegemonic ambition of Western medicine have at times been referred to, but more often coercion has appeared as the dominant expression of Western medical activity, greatly qualified by the administrator's fear of a political backlash and by state reluctance to invest Indian health (Arnold, 1993, p. 240).

Adopting Foucault's concept of subjection and Gramscian concept of hegemony, his locus of analysis of the colonizing process includes the infiltration of colonial language of medicine into Indian phraseology, and the ideological formulation of a new nationalist order.

[6] Meghan Vaughan's work *Curing the Ill (1991)* shared the same Foucaultian theoretical framework as Arnold (1993) and argued that medicine and its associated discipline played an important part in constructing the Africans' as an object of knowledge. Like Arnold, Vaughan also in her study of madness, leprosy and health education questions the extent to which colonial power in Africa created individual subjectivity that Foucault had described for Europe. Her critical take on Foucault led her to see that biomedicine in the African experience seemed more commonly to produce group identity, each with a distinctive collective psychology and body. What distinguishes Vaughan's work from Arnold is her theoretical treatment of resistance to the colonialism as integrative of the biomedical discourse. She poses question whether it is possible to locate 'real' resistance to colonialism through this account of biomedical discourses. Arnold recounts resistance to the colonial medical practices as constitutive of discourses of biomedicine whereas Vaughan is tentative about the possibility of studying resistance through colonial biomedical discourse.

[7] In both eras, the system of economic exploitation was identical; the financial resources of the-then East Pakistan were transported to the development of West Pakistan (Sobhan, 1982). This was possible because of the unequal manner in which the two economies tied together. The West Pakistan Central government controlled the overall economy and the regional governments had very little say in the formation of economic policy; there was virtually no room for independent action by the East Pakistan Government (Faaland and Parkinson, 1976). The magnitude of the transfer of resources from 1948 to 1968/69 was estimated by a panel of economists as approximating a transfer of resources from East to West of Rupees 3,000 crores (Islam, 1970).

[8] Afroza Ahmed (1998) in a her paper presented at the 24th WEDEC conference titled *Sanitation and Water for All,* held at Islamabad, Pakistan uses this parameters:

> On an average, each child under the age of five has 3.5 episodes of diarrhea per year, leading to 110,000 deaths. The Government of Bangladesh has achieved remarkable water coverage (97 per cent-BBS'95). However, sanitation coverage in rural Bangladesh is only 39 per cent (1996). Poor human waste disposal is the major causes of water borne diseases. In Bangladesh 20,000 metric tons of human excreta per day disposed in the open areas in an insanitary fashion. Regarding the sanitation, here too, there has been significant achievement in recent years with access to, and use of sanitary latrines increasing significantly from just 16 per cent in 1990, to 39 per cent in 1996. However, more than two thirds of the rural population still pollutes the environment through the use of non-sanitary latrines of open defecation. Furthermore it is estimated that only about 17 per cent of the rural population wash their hands using soap and water after defecation (BBS 1998), and there is a lack of understanding of the relationship between good sanitation practice, hygiene and health. Although some individual agencies have

developed some effective communication strategies for behavioral development, no concerted effort to develop nation-wide strategy for social mobilization exists. In 1998, the Government and UNICEF together with their partners has initiated development of a comprehensive *National Communication Strategy for Sanitation, Hygiene and Safe Water Use*, using synergistic, reinforcing media delivered though a variety of strategic channels, is being developed in 1998, for country wide scale-up in 1999. It aims to reach the family and children in particular, to promote behavioral development for a healthier, safer environment in Bangladesh.

Published in the conference website. http://wedc.lboro.ac.uk/papers/24/A/ahmed.pdf, Accessed on July 7, 2004.

[9]America's food assistance program began in 1812, when President James Madison sent emergency aid to earthquake victims in Venezuela. Herbert Hoover led a huge feeding program in Russia during the 1920s in addition to famine relief programs during World War I and World War II in Europe. In 1949, the United States launched the Marshall Plan, which brought tons of food to the people of Western Europe, and planted the seeds for a rejuvenated U.S. food aid program. Many European countries that were helped at that time have long since become major food exporters and important international donors themselves. On July, 10, 1954, President Dwight D. Eisenhower signed the Agricultural Trade Development Assistance Act, or Public Law 480, into law. The purpose of the legislation, the President said, was to "lay the basis for a permanent expansion of our exports of agricultural products with lasting benefits to ourselves and people of other lands." Since that day, the lasting benefits President Eisenhower envisioned have come to pass. Early in his administration, President John F. Kennedy underlined the importance of PL 480 to the U.S. and the rest of the world - by renaming it "Food for Peace" and placing it in the newly created U.S. Agency for International Development. "Food is strength, and food is peace, and food is freedom, and food for help people around the world whose good will and friendship we want," Kennedy said. Since its inception, "Food for Peace" has adapted several times to accommodate changing nature of the global political economy. However, the promise to fight hunger is not seamless, during the famine of 1974 due to the political disparities between Bangladesh and US food aid delayed.

[10] In December, 2000, the Bill & Melinda Gates Foundation announced the Gates Award for Global Health, an award to the tune of $1 million. This annual award said to be established to recognize an organization that has made a major and lasting contribution to the field of global health. Any organization from any country in the world that has substantively improved the health and the lives of people in need may be nominated for the Gates Award; the organization may be a charitable institution, a private company, or a public entity (ICDDR,B 2001).

[11] Bangladesh Rural Advancement Committee (BRAC) was started in early 1972 as a relief measure following the war of liberation. Soon it became a community development organization providing health, family planning, education and economic support to different sectors of the rural community, but with particular emphasis on the most disadvantaged, such as women, fishermen and the landless. The Rural Development Programme (RDP) is one of the most celebrated programmes of BRAC, the reason being the development of a donor-money dependent informal infrastructure to fulfill people's basic needs i.e.; education, health, housing -- as opposed to state sponsored provisions and services. At the rural level, BRAC has become a lender of micro credit, a local donor; on the other hand, at the national level it has legitimized the importance of the presence of donor money in the national economy. In other words, it was able to communicate with local problems by, and through employing language of global governance. BRAC is considered a model for other developing countries; the emergence of BRAC Afghanistan in the war ravaged Afghanistan or BRAC Sri Lanka in post-Tsunami Sri Lanka is examples of such account. For more information on the organization, see www.brac.net.

[12] In the new millennium, Bangladesh has often become synonymous with Grameen Bank, a financial institute with development goals. The Grameen Bank has developed a micro-credit model which is lauded for having made credit available to the poor. During the Clinton Regime, the founder of the model was even considered for a Nobel Prize in economics. Queen of Greece, Sofia, after her 2003 visit to Bangladesh took the model to Greece. In 1997, Grameen Foundation USA was established to fight global poverty and

provide opportunities for the poorest peoples of the world. See, http://www.gfusa.org/. For an understanding of the model, see Mohammad Yunus and Alan Jolis. (2001). Bankers to the Poor: The biography of Muhammad Yunus, founder of Grameen Bank. Karachi; New York: Oxford University Press.

[13] Millennium Development Goals: Country Reporting, United Nations development Programs and Ministry of Finance, Government of the People's Republic of Bangladesh (1999) describes Bangladesh:

> Bangladesh which was once termed 'the test case of development' may indeed represent a learning site for keeping the hopes alive for other equally less fortunate post-colonial societies with adverse initial conditions. This would be especially important in the context of overcoming the persistent economic pessimism and hopelessness—'Afro-pessimism' is a case in point--that is often cited in relation to the most disadvantaged parts of the developing world.

Published in the following website http://www.mdgbangla.org/country_progress Accessed on March 6, 2005.

[14] Latour's intellectual trajectory and dialogical journey has started from his laboratory study *Laboratory Life* (1979) followed by his study on *The Pasteurization of France* (1988). The final instalment on this is the *Pandora's Hope* (1999). A couple of other significant works fall in between these works. In each of these works, he not only engages himself in a dialogue with the existing theoretical trends of analyzing science but also critically examines his own theoretical genre, revises and modifies the definition of his own neologism. I recognize the importance of following the changes made in his theoretical trajectory; at times I refer to these changes, but my discussion of his theory is fundamentally based on his work *Science in Action* (1987).

[15] Here I am referring to Arjun Appadurai's (1996) theorization of deterritorialization and relations of disjuncture.

[16] By state formation I mean the formation of material conditions not just the territorial sovereignty; emergence of some sort of imaginary belongingness and bond with the land and its citizens by instituting ranges of relationship between different state and non state actors (Carroll, 1996).

[17] DISC disseminates the Center's research findings and other outputs through print and electronic media. The Center's internal publications include: the quarterly *Journal of Diarrhoeal Diseases Research*; a quarterly English newsletter *Glimpse*; a 4-monthly Bangla newsletter *Shasthya Sanglap*; a bilingual staff news bulletin *ICDDR,B News*, an annual report, working papers, scientific reports, and special publications. See www.icddrb.org

Chapter Two

[18] Historically the relationship between history and culture, between ethnography and archive is indeterminate. A collective of anthropologists concerned with the problematic of neo-modern power (Comaroff and Commaroff, 1992; Axel, 2002) and colonialism (Dirk, 1999; 2002) identified this indeterminacy as the mere result of institutional divides. This disciplinary disparity, as argued by Cohn (1987), Dirk (1999; 2002) and Axel (2002) stems from the project of history and ethnographic writing as complicit in colonial rule and state power. In this context, the anthropological assumption that the 'field' is a privileged site of knowing our present and past as oppose to archive is embedded within the modalities of institutional power. The future of historical anthropology which in their conceptualization seeks to understand the politics of living, the ongoing connections or disjunctures of futures and pasts in the heterogeneous presents has to be situated in the margins of institutional divides.

[19] According to Nicholas Dirk (1999), history writing is part of the nation building project, he defines history in the following manner:

> History served as a principal form of governmentality at the same time that governmentality expressed itself through the categories of historical thought and writing. In some prosaic terms,

history was organized theoretically in narratives that made the state (and the nation) into the subject and the object of temporal consequence; it also became primarily located within the formal ambits and agencies of state power. History was written by the state to educate and justify political policies and practices, and it was produced and preserved by the state for future historical reference in the archive. The archive, that the primary site of state monumentality was the very institution that canonized, crystallized, and classified the knowledge required by the state even as it made this knowledge available for subsequent generations in the cultural form of neutral repository of the past (p.174).

Gyan Prakash (1992) in the very context of Indian historiography while describing the anxieties of postcolonial criticism illuminates the political rationalities of history writing projects in the following manner, this partly echoes what Dirk argued:

> History and colonialism arose together in India. As India was introduced to history, it was also stripped of a meaningful past; it became a history-less society brought into the age of History. The flawed nature of history's birth in India was not lost on the nationalists who pressed the nation-state's claim to the age of history, and Marxists struggled against capital's collusion with colonialism to make the worker the agent of history. Consequently, history, flawed at birth, has lived an embattled life in India. These constitute the points of departure for postcolonial criticism (p. 17).

[20] In Brian Keith Axel's (2002) apt phrase,

> Extrapolating from Cohn and Silvio's discussion, we may underscore how an archival desire to excavate national origin is indissoluble from the nation-state's contextualizing desire to construct monuments designed to keep the people in their place and protect citizens against that procedure's discoveries. Historical anthropology may thus, through an inquiry into the nation as marginal context, see a point of conjecture between the Marxian analysis of a national "commodity and its secret" (Marx 1990, 163) and a Freudian understanding of the visuality of "tokens of triumph" (Freud 1977, 353) .p.24.

[21] How are stories of the Laboratory entering a remote Matlab *thana* echoed the nationalist history of Bangladesh? Hayden White's (1987) concept of 'emplotment' helps me to explore this question, in this case the triumphalist emplotment of the Laboratory entering the everyday life of the Matlab. With the term he was particularly interested to show how historical narrative render past events as moral stories in order to create an agenda for social action. His insistence of the term is evolved from Ricoeur's theory of metaphysics of narrativity (Ricoeur, 1978 cited in White, 1987), referring to Ricoeur, he argues how narrative as emplotment is a mode of representing historical events:

> A narrative, for him [Ricoeur], is neither an icon of the events of which it speaks, an explanation of those events, nor a rhetorical refashioning of "facts" for a specifically persuasive effect. It is a symbol of mediating between different universes of meaning by "configuring" the dialectic of their relationship in an image. This image is nothing other than the narrative itself, that configuration of events reported in the chronicle by the revelation of their "plot-like" nature (p. 52).

[22] According to Lyotard (1984), postmodernity is not a historical period that simply occurs after modernity, but rather a shift of mood or perception brought about by changes in the organization of knowledge since the late nineteenth century. Faced with the decline of grand narratives, he does not propose a new grand narrative, but rather a multiplicity of 'little narratives', which subverts the dominant narrative. Lyotard's insistence on the legitimacy of the performative, of little narratives, of the multiplicity and heterogeneity of language games leads him to a mosaic fracturing or splintering of knowledges. There are no longer absolute and universal rules or conditions that are valid for all statements. In the postmodern, narrative not science, leads to an interrogation of the great variety of languages and language games; denotative, scientific statements about flora and fauna intermingle with deontic prescriptions and questions; the rules and conditions of discourse not established in advance, but rather emerge in the conversation itself. These particularities of language games, for him are organizing the conditions of the postmodern.

My attention to this term was a result of reading narrotologists (Beard, 2003; Lawless, 2003; Linde, 2002 and Bamberg, 2002) who refer to it from a distinct perspective that eventually contradicts Lyotard's proposition of the death of the grand narrative. Focusing on specific context they have argued that master

narrative directs our ways of interpreting the past, reproduces authority and transforms identity. Linde (2001) in her work on an American insurance company examined the role of master narrative on the formation of institutional identity of the company and reproduction of institutional authority.

[23] My understanding of narrativizing practice as constitutive of identity is founded on Geofry M. White's (2001) discussion. He defined narrativizing practices as,

> ...the discursive strategies that use narrative to render past events both comprehensible and persuasive. In producing, enacting, circulating (or simply consuming) stories of the past, social actors create and objectify the realities in which they live. Successful (or, rather, effective) historical narrative not only represents the past, it represents it as real, natural, important, relevant, and authoritative, often using metadiscursive means to do so. The cultural status or significance of historical narrative is established by a variety of pragmatic means used to index its value for a given speech community (something like this is implied in the concept of "entextualizing" discussed in Silverstein and Urban 1996). The studies that follow all analyze instances of historical narrative that repeat or re narrate well known events. As they are externalized or enacted, then, they enter into dialogic relations with reigning discourses of history and identity (Bakhtin 1981). p. 497.

Chapter Three

[24] The mission of DISC is "to diffuse global results of health, nutrition, and population research for solving the common health, nutrition and population problems, especially in the context of the developing world" (ICDDRB Annual Report, 2003).

[25] In the sociology of science and knowledge (Hess, 1995), feminist cultural studies (Bordo, 1987; Martin, 1987, 1989, 1990) and rhetoric of science (Bazerman, 1988; Fahnestock, 1989; Ross, 1996, 2006) the arcane characteristics of scientific literature, the objectivity-value neutrality of its claims is rigorously discussed. Since large body of fact (data) for this study contains this tension of objectivity/value neutrality/truth claims, it is vital to engage myself with this interdisciplinary dialogue and develop a framework to approach and deconstruct this particular practice of scientific forms of literary expression. In the feminist cultural studies of science, this authority of science has been extensively analyzed (Bordo, 1987; Bleiler, 1987; Spanier, 1997; Maynard, 1997). A particular emphasis was given in the gendered metaphor, misogynist argumentation of science in these streams of critique of science. However, within the same genre of feminist critique, there are works that unsettled distinctions between the social and the science. An exemplary work of such argumentative nature is Emily Martin's *Women in the Body* (1987). Theoretically situated at the intersection of cultural studies and science studies, her expository on the scientific representation of women's body argued that cultural ideas about gender through the language and metaphors have been built in to the instruments and technologies of obstetrics. On the other side of the same coin women's experience of bodily event like menstruation, pregnancy is organized by their exposure to these scientific articulations (Martin, 1992). I share the concern and the analytical position of these works on the authority of scientific text over social life, however, I join the rhetoricians of science to understand how science institute authority in its rhetorical procedure. Echoing the rhetoricians of science, I argue objectivity is the rhetorical means to pursue scientific claims, the certainty of new knowledge (Bazerman, 1988).

[26] The reference here is from the scientific report series of the Center. Each scientific report that I have managed to skim through or collected is published with this disclaimer. However, annual report, demographic surveillance series from Matlab or seminar proceedings of the Center does not contain this copyright disclaimer.

[27] Etzkowitz and Webster (1995) from the perspective of political economy shows how formerly independent and even opposed concept, science and property through the legal concept of intellectual property have been made contingent upon each other.

> Indeed it can be argued that the world economy has embarked upon a new stage of economic growth with knowledge and therefore intellectual property as the engine of industrial development,

displacing traditional elements such as monetary capital, natural resources and land as the driving force. As the capitalization of knowledge becomes the basis of for economic growth, science policy and industrial policy merge into one. In this chapter, we shall discuss the new relationships between science and property in academia, government, and industry both nationally and internationally (p. 481).

Their work particularly emphasized the concomitant emergence of neo-liberal governance and capitalization of knowledge; their work further records the shifts in the conventional types of relationships between the academia/university and industry. The Center's persuasion of science as intellectual property is an example of this growing complexity, it exposed the new set of relationships and a new scientific infrastructure – an international scientific research center in the 'third world' and the correspondence between US University, global health authority like WHO, national government and local scientists.

[28] Recently, the varieties of scientific authorship and the sites where it intersects or clashes with other regimes of intellectual property is considered as a possible area of cross-disciplinary analysis by social scientists from diverse ranges of background. Science studies, history of science and rhetoric of science has particularly taken up the task of advancing Foucault's theorization of authorship further. My discussion here is indebted to this emerging cross-disciplinary study of scientific authorship. See, Biaglio and Galison. 2003. Scientific Authorship. Credit and Intellectual Property in Science. New York and London: Routledge.

[29] A common expression will be found in most scientific research reports or scientific research proposals which represents the philanthropic rationale of science – "There are expected to be no direct benefits to the subject. However we anticipate benefits to the society with better knowledge of pathogenesis of cholera and its further application to clinical scenarios" (Cholera Research Laboratory Annual Report, 1978).

[30] Taking Pasteur's research as an example, Latour in his later work *Panodora's Hope* (1999) further concretized his concept of black boxing:

> The experimental stenography in Pasteur's paper is extremely varied since it follows extremely varied since it follows all the subtleties of the variable ontology deployed in the text. In the same paper some experiment are backgrounded and blackboxed while others are made the focus of attention and allowed to go through changes. At first the practice of doing science is eluded to only through very stylized accounts of experiments which are quickly blackboxed. In another case, human agency is reintroduced in a recipe-like description of the procedure that leads to the lactic acid fermentation (p.131).

[31] See, Curlin, T.G., Aziz, K. M. A., & Khan, M.R. (1977). The Influence of Drinking Tubewell Water on Diarrhea Rates in Matlab Thana, Bangladesh. Proceedings of the 12th Joint Conference U. S – Japan Cooperative Medical Science Program Cholera Panel. Japan, 48-54.

[32] Sociology of knowledge originated as a criticism to the privileged epistemological position which 'postulate one view of reality as the true one, and then set out to account for the fact that other people could hold different – that is, false – beliefs' (Freudenthal and Lowy, 1988). Ludwick Fleck's work *Genesis and Development of Scientific Fact (1935)* is one of the pioneer works from this critical tradition focused on the social determinants of knowledge and science. He argued that scientific facts are constructed by distinct 'thought collectives' each of which are composed of individuals who share a specific 'thought style'. In his account, thought collective and thought styles are both informed by the cultural universe and habits of mind and are the results of communal intellectual interaction within a collective. Therefore, for Fleck, thought collective is to be construed in functional terms and the very functions is the social conditioning of act of cognition. He further argues that in a given domain different thought styles can coexist and each of these thought styles constructs its own facts but different thought styles are incommensurable. The socialization into a given thought styles allows one to see a phenomenon in a given way which disproves other ways of approaching the same phenomenon. Despite the fact that his thesis of genesis of scientific fact outlined the fundamental theoretical principles of social constructionism his work was not noticed in his own times, many of interlocutor today use his own analogy to understand academic irrecognition of his work which says that as a Jewish bacteriologist from Poland working in the time of second world war his theoretical

position and social-political location kept him the margins of the thought collective (Kuhn, 1976; Shapin, 1980; Kuklick, 1982). The seminal work of Thomas Kuhn, *The Structure of Scientific Revolution (1962)* and acknowledgement of Fleck as a catalytic agent in his work drawn academic attention to Fleck's work. Kuhn's work is considered to be parallel to Fleck's proposition. In brief, Kuhn's work 'attributes scientific revolution as a paradigm crisis, which is occasioned by the accumulation of anomalies leading to the formulation of new paradigm' (Hess, 1997). Therefore, accumulation of incommensurability in the making of scientific fact was a pulpable question in the genesis of social constructionist approach of studying science. However, in the post-Kuhnian tradition of social constructionism analytical emphasis shifted away from the role of incommensurablity, error of scientific activity towards the scientific facts that gained academic and sociopolitical currency. Bruno Latour's work *Science in Action (1987)* revitalized this question by advancing this proposition further and the theoretical, methodological significance of his work lies in this revitalization. I would like to thank Jean Comaroff for guiding me towards this intellectual geneology of sociology of knowledge and science, her intervention helped me to situate Latour into the larger historical context of science studies. I would like to thank Sarah Berry and Helen Loshny, with whom I have read these classical works of science studies.

[33] However, this labeling further exposes the multifaceted texture of these texts. The historical facts labeled as A is an institutional biography published on the eve of the silver jubilee of the Laboratory; it contains biographical notes contributed by staff from 'all walks of the world.' The national and 'international' staff wrote about their experience with the Laboratory and they spoke about their colleagues; it also includes speeches delivered in scientific seminars. There are also biographical pieces written not by individuals but by a group of people, sometimes the daughters and sons of departed staff members who wrote about their parents. The two recollections of this sort that have been included in the book are reflective of organizational hierarchy: one belongs to the son of an electrician and the other is of the daughter of the 'first ever Bangladeshi' anthropologist working in Bangladesh's public sector. In all biographical pieces, the articulated voice of-authority-loyalty over/to the Laboratory is the embodiment of social differences of the scientists-technicians-administrators-laymen at work. The text B is written by W. E. van Heyningen and John R. Seal, both of whom were intimately associated with the history of the Laboratory in Bangladesh. Their scientific as well as historical treatise on cholera research records the role of U.S. medical science's campaign against cholera. They had access to sources like the US National Institute of Health (NIH), and various internal communications that took place during the inception phase of the Pakistan SEATO Cholera Research Laboratory between Agencies for International Development (AID) of the U.S Department of State, NAMRU-3 scientists. This text represents the complex dynamics of insider-outsider role of the authors, insiders to the American scientific community, insider-outsider in NIH or AID, and outsider-insider in the Laboratory at Dhaka. In contrast to text A and B, the fragments in the narrative labeled C is a scientific article published in the Bulletin of World Health Organization (1972) by a number of authors from the Laboratory, and Johns Hopkins University. The article is a scientific report of five years of observation of cholera vaccine trial in rural East Pakistan. The order in which the fragments of facts are represented and facts incorporated in the label D is the result of my subjective relationship to these texts (A, B, C) and the history of Bangladesh itself.

Chapter Four

[34] The divide and rule policy of British colonialism created a historical tension between two religious communities living in South Asia. The consequence of this tension is the creation of two different nation-states, India and Pakistan based on religion; regional politics was organized along similar sectarian lines. In this context, when the movement against West Pakistani rule sprung up in the-then East Pakistan and gradually increased, the Pakistan state authority dubbed the movement an Indian conspiracy, intended at disuniting Muslims. Hence, it launched a campaign against the Bengali Hindus. During the war of 1971, Hindu Bengalis were specially targeted by the Pakistani army or by pro-Pakistani community groups.

[35] The Johns Hopkins Center for Medical Research and Training in Calcutta established at roughly the same time as the Cholera Research Laboratory in Dhaka and was working on similar issues (Ruxin, 1994).

[36] The simultaneity of the decolonization of British India, the end of the Second World War, and the development of cold war shaped the politics of the region. The birth of two separate states India and Pakistan, based on religious division divided many geographical territories (Punjab, Kashmir, Bengal) and communities (Muslim-Sikh-Hindu Punjabi, Muslim-Hindu Bengali) into two pieces; in the process, people were forced to choose either side of the national boundary, the obvious consequence of this political event is the sustained tension between India and Pakistan. To politically confront India (then, presumed to be an ally of the Soviet Bloc), Pakistan chose to be affiliated with the Unites States, which prompted the signing of different development, and military treaties with the US and its allied states. SEATO was one such agreement. The system of economic exploitation in East Pakistan, both in the Pakistani and British colonial regimes was identical; on the one hand, a transfer of surplus constantly took place from the-then East to West Pakistan (Sobhan, 1982). On the other hand, East Pakistan was denied its 'fair share of foreign aid.' However, Bangladesh inherited the burden of aid dependency (Griffin and Khan, 1972).

[37] See, Shiva, V. (1991). The Violence of Green Revolution. Third World Agriculture, Ecology and Politics. London and New Jersey: Zed Books.

[38] In a letter to the editor of *The Lancet* (April 8, 1978) Colin McCord a scientist from the Cholera Research Laboratory wrote:

> Experiments have been done at the CRL which have paid little regard to the rights and needs of the subjects of research and which have been done without informed consent. The following experiments would not, in my opinion, have been passed by ethics committees elsewhere:
>
> (a) Radioactive materials were given to cholera patients
>
> (b) Tubes were passed through the entire intestinal tract from mouth to anus to measure the "transmural electronic potential" in cholera patients.
>
> (c) Biopsies were taken from the jejunum and other parts of the intestine.
>
> (d) Proper treatment was withheld from patients in coma and suspected to have acute hypoglycemia in order to test a hypothesis; glucogen was given instead of intravenous glucose to see whether glycogen stores were depleted. Lever glycogen was depleted and one patient died who might have survived with prompt administration of glucose.
>
> (e) Catheters were passed through the heart and into the pulmonary artery to study the haemodynamic effects of cholera and of different kinds of fluid replacement.
>
> (f) When it was observed that there was a high incidence of cholera in villages downstream from the Cholera Hospital at Matlab, the first reaction was not to improve the sanitary problem, but to use the these villages as a place to test whether installation of tubewells would prevent cholera. The experiment was a failure. Subsequently, measures were introduced to prevent contamination of the water by the hospital (p.768).

[39] In their letter to the editor of *The Lancet* (June 3, 1978), Nurul Islam, Dean, Faculty of Postgraduate Medical Science and Research, University of Dhaka; Hajera Mehtab, Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine and Metabolic Disorder, Dhaka; M. A, Muttalib, Community Health Research Association, Dhaka and Zafrullah Chowdhury, Gonoshasthaya Kendra, Dhaka, Bangladesh, they made some specific suggestions to make internationalization more meaningful:

1) The institute should do research on diarrhea diseases only.
2) In the interests of development of indigenous research, research in other field such as population, fertility, nutrition, clinical medicine and social medicine, should be done under the direct control of the five national institutes. As the Bengali proverb says: "Under the Banyan tree, nothing grows."
3) Research should include development of implementation programs for solutions of the problems under study.
4) Two-thirds of the senior scientific investigators should come from developing countries. To make it effectively (not cosmetically) international, individuals from Western European countries, socialist countries, China and so on should be included from the early stages of transition.

5) The responsibility of the ethical committee to protect individuals who are in any way subjected to research procedures, should be spelled out in the charter in some detail.
6) All the protocols for experimentation should be made public since human experimentation will be involved, to enable independent Bangladeshi and other scientists to have the opportunity to comment.
7) No more than 25% of the center's fund should come from one donors of one nationality.
8) Salary levels and benefits must be set so that individuals who come to Bangladesh from other countries are not in a position to derive a large surplus of income over expenses because of their stay in Bangladesh. The attraction inducing individual scientists to come to the center ought not to be financial but professional opportunities and interests in the health problem of developing countries.
9) All employees of the center should pay Bangladesh income tax. A fund could be established so that if this tax was greater than that which should have been paid in the country of origin, the difference would be refunded (p.1208-9).

[40] In 1977, salaries of the 17 international staff were over 9 million taka while the remaining 581 employees received less than 6 million. See Annual Report, Cholera Research Laboratory, 1977.

[41] In Bangladesh, the Non Governmental Organizations (NGOs) are bound to register as social welfare organization.

Chapter Five

[42]Comaroff and Comaroff (1992) suggest that,

> As anthropologists, we must therefore work both in and outside the official record, both with and beyond the guardians of memory in the societies we study. In order to reconstruct the annals of a cultural imagination, moreover, we have to operate with a working theory not merely of the social world, but also of the role of inscriptions of various kinds in the making of ideology and argument. p.34

[43] I occupy the methodological position outlined by the Comaraff and Comaroff (1992) and Asad (1993); my concern about the narrative strategy, ethnographic remaking is to disrupt the existing historical monologue of Bangladesh.

[44] See, Sharma, H and Gough, K. (Eds.). (1973). Imperialism and Revolution in South Asia. New York: Monthly Review Press.

[45] Faaland and Parkinson worked in Bangladesh for over fifteen years during different political regimes from Pakistan to independent Bangladesh. During the Pakistan period, they were advisors to the Pakistan Planning Commission located in the-then West Pakistan. Later, during and after the 1974 famine they visited Bangladesh and got involved in debates around the future of Bangladesh, at local and international levels. In 1975, Mr. Kevin Rafferty, in a newspaper article termed Bangladesh as the 'end of a development dream.' Faaland and Parkinson (1976) rejected this view; instead, they proposed that Bangladesh was-a test case of development:

> Bangladesh is a not a country of strategic importance to any but her immediate neighbours. Perhaps its only importance politically lies in its availability as a possible test-bench of two opposing systems of development, collective and compulsive methods on the one hand, and a less fettered working of the private enterprise system on the other. It might be considered worthwhile by some countries to give aid to demonstrate the power of one or the other system, but it can scarcely be felt that large gains are likely to result from such an exercise, to Bangladesh or to potential contestants. If aid is to come for the development of Bangladesh it is more likely to be the economic reasons or on humanitarian ground. In the long run, the latter is important. Assistance from other countries must be seen as an endeavor to solve the world's most difficult problem of economic development.

If the problem of Bangladesh can be solved, there can be reasonable confidence that less difficult problems can be solved. It is in this sense that Bangladesh is regarded to be the test case.p.5.

[46] The implementation of this project is historically significant in the making of Bangladesh as a developing state. The Comilla Academy, popularly known as the Comilla model of development was conceptualized at a time when large quantities of PL480 money was coming to Pakistan on the condition that part of it would be used for alleviating rural unemployment. It seems that the planners could not determine what should be done with this ample amount of funding. Akhtar Hamid Khan, a Karachi based economist proposed a project with a two- fold objectives: firstly, build an infrastructure of link roads and subsidiary drainage of channels all over the countryside and secondly, employ landless laborers on this infrastructure building project in the expectation that that this will increase their purchasing capacity. During the 1962 slack season distressed farmers and landless laborers from 195 villages cleared 35 miles of choked drainage channels; they rebuilt and constructed over 14 miles of roads and embankments; the local leaders trained by Comilla Academy employed and supervised the workers from their villages. Direct payment to workers, one-half in wheat flour and the remainder in cash, demonstrated as argued by Khan that 'foreign aid can relate directly to the village and benefit the great bulk of the population.' (Khan, 1973) The strategy used in the project became known as the 'Comilla formula,' one that materialized modernization theory.

Comilla Model, a rural development approach that originated and developed in a training-cum-research institution now called the Bangladesh Academy for Rural Development (BARD) is located on the outskirts of Comilla district town. The approach drew its name from that of the place of its origin. Akhter Hameed Khan, pioneer of the Comilla Model and the first director of the Academy, conceived of the idea and developed the method of its implementation in the areas of agricultural and rural development on the principle of people's participatory role at the grassroots level and development of cooperatives. At the primary level, the-then East Pakistan Rural Development Board decided to introduce a number of pilot projects beginning in 1959. There were two-fold objectives behind the introduction of these projects: (i) to provide a real-life learning situation for the trainees at the Academy, and (ii) to devise development model(s) of programmes/institutions which could be replicated elsewhere in the country. In guiding and operating these projects, BARD formulated a set of principles and strategies which provided the basis for developing the pilot projects, resulting in a rural development approach, known widely and termed variously as the Comilla Approach, Comilla Model, Comilla Programme, and Comilla Experiment. Several steps were involved in the evolution of the Comilla Model. The first step was to make use of the-existing training-cum-research institution, i.e. BARD. The second step was the affiliation of a laboratory area, a whole thana, to this institution. The purpose of the laboratory area was to carry out survey/research and organise action-research or pilot projects. The third step was a thorough study of the laboratory area and intensive consultation with the villagers on their problems and their views about the solution of those problems. The fourth step was close collaboration with the planning commission at the national level, which made and evaluated policies and prescribed priorities in respect of plans and projects. The fifth was continuous evaluation and documentation of the pilot projects, not only to determine their progress but also to discover their weaknesses and to revise them wherever necessary. The sixth step was to assist the government agencies in the multiplication of the model. The arguments and assumptions which lie behind the development of the Comilla Model seem to have been: (i) that the problems of rural development should be approached from the villagers' point of view, because they have the best understanding of the problems of rural life and the rural situation; (ii) that the villagers are capable of bringing about changes in their conditions having been provided with the means for development; (iii) that agricultural development should be made an essential step in initiating a broader rural development process; (iv) that the village should be considered as a basic development unit, and recognized as the starting point of the process of modernization; (v) that training, research and demonstration are essential in promoting rural development, and these should have a symbiotic relation with the life of the rural community (Stevens, 1976).

The food for peace program or PL 480 gained confidence from this relative success and traveled to Africa and other Latin American states. Perhaps this is the historic moment when Bangladesh simultaneously became both a 'test *and* successful case' of development.

[47] Later, Bangladesh developed other economic and social development models which are now globally recognized as successful cases. To name a few of these organizations: Bangladesh Rural Advancement Committee (BRAC), Grameen Bank, and PROSHIKA's names come to the front. These models considered

as models because on the one hand, they have competently localized the universal/western models of development; while on the other, they have made this localized-universal model available for other 'developing and donor states'.

[48] The colonized Algerian challenges not the relevance of biomedicine, Fanon (1965) argued but rather the embedded colonial relationship in biomedical institutions. As he states,

> At no time, in a non-colonial society, does the patient mistrust his doctor. On the level of technique, of knowledge, it is clear that a certain doubt can filter into the patients' mind, but this may be due to a hesitation on the part of doctor which modifies the original confidence. This can happen anywhere. But it is obvious that certain circumstances can appreciably change the doctor-patient relationship...the colonial constellation is such that what should be the brotherly and tender insistence of one who wants only to help me is interpreted as a manifestation of the conqueror's arrogance and the desire to humiliate (p. 125-126).

He remained convinced that Western medicine and psychiatry were fundamentally good things, although distorted in a colonial structure of inequalities (Anderson, 1998).

[49] Dr. Jafrullah Chowdhury, founder of Ganoshashtho Kendra (GK - People's Health Center) shaped the peoples' health movement in Bangladesh along the line of barefoot doctor movement in Maoist China. In 1985, at Ramon Magsus Award Ceremony where he was awarded the Magsus Award for community leadership he described the philosophy of GK in the following manner:

> We have tried to demystify medical care and decrease the control of the medical profession and instead promote the paramedic, the village-level health worker, as the backbone of health care. This has led to both capability building and job creation for the poor, especially poor women, as well as putting health care within the reach of those who have not in the past had access to it (http://rightlivelihood.org/recip/gk.htm accessed March 2005).

[50] Vandana Shiva (1991) while examining the impact of the green revolution in the state of Punjab defines science in the following manner. It is a rather long quote, but helps to exemplify the violence conquest dichotomy of her conceptualization:

> Within the structure of modern science itself characteristics which prevent the perception of linkages. Fragmented into narrow disciplines and reductionist categories, scientific knowledge has a blind spot with respect to relational properties and relational impacts. It tends to decontextualize its own context. Through the process of decontextualization, the negative and destructive impacts of science on nature and society are externalized and rendered invisible. Being separated from their material roots in the science system, new forms of scarcity and social conflicts are then linked to other social systems e.g. religion.
>
> The conventional model of science, technology and society locates sources of violence in politics and ethics, in the application of science and technology, not in scientific knowledge itself (p. 21-22).

She reveals the other side of the coin, the hidden social and ecological cost of green revolution in Punjab. Her critical intervention in public discourses are aimed at understanding and evaluating modernizing projects like the green revolution which helps us to bring attention back to the complex interplay between science, state of ethnic and communal relationship, and ecological changes. Similarly Nandy, discusses the catastrophic examples of scientific enterprises and in doing so remains focused on the inherently violent nature of science (Nandy, 1988).

[51] However, Prakash's (1999) analytical position that all science (science in the development infrastructure, communication sector or public health sector) construes similar consequences is homogenizing. The contrasting history and politics of cholera research and atomic energy research proved his theoretical proposition erroneous. The meaning of progress is evolving in nature, the connotation of it during the early moment of decolonization-nationalization of India and Pakistan is different from the one Bangladesh encountered during its early moments of independence. Prakash's historiography seems to show inadequate attention to register the shifting meanings that scientific practices enact in different historical moments.

Chapter Six

[52] In October 1848, articles advocating chloroform as a treatment for cholera began appearing in British medical journals. In the same year, the Medical Society of London endorsed the use of chloroform to treat cholera patients. The treatment involved putting the patient to bed wrapped in warm blankets, followed by a glass of brandy in hot water, with sugar and spice; rubbing the body and applying heating liniment; and placing the patient under the influence of chloroform by inhalation for as long as the bad symptom recurred. Discussion of this procedure, as well as other ways of administering for cholera continued at the monthly meetings of the Society until December, 1848 but failed to reach any consensus on the efficacious cure of the disease (Vinten-Johansen et al, 2003).

[53] In 1846 John Snow became interested in the properties of ether, which had been newly adopted in America as an anaesthetizing agent. His work in anesthesia had begun during his earlier investigation into asphyxia of the newborn. Snow made great improvements in the method of administering the drug, and obtained permission to demonstrate his results in the dental out-patient room at St George's Hospital. This proved so successful that he won the confidence of Robert Liston, the eminent surgeon of the time and thereby the ether practice of London came entirely into his hands. Despite having practically introduced the scientific use of ether into English surgery, he had 'so well balanced a mind that he appreciated the value of other anaesthetizing agents, more particularly chloroform' (Shephard, 1995). It was this drug that he famously administered to Queen Victoria during the birth of Prince Leopold on 7 April 1853, and again, a few years later, during the birth of Princess Beatrice on14 April 1857. His biography by Vinten-Johanesen et al (2003) and Shephard (1995) provide details of his work on chloroform.

[54] For Haffkin's scientific method of vaccine preparation and influence of Pasteur's work in his experimentation see, Lowy, I. (1992). From Guinea Pigs to Man: The Development of Haffkine's Anticholera Vaccine. The Journal of the History of Medicine and Allied Science (47) 270-309.

[55] During his stay in India a severe epidemic of plague 'gifted' him the golden moment he was looking for since the beginning of his scientific career. He shifted his scientific effort to the development of anti-plague vaccine and his vaccine declared a success. Immediately, he was appointed as the director of the Bombay Plague Laboratory. However, the golden moments were short-lived. In the Mulkowal disaster of 1902, nineteen plague victims died of contaminated injection of anti plague vaccine and Haffkine was accused of negligence. He was convinced that the harsh political measures were taken against him as resultof local political intrigues, among other things jealousy felt by the British medical officer due to the rapid rise of a foreigner (Lowy, 1982).

[56] The idea of NAMRU originated from the academics involved in naval research during the Second World War, who suggested that infectious diseases are the worst enemy of militaries in wartime situations. They therefore suggested a small well-trained well-equipped infectious disease research unit.

[57] During this time, when scientists were involved in electrolyte balance studies, an intravenous rehydrating solution discovered as a remedy to cholera induced dehydration. I have been unable to locate any information regarding the exact time and place when the rehydrating solution was developed. As this remedy was very costly and often was difficult to administer in the epidemic field, scientists were dissatisfied with its performance, as a result, in their later discussions this episode of cholera research remained ignored.

[58] The fate of the Russian researcher in Dhaka is reflective of this nature of scientific sub culture. The SEATO cholera research team and researchers from Russia arrived in Dhaka in the very same week of 1959; however, as was only to be expected, the agreement between the Pakistani government and the Russian scientists ended in its infancy. The US-Japan Cooperative of Medical Science program is another example which illustrates similar political nature of the scientific alliance. After the Second World War, in January 1965, to improve US Japan political relations, President Lyndon B Johnson and Prime Minister Eisako Sato met in Washington. The main purpose of the meeting was to improve economic relations.

From this perspective, the meeting was of little success but to ensure that at least some sort of agreement had emerged from this effort, President Johnson asked the White House science and technology director to come up with something for the next morning. Obviously, the idea that emerged overnight was a joint scientific effort for betterment of human health in the field of knowledge (Heyningen and Seal, 1983).

[59] Dr. Yunus (2001) in his biography describes the misery of the Famine of 1974. Although his description shies away from any discussion of global politics; he avoids any mention of how US-Bangladesh diplomatic relations influenced the creation of a famine situation:

> The Year of 1974 was the year which shook me to the core of my being. Bangladesh fell into the grips of famine.
>
> Newspapers were reporting horrible stories of death and starvation in remote villages and district towns in the north. The university where I taught and served as a head of the economics department was located in the south-eastern extremity of the country, and at first we did not pay too much attention to it. But skeleton-like people started showing up in the railway stations and bus stations of Dhaka. Soon a few dead bodies were reported in these places. What began as a trickle became a flood of hungry people moving to Dhaka. Where was the economic theory which reflected their real life? How could I go on telling my students make-believe stories in the name of economics?
>
> I wanted to run away from these theories, from my text books. I felt I had to escape from the academic life. I wanted to understand the reality around a poor person's existence and discover the real-life economics that were played out everyday in the neighboring village – Jobra (p. 3-4).

[60] WHO's reservation stemmed from the concern that a non-standardized preparation of the solution may result in the making of an incomplete solution, a solution lacking any of the recommended ingredients (sodium, chloride, potassium, bicarbonate and glucose). Lobon Gur Solution (LGS) is an incomplete solution as it normally does not have bicarbonate; although, it is thought that gur purchased in the local Bazar may sometimes have bicarbonate. The other threat that the BRAC program posed was the potential to diminish the influence and control of the medical profession. BRAC opposed the dominant notion that treatment and medical care as the exclusive domain of medical practitioner. They argued that LGS can be prepared and served to the cholera victim with little or no medical reservation (Chowdhury and Cash, 1996).

[61] The Bengali domination of the Hill peoples of the Chittagong Hill Tracts is reminiscent of the British colonial rule in the region, but ethnic relations climaxed after the independence of Bangladesh when the newly independent state denied the ethnic identity of the Hill people and attempted to impose Bengali identity for all citizens of Bangladesh. In politically sovereign Bangladesh, the Chittagong Hill Tracts became an internal colony of Bangladesh. In 1973, military rule was established in the region which eventually resulted in the Hill peoples' armed struggle against military oppression. Kabita Chakma discusses the complex situation of Bengali domination in the Chittagong Hill Tracts (Chakma, 2005).

Chapter Seven

[62] Medical historian Joshua Nalibow Ruxin (1994) describes this moment in his expose in the following manner:

> The deaths that resulted had major repercussions for Phillips and his colleagues. According to a visitor at the Naval Research Center in the Philippines during the autumn of 1962, soon after the tragedy, Wallace "felt badly about it", and Phillips "felt so badly about it he didn't pursue it any further". These emotions even led Phillips to conceal the deaths and to delay publishing the other results, including his distinguished verification of glucose-sodium absorption in vivo, until 1964.p. 373.

[63] Sandra Harding (1998) outlines this early post-Kuhnian tradition of science studies in the following manner:

> The post-Kuhnian social studies of science projects challenge this internalist epistemology that attributes all of the scientific achievements of the sciences to nature's order plus the sciences internal processes – epistemologically scientific method, understood as sharply demarcated from any other methods of obtaining knowledge (p. 3).

The monumental work in laboratory studies of Latour and Woolgar *Laboratory Life. The Construction of Scientific Facts* (1979) is an account of post-Kuhnian tradition.

[64] Bruno Latour's question what is behind a scientific text pursues similar methodological and argumentative motif (Latour, 1987). While following the movement of science and scientists in the persuasion of their scientific propositions, scientific texts are one of the stations where scientists are destined to stop. Robert Koch's scientific invention of comma bacillus has no existence if not communicated with the scientific community and people. In his account, in the scientific text we find scientists as the semiotic actors, the tensions of objectivity-subjectivity in the scientific literature is the sufferings of semiotic actors to stabilize a scientific fact from the laboratory to the paper (ibid, 64).

The different rhetorical mode adopted by the Center scientists in conference paper, scientific report series or in the editorial note of the Center director published in annual report is not external to the knowledge it produces, yet it is constitutive of its knowledge claims (Ross, 1990). In 1849, the reason John Snow failed to convince its contemporaries might as well because of his very exclusive formulation of water borne theory of cholera denying utterly all other vectors that may have had influence on the spread of the epidemic (Eyler, 2001). Analytical framework borrowed from the rhetoricians of science I argue, scientific literature suffers from the tensions of social (dis)engagement, the suffering that is constitutive of its rhetorical style and strengthens its techniques of persuasion.

[65] A context stripping happens to contextualize scientific way of understanding cholera. In Robert Koch's description, the sociality of the death of a cholera victim found in Kolkata morgue was confiscated. Under the microscopic readings, the dead person rather became 'fresh material' of his scientific hunt for *comma bacilli.*

[66] Dehistoricizing tendencies and objective voices are two rhetorical strategies that the scientists have always persuaded while making their scientific truth claims. While critiquing these dehistoricizing tendencies, many scholars from sociology of knowledge and historians of colonial science ascribed an overarching ahistoricity to science. My concern here is not on how scientific practices perceived history outside their reality or how scientists determines or undermines the reciprocal relationship between external and internal history, rather to emphasize a historicity within. By historicity within, I am referring to the particular way scientists created their history, defined and engaged with history among them.

[67] For decades, tuberculosis is equally fatal communicable disease in Bangladesh, however it is only recently it has been recognized as a major public health concern. There is still lack of common knowledge about the disease among rural people. Statistics shows that more people in Bangladesh dies or suffers from tuberculosis than sexually transmitted diseases (STD) or HIV+/AIDS, but public health expenditure rules out the statistical significance of these occurrences. Since early 90s, the global anxiety around HIV epidemic overshadowed all other local primary health concerns. This hegemonic constitution of local public health concerns shows that what will become a major focus of health intervention is not necessarily contingent upon peoples suffering, rather it is the reflection of how different actors came to know about the disease and interpreted it.

[68] My understanding of deterritorialization is influenced by Arjun Appadurai's (1996) concenptualization of the term.

[69] See, ICDDR,B Strategy Plan to the Year 2010. www.icddrb.org

[70] Govermentality scholars interested in the postcolonial processes of governmentalization found Foucault's discussion of governmentality inadequate and proposes new prefixes to his neologism: colonial governmentality (Scott, 1995; Ibrahim, 1997, Chun, 2000 and Kalpagam, 2000), Western governmentality

(Pels, 1997), transnational governemntality (Ferguson and Gupta, 20002), neo-liberal governemntality (Rose and Miller, 1992; Lemke, 2001) and humanitarian governmentality (Redfield, 2005; Ngyuen and Peschard, 2003). Among these works, Ferguson and Gupta's (2002) definition is particularly significant to understand the transnational processes that I am discussing here:

> In all other cases, we are dealing with political entities that may be better conceptualized not as "below" the state, but as integral parts of a transnational apparatus of governmentality. This apparatus does not replace the older system of nation-state (which is – let us be clear – not about to disappear) but overlays and coexists with it. In this optic, it might make sense to think of the new organizations that have sprung up in recent years not as challengers of pressing up against the state from below but as horizontal contemporaries of the organs of the state – sometimes rivals; sometimes servants, sometimes watchdogs; sometimes parasites but in every case operating on the same level, and in the same global space (p. 996).

[71] While examining the problem of colonial modern power, David Scott (1995) described this transformation:

> ...the problem ofcolonialism in relation to the political forms of modernity is the emrgence at a moment in colonialism's history of a form of power – that is, therefore, *a form of power not merely conincident with colonialism* – which was concerned above all with disabling old forms of life by systematically breaking down their conditions, and with constructing in their palce new conditions so as to enable – indeed, so as to *oblige* – new forms of life to come into being (italics original, p. 193).

Chapter Eight

[72] It is a common practice in Bangladesh that the mother will be known with her children's name like Kokila's mother, Kokilar Ma. All the names I have mentioned here are pseudo name.

[73] My conceptualization of actor network theory is influenced by the work of Susan Leigh Star (1988; 1991). However, the use of the term hierarchical actors' networks is influenced by her theorization; she does not necessarily adopt the term hierarchy in her work.

[74] Dr. William Greenough (2004), the former director of the Center wrote a biographical note focusing on the scientific excellence of the Center. In the same piece, he has also termed the Center science as model of 'third world science.' He writes:

> The legacy of cholera demonstrates how basic science – when brought to the bedside – can save lives, reduce costs and prevent disease. It also illuminates aspects of intestinal transport as well as very basic cellular mechanisms (p.338).

[75] Pigg and Adams (2005) in their introduction to the edited collection titled *Sex in Development: Science, Sexuality and Morality in Global Perspective* outlined the formations of new subjectivities mediated through the AIDS prevention projects of international development organizations in 'third world states.'

[76] 'People at risk is' a common vocabulary used to refer not only to the people of Matlab but citizens of Bangladesh in general by the Center. This is one of the words that contributes in the implicit construction of Matlab as the diseased mass. My use of the term is rather rhetorical.

[77] To clarify the distinction between postcolonial critique and postmodern move to recognize heterogeneity, Gyan Prakash (1995) writes:

> Though the present currency of such concepts as decentered subjects and parodic texts may provide a receptive and appropriative postcolonial criticism, it's emphasis on heterogeneity neither aims to celebrate the polyphony of native voices nor does it spring from superior value placed on multiplicity. Rather, it arises from the recognition that the *functioning* of colonial power was heterogeneous with its founding oppositions. (p. 16, italics original)

[78] In that informal conversation we have discussed many questions that were contentious and some of the information shared with me may be considered as insider information. Disclosure of the identity of the fieldworker may jeopardize her/his work situation. Therefore, in my reconstruction of the event I have purposefully distorted it.

APPENDICES

Appendix A:
Data Collection Process and Phases, September 2004-May 2005

In the public discourse, there is no coherent idea about the Center. When I started my undergraduate degree program, anthropology as discipline was in its infancy in Bangladesh and what it means to become an anthropologist was a question unexplored. Even within the university's academic development committees, the question of separate anthropology department was arguable – what more can anthropology offer than sociology, political science and archaeology. As freshwoman student, we often felt unsettled about the fate of anthropology and our disciplinary association. I remember, in those unsettling moments, our senior colleagues mentioned ICDDRB as one of the few possible places to work when we graduate. The only full professor of the department was also working as consultant anthropologist for the Center. In the corridor of the anthropology department, the name of the Center was like an echo, ever-present. This was early 90s. The increasing demand of the global public health regime to understand the health seeking behavior of poverty-stricken population and ICDRRB's taking the responsibility to produce that knowledge was creating welcoming situation for expatriate foreign, favourably white anthropologist, epidemiologists. This global demand to have readily available knowledge about the cultural determinants of disease and illness of 'underdeveloped or developing states' considered to be a valid reason to initiate institutionalization of anthropology in Bangladesh. The compliance of academic anthropology with the politics of international development and ICDRRB playing a

significant role in this complicity remain at the center of discussion and debate of anthropology in Bangladesh. Besides, in the public discourse the Center was either known as the cholera hospital or sometime as a laboratory of foreign scientist using the poor people of Bangladesh as guinea pig of their scientific experiments. Local activists, left lenient critiques of western imperialism quite often highlighted the Center's historical association with the SEATO Military treaty. When I entered the Center my understanding of the history and political existence of it was compound and opaque at the same time. Moreover, my typical social scientist's dissociation with any kind of numeric representation of facts, statistical documentation process let alone scientific taxonomy and my naiveté on the practice of science revealed the data as a surprise to me.

Phase I: September-November 2004: At the DISC

In September 2004, I have signed up for the Center library membership and started reviewing the Center's annual reports. The library assistants quickly showed me the shelves that have ICDDRB publications. Annual reports and the *Smritikotha* (Silver Jubilee publication of ICDDRB) worked as a guidebook to find out significant scientific experiments, particular clinical case and major scientific publications. Many of these reports were indecipherable for me, but so little that I manage to comprehend out of this utterly scientific literature compelled me to look into the international bioethical code. Even when the requirements of international regulatory framework are maintained people at the margin may still be at risk. My inability to make sense of the epidemiological reports or to interpret the biostatistical data become was becoming a source of constant angst during my archival work at the Center. After two months of work, I left the Center with number of documents from following categories:

1) Annual Reports of ICDDRB
2) Health and Science Bulletin of ICDDRB
3) Scientific Report Series of ICCDRB
4) Scientific Achievements of ICDDRB 1991-1995
5) Joint Publications of ICDRRB (Publications, project evaluation reports with BRAC, CARE Bangladesh, UNICEF)
6) Annual Scientific Conference of ICDDRB

Phase II: January-April 2005: Scientific Reports to Academic Publications

My lack of understanding and training in biomedical research and the copyright concerns attached to the Center publication prolonged my data collection process. This situation left me with the ethical dilemma propagated by the existing intellectual property rights and laws. I have described the dilemma at length in Chapter 3 of this thesis. Reports that I have retrieved from the DISC are ranging from 1963 to 2003, although the authors of these reports mostly from major US research institutes, tracking individual author seems impractical. I contacted the Center with the hope that they might have a list of consultants as many of the scientists who worked during the early years of the Laboratory came back to the Center after internationalization. "Scientists come and go" – this was the response from the Center to my request. Complementing this statement, they said, their excellence in training is renowned and numerous students from the United States, including Johns Hopkins University are coming to the Center every year for practical training, it is impossible for their part to keep track of each of these foreign trainees. Similarly, numerous scientific projects are going on simultaneously, many 'foreign scientists' are working for a specific contract period with the Center whereas

they only have communication with scientists whose contribution was monumental in the scientific discoveries of the Center or who held a top rank institutional position. It didn't have a complete list of consultant-experts-scientists worked there but the librarian suggested me that pretty much the same version of the scientific report generally got published in acknowledged scientific academic journals.

At that stage of my analysis, I was uncertain whether my writing or analysis would involve any direct quote from these reports, however, to comply with the demands of existing intellectual property law I started tracking down the academic version of each scientific report. At this phase of my research, I retrieved articles from the following journals and seminar proceedings:

1) Bulletin of World Health Organization
2) US Japan Cholera Panel Conference Proceeding
3) Journal of Diarrhoeal Disease Research
4) Bangladesh Journal of Micro Biology
5) Asia Pacific Journal of Public Health
6) The Lancet
7) CIBA Foundation Symposium Series
8) UBINIG Series on ICDDR,B

While reviewing these published articles, I found that scientists from the Center continually referring to particular events from the history of cholera research. The scientific angst to connect with its past brings into the brunt three epochal character in the history of cholera research.

Phase III: February-April, 2005: Biographies of Snow, Koch and Haffkine

I found myself in front of a new set of facts (data), the foundational events and epochal characters, which/who fashioned the history of cholera research: English epidemiologists John Snow's water borne theory (1849), German bacteriologists Robert Koch's discovery of *vibrio cholera* (1883) and W. M and Russian-Jewish zoologist invention of anti-cholera vaccine (1893). An understanding of this historical episode was not only indispensable in the understanding of current scientific practices of the Center, but also these events were transforming moments for South Asia in many ways. Scientists who worked in the Center themselves tried to put together a history of cholera research weaving these historical episodes with American interest in cholera prevention. I started looking for secondary sources about these scientific events and the scientists who are the main heroes of these events and read different versions of biographies of Snow, Koch and Haffkine.

1) Waksman, S.A. 1964. The Brilliant and Tragic life of W.M.W Haffkine, Bacteriologists. New Brunswick, New Jersey: Rutger University Press.

2) Lutzker, E and Jochnowitz, C. (1987) Waldemar Haffkine. Pioneer of Cholera Vaccine. ASM News. 53(7), 366-369.

3) Johansen et al. 2003. Cholera, Chloroform and the Science of Medicine. A life of John Snow. Oxford, New York: Oxford University Press.

4) Shephard, D. A. E. 1995. John Snow. Anesthetist to a Queen and Epidemiologist to a Nation. A Biography. Cornwall, Prince Edward Island: York Point Publication.

5) Eyler, J.M. 1979. Victorian Social Medicine. The Ideas and Methods of William Farr. Baltimore: Johns Hopkins University Press.

6) Eyler, J. M. 1973. William Farr on the Cholera: The Sanitarian's Disease Theory and the Statistician's Method. *Journal of the History of Medicine and Allied Sciences, Vol. 28, p.* 79-100.

7) Brock, T.D. 1988. Robert Koch. A life in Medicine and Bacteriology. Madison: Science Tech Publishers.

8) Heyningen. W. E and Seal J.R. 1983. Cholera. The American Scientific Experience, 1947-1980. Colorado: Westview Press.

This may as well raise question about the methodological chaos of this study. The reiterative process of data collection makes it more similar with the grounded theory approach, but it was not a conscious decision taken at the beginning of archival work. In my research, the oath of not defaming the Laboratory that one has to take to gain access to the DISC created an awkward ethical situation: on the one hand was the laboratory which is apparently the organization and its practices that I am studying; and on the other hand are the people of Matlab who, for the last four decades, have made themselves available for scientific studies to be conducted on them. The colliding interest of the actors in the different steps of the hierarchy generates this awkwardness; here accountability to the research participant becomes a complicated decision. Are the human subjects of scientific research, and the scientists conducting the study, equally constitutive parts of the Laboratory, particularly since the Matlab is a central part of the laboratory? Hence, in this research what does being responsible to the participant entail? Does it mean complying with the organizational hierarchy of the Laboratory, or recognizing the existence of the people on the lower rungs of the ladder? The nature of fact revealed and ethical dilemma encountered in the first phase of data collection designed the later phases of the study.

Appendix B:
Cholera Vaccines Trials Conducted in Bangladesh, 1963-1985

The 1963 Field Trial

Cholera vaccine was the first anti bacterial vaccine introduced for the control of communicable disease in man. Despite widespread use of the vaccine, convincing proof of its efficacy was not available. Accordingly, in November 1963 the Pakistan SEATO Cholera Research Laboratory initiated a control field trial in rural East Pakistan. The study was designed to answer three related questions: (1) Can an injected vaccine prevent the diarrhoea associated with *Vibrio Cholerae*? (2) If so, for how long? (3) Does the vaccine prevent in apparent infection among contacts of persons with diarrhoea associated with *V. Cholerae?*(Oseasohn et al, 1965).

The 1966-67 Field Trial

A controlled cholera vaccine field trial was carried out in rural East Pakistan to determine the efficacy of a cholera vaccine program of average antigenic potency of when used in continuing program with annual reimmunizations. A cohort of 40000 children aged 0-14 years were equally divided into a control group and 3 vaccine groups. Inoculations of vaccines were given annually for 3 years just before the start of cholera season, and follow up continued for 2 additional years. The results indicate that there was increasing protection with reimmunization, reaching a maximum with 3 doses.

The 1974-75 Field Trial

From among the residents of the Cholera Research Laboratory (CRL) field study area in rural Bangladesh, 92,838 volunteers participated in the field trial. Volunteers were drawn from children between 1 and 14 years of age and adult women. The toxoid, lot number 21201 prepared by Wyeth Laboratories, was prototype formed by glutaraldehyde treatment of purified cholera enterotoxin obtained from broth cultures of Inaba 569B. Volunteers received by jet injector on a double blind basis either 0.5 ml of adult dose tetanus-diphtheria toxoids. Seventy four percents of the volunteers received a second injection six weeks later (Curlin et al., 1977).

The 1977-78 Field Trial

The question of the efficacy of a sucrose electrolyte solution in maintaining hydration in patients with acute diarrhoeal disease is a crucial one for health planner. Therefore, a series of three double blind controlled trial was conducted. The trials of sucrose with glucose oral solution in patients hospitalized and with bacterial and viral dehydration diarrhoea and one "before and after" trial on children with rotavirus diarrhoea attending the Matlab rehydration center was conducted (Sack et al., 1979).

The 1985 Field Trial

A clinical trial was performed to determine the ability of a new cholera vaccine candidate immunogen – purified B subnuit – to induce an immune response in Bangladeshi volunteers (lactating women). Twenty four Bangladeshi lactating women were recruited for the study. They were divided into four equally sized groups which were given two immunizations with B subnuit 25 days apart intramuscurally (IM) or as a combination of both. Stool, saliva and serum specimen were collected from the women immediately after the initial and secondary immunizations. For comparison intestinal lavage, saliva, serum specimens were collected from number of Swedish volunteers (who are not living in a cholera endemic area) given one PO or one subcutaneous immunization with B subnuit. The trial was performed to determine the capacity of B subnuit to give rise significant local and systematic antibody responses in Bangladeshi volunteers. This included evaluation of best route of antigen administration and effect of a secondary immunization for stimulating serum antibodies and local anti body formation (Svennerholm et al., 1981).

Appendix C:
List of Documents Used to Reconstruct the Historical Events

Chapter Four

[A] Smriti, ICDDR,B in Memory, 2003 A silver jubilee publication of the center.

[B] Heyningen. W. E and Seal J.R .(1983). Cholera. The American Scientific Experience, 1947-1980. Colorado: Westview Press.

[C] Mosley et al. (1972). Report of the 1966-67 Cholera Vaccine Trial in Rural East Pakistan. A Five Years of Observation with a Practical Assessment of the Role of a Vaccine in Cholera Control Programmes. Bulletin of World Health Organization 47, 229-238.

[D] This process of weaving different historical pieces into one narrative is the reflection of my own subjective relationship with the text and the history of Bangladesh.

[E] Greenough, W. (2004). The Human, Societal and Scientific Legacy of Cholera. Journal of Clinical Investigation. 113 (3), 334-339

[F] Hartman, B. (1995). Rights and Wrongs. The Global Politics of Population Control. Boston, Massachusetts: South End Press.

[G] ICDDR,B Annual Report 1980.

[H] BRAC ICDDR,B Project Report, 1993

[I] The Lancet debate around the internationalization of the Laboratory published on the following issues of the Lancet:

a. Round the World: Bangladesh, An international Research Center, The Lancet, January 28, 1978, p. 89.
b. Mosley, W.H., Rahman, M.M., Chen, L., Aziz, K.M.S. Greenough, III. W.B., (1978, March 18). International Research Laboratory in Bangladesh [Letter to the Editor]. *The Lancet*, p. 602-603.
c. McCord, C. (1978, April 8) International Research Laboratory in Bangladesh [Letter to the Editor]. *The Lancet*, p. 768.
d. Mosley, W. H. (1978, May 6) Cholera Research in Bangladesh [Letter to the Editor]. *The Lancet.* p. 991-992.
e. Nalin, D. R. (1978, May 6) Cholera Research in Bangladesh [Letter to the Editor]. *The Lancet.* p. 992.
f. Heyningen, W. E (1978, May 6) Cholera Research in Bangladesh [Letter to the Editor]. *The Lancet.* p. 992.

g.Rohde, J.E. (1978, May 6) Cholera Research in Bangladesh [Letter to the Editor]. *The Lancet.* p. 993
h.McCord, C. (1978, June 3) Cholera Research in Bangladesh [Letter to the Editor]. *The Lancet*, p. 1207-1208
i.Levine, R. J. (1978, June 3) Cholera Research in Bangladesh [Letter to the Editor]. *The Lancet*, p. 1208
j.Islam, N., Mehtab, H., Muttalib, M. A., Chowdhury, Z. (1978, June 3) Cholera Research in Bangladesh [Letter to the Editor]. *The Lancet*, p. 1208-1209

[J] Macgrane, S. (2003). A Simple Solution. The Magazine of Johns Hopkins Bloomsberg School of Public Health, Spring 2003.

[K] Akhter, F. (1996). Military Objectives of Cholera Research and Violation of Biomedical Ethics in the Research on Human Subjects. UBINIG Series on ICDDR,B, 1. Dhaka, 1996.

Chapter Six

[A] Johansen et al. (2003). Cholera, Chloroform and the Science of Medicine. A life of John Snow. Oxford, New York: Oxford University Press.

[B] Shephard. D.A.E. (1995). John Snow. Anaesthetists to a Queen and Epidemiologists to a Nation. A Biography. Cornwall, Prince Edward Island: York Print Publishing.

[C] Eyler, J.M. (2001). The Changing assessment of John Snow's and William Far's Cholera Studies. History of Epidemiology Series 46 225-232.

[D] This site is devoted to the life and times of Dr. John Snow (1813-1858), a legendary figure in the history of public health, epidemiology and anesthesiology. http://www.ph.ucla.edu/epi/snow.html

[E] My understanding of the overlapping history of the disease, development public health in colonial territories and the emergence of bacteriology as a scientific discipline.

[F] Harrison. M. (1994). Public Health in British India. Anglo-Indian Preventive Medicine 1859-1914. Cambridge: Cambridge University Press. Add more History of Sanitation etc.

[G] Black. M. (1990). From Handpumps to Health. The Evolution of Water and Sanitation Programs in Bangladesh, India and Nigeria. New York: UNICEF.

[H] Brock, T.D. (1988). Robert Koch. A Life in Medicine and Bacteriology. Madison; Berlin: Science Tech Publisher; Springer-Verlag.

[I] Heyningen. W. E and Seal J.R. (1983). Cholera. The American Scientific Experience, 1947-1980. Colorado: Westview Press.

[J] Waksman. A.S.(1964). The Brilliant and Tragic Life of W.M.W Haffkine. Bacteriologist. New Brunswick, New Jersey: Rutger University Press.

[K] Lowy, I. (1992). From Guinea Pigs to Man: The Devselopment of Haffkine's Anticholera Vaccine. The Journal of the History of Medicine and Allied Science (47) 270-309.

[L] Pollitzer, R. (1965).Cholera Advances in Historical Perspective. In Proceeding of the Cholera Research Symposium. January 24-29, 1965. Honolulu: U.S Government Printing Office.

[M] Cvjetanovic. B. Earlier Field Studies of the Effectiveness of Cholera Vaccines. The copy of this document that I have accessed has incomplete bibliographic information.

[N] Naval Medical Research Center website. Accessed January 6, 2004 http://www.geis.fhp.osd.mil/GEIS/Training/namru-3.asp

[O] Philips. R. A. (1964). Water and Electrolytes losses in Cholera. Federation Proceedings. 23: 705-12.

[P] Ruxin, J.N. 1994. Magic Bullet. The History of Oral Rehydration Therapy. Medical History. 38: 363-397.

[Q] Smriti, ICDDR,B in Memory, 2003 A silver jubilee publication from the Center.

[R] Macgrane, S. 2003. A Simple Solution. The Magazine of Johns Hopkins Bloomsberg School of Public Health, Spring 2003.

[S] Oseasohn et al, 1965. This is another example of scientific report for which I didn't have complete bibliographic information.

[T] Curlin et al. 1977. Serological Aspects of Cholera Toxoid Field Trial in Bangladesh. In Proceedings of the 12th Joint US-Japan Cooperative Medical Science Program, Cholera Panel.

[U] Curling et. al. 1977. The Influence of Drinking Tubewell Water on Diarrhoea Rates in Matlab Thana, Bangladesh. In Proceedings of the 12th Joint US-Japan Cooperative Medical Science Program, Cholera Panel.

[V] Chowdhury, A.M.R and Cash. R.A. 1996. A Simple Solution. Teaching Millions to Treat Diarrhoea at Home. Dhaka: University Press Limited.

[W] Cholera Research Laboratory Annual Report, 1976.

[X] ICDDRB Annual Report, 1980.

[Y] ICDDRB Annual Report, 1986.

[Z] UBINIG Series on ICDDR,B No. 1, Dhaka, 1996.

[AA] Cholera Working Panel.1993. Large Epidemic of Cholera-like disease in Bangladesh Caused by Vibrio cholerae 0139 Bengal. The Lancet. Volume 342. August 14, 1993. 387-390.

[AB] Greenough III. W. 2004. The Human, Societal and Scientific Legacy of Cholera. The Journal of Clinical Investigation 113(3): 334-339

[AC] Rohde. J. E. and Northrup. R.S. 1976. Taking the Science where the Diarrhoea is. *In* Acute Diarrhoea in Childhood: CIBA Foundation Symposium 42 (New Series).

[AD] ICDDRB Annual Report 2003

[AE] ICDDRB Health and Science Bulletin 3 (2), June 2005.

Appendix D:
Suraiya Begum's Narrative: A Tale of a Field worker

August 1971. I was getting ready to go back home after my masters final exam in Sociology at Dhaka University. At that time, the Cholera Research Institute (now ICDDRB) was recruiting some female workers. Five or six female students from our sociology department applied for the job. I got the job after getting the interview card and appearing for the viva. I joined the job on November 16, 1975. We were however given training the first 2/3 weeks. This was the first time I had gone to work in a village. I always lived and studied in *Zila* (district) towns. I faced a lot of difficulties at this job because we were the first female workers to work at the field level in Matlab. We tried to build trustworthy relationships with the village women so that they could mingle with us easily and we would not face problems gathering information from them. We would go to them wearing normal *saris* and using *ghomta* (covering our head). Mothers from the village were very simple. If you socialize with them honestly, they speak their minds freely. Most of us in our team were unmarried. The mothers would refuse to weigh themselves as they thought that family planning ingredients would enter their body through their feet when it touches the weighing machine

They would call us shameless, modern, *dajjal* (impolite) girls who were sinning. We would then tell them - "We wear saris and ghomta when we come to you, but you bath in the river banks, bring water without wearing ghomta." They would then understand their mistake. The first question we were asked when we went to villages is if we were married. They would also ask if we had gone to school, how much money we earned, etc. At the beginning, we would tell the truth that we were unmarried. We would

then find we were getting marriage proposals for men who had gone to school only up to class 9 or 10. I once told a woman that I was married, had a boy and girl and that my husband stayed abroad. That woman asked for my Matlab office address.

One day, she arrived at my office at the end of office hours and wanted to see my children. I was caught by surprise. I told everything to my senior *apa* (colleague). She said, "Tell them they have gone to visit their *mama* (maternal uncle)." I somehow managed the lie this way. We would all say we were married to avoid marriage related issues because at that time, village folks frowned on women working. They would say we work with outside men, have no shame and our character is not good.Once one worker went to collect blood, at that time the husband of one woman came home to beat her. Another time, one woman's husband came to beat her because she talked to us and told our worker to leave admonishing her.

Again, I have seen cases where the male porter who was carrying the weighing machine was given a chair to sit on, and we were given wooden stools (*piri*) to sit on. They would not value females. Some of them would ask if the male (porter) was my husband. When collecting blood, they would say if we pinched their fingers, family planning medicine would get into their body.

Later on, when we would visit them every month, their attitude changed. They even acted friendly with us. We crossed many hurdles. Now 27 years later I marvel at how easy it is to work now! Nothing causes hurdles now. I now think we have become successful based on the social changes we brought about in Matlab. I think the female education rate in Matlab is high today because there are more female field workers there.

That is why a lot of parents are more eager to send their girls to study (Translation is mine, Smritikotha, A Silver Jubilee Publication, ICDDRB, 2003, p.18).

Appendix E:
Brief Definitions of Scientific Terms

Antigenic Potency: Ability of antigens including vaccines to generate an antibody response.

Arsenicosis: Arsenicosis is a chronic illness resulting from drinking water having high levels of arsenic. The person affected can have changes in skin color and formation of patches on the skin. The disease can also lead to skin, lung, kidney and bladder cancers.

Attenuated Vaccine: Attenuated vaccine is a vaccine prepared from live microorganisms or viruses cultured under adverse conditions leading to loss of their virulence but retention of their ability to induce protective immunity.

Captain Phillip's Sodium Pump Hypothesis: In early 1960s, when Captain Robert Allan Philips had started working on cholera epidemic, research had confirmed that after symptoms of diarrhoea had been initiated, the vibrio no longer played any part. Existing history shows that at around the same time i.e. early 1950s, scientists in different laboratories expressed sheer frustration about their lack of understanding of the physiology of body fluids (Ruxin, 1994). Scientific understanding of the glucose, sodium and water transport in body fluids across intestine was ill-developed. For Captain Philips, it was evident that the loss of electrolytes resulting in severe dehydration was causing death in diarrhoea cases. In September 1961, a cholera pandemic broke out in the Philippines, and Philip sent his team to Taipei and continued his experimentation in rehydration study. For two patients he prescribed a high concentration of sugar and sodium orally and the effect of it on the patient was significant. His work here made him formulate the sodium pump hypothesis, which stated that the cholera patient's intestinal sodium pump gets poisoned implying that sodium instead of getting absorbed in blood comes out with feces (Philips, 1964). He believed that a high concentration of the oral solution would unpoison the pump.

Cholera toxin: Cholera Toxin is a substance produced by *Vibrio cholerae,* the bacteria responsible for causing cholera. This toxin is the one that acts on the cells in the intestine and causes the typical liquid diarrhoea, the main manifestation of cholera.

Cholera Vaccine: Cholera vaccine is generally a preparation of killed *Vibrio cholerae,* used in immunization against cholera.

Diarrhoea/Cholera: Diarrhoea is defined as loose, watery stools occurring more than three times in one day. Cholera is one form of diarrhoea caused by a bug called *Vibrio cholerae*, in which the patient has profound liquid rice water like stools.

Escherichia coli: *Escherichia coli* are one of the main species of bacteria living in the lower intestines of mammals including humans. The presence of *E. coli* in surface water is an indicator of fecal contamination. Different strains of *E. coli* can also produce different diseases in humans including diarrhoea, urine tract infection among others.

Fixed Virus: Fixed virus is one whose virulence and incubation period have been stabilized by serial passage and remained fixed during further transmission. W.M.W Haffkine in his cholera vaccine preparation used this virus to develop immunization against cholera (Lowy, 1992).

Live Vaccine/Killed or Dead Vaccine: Live and dead vaccine represents two different schools of thought in the history of vaccine development. The use of dead or killed virus in the preparation of vaccine is more common. A preparation of dead or weakened pathogen, or of derived antigenic determinants, that is used to induce formation of antibodies or immunity against the pathogen termed as dead or killed vaccine. To the contrary, live vaccine is one prepared from live microorganisms that have been attenuated but that retain their immunogenic properties

Monsur's sugar: In countries like Bangladesh where laboratory facilities were meager the bacteriological diagnosis of cholera in outlying areas always presents a difficult

problem. In early 60s, A K Monsur, a Bangladeshi bacteriologist, developed a new method, which made it possible to make an accurate bacteriological diagnosis of cholera even in remote areas. The method and media that he discovered was named after him respectively: Monsur's method and Monsur's Sugar. The two media that he found were (1) a solid alkaline, bile salt, tellurite, gelatin-agar plate which acted as a highly selective medium for *Vibrio Cholerae,* and (2) a liquid alkaline, bile salt, peptone, tellurite medium which acted as both an enrichment and preservative fluid. With these two media the bacteriological diagnosis of cholera in rural areas can be approached from two different angles: (1) on-the-spot diagnosis by a mobile team in the field, supplied with media sent out periodically from a base laboratory; and (2) central laboratory diagnosis of specimens posted in a preservative fluid medium; reliable results can be had even after a week or more (Mansur, 1963).

Toxoid: Toxoid is a bacterial toxin whose ability to cause disease has been suppressed, however the ability to produce immune response in the human body is maintained.

Tube well: The term generally used to describe water well in South Asia including Bangladesh, termed borehole or water well in other parts of the world. It is a device installed into a well to extract groundwater from an aquifer. A well is first drilled into the ground and then a pipe assembly is lowered which consists of an intake section and a discharge section. The intake section consists of a slotted part, the well screen, and a blind pipe. The discharge section consists of housing pipe, pump and discharge mouth or sprout.

***Vibrio cholera 01/Vibrio cholera 0139/*Bengal**: V. *cholerae 01* is a specific group or serotype of the cholera causing bacteria. This subtype was the only one known to cause epidemic cholera before 1992. However, *V cholerae* 01 was almost completely replaced by another serotype *Vibrio cholera 0139,* also referred to as Bengal, at the beginning of the epidemic in 1993.

William Farr's Miasma Theory: Dr. William Farr, assistant commissioner for the 1851 census and a career employee of the government's General Register Office was convinced that cholera was transmitted by air. He reasoned that soil at low elevations, especially near the banks of the River Thames, contained much organic matter which produces *miasmata*. The concentration of such deadly *miasmata* would be greater at lower elevations than in communities in the surrounding hills. His calculations in 1852 seemed to support this theory.

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