

Science and Modernity: Modern Medical Knowledge and Societal Rationalization in Malaysia

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by

Choon-Lee Chai

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Abstract

The focus of this thesis is on the social history of public health and medicine in British Malaya during the late 19th and early 20th centuries. I argue that the introduction of modern medicine, medical services, and medical knowledge to Malaya, while serving the immediate needs of colonial economic extraction, and providing legitimacy to colonial rule, also functioned as a cultural agent of colonization, and later modernization. As a cultural agent, modern medical knowledge challenged traditional medical practices and beliefs, and set a new cultural standard of truth, morality, and aesthetic that was to become the cultural basis of modern Malaya and later Malaysia. Using Weber and Habermas' theory of societal rationalization, I further contend that the disenchantment of the world by modern medical knowledge, and the reign of the instrumental rationality of modern science, resulted in a predicament of modernity that continues to plague modern Malaysia. The tension of modernity is reflected in the struggle by the Malaysian government to maintain a balance between the pursuit of modernity on one hand, and the preservation of Islamic religious beliefs that define the very nature of the Malaysian nation on the other. In other words, there is an effort to make Malaysia both a modern scientific state and a Muslim state; and I contend that the goal is achieved through cultural discourses of Islam and modern science that are in harmony with each other.

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Chai, Choon-Lee

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Dedication

To the memory of my beloved father
whose selfless toil supported the family,

My mother whose tenacity and resoluteness continue to inspire me,

and

Choon You, Choon Soi, Choo Foo, and Choon Moi who
shoulder much of the household responsibilities

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Chapter 1: Introduction

Every race has its lumber-room of magical beliefs and practices, and many such survivals are gracious and beautiful and maintain the continuity of a civilization. It is to be hoped that modern materialist ideas will not obliterate them entirely and leave Malay culture jejune.

Richard Winstedt, *The Malay Magician*, 1961: vii.

1.1. Introduction

When Sir Hugh Charles Clifford, the former Resident of Pahang in British Malaya, pondered upon the need of bringing the fruits of European civilization to the Malay Peninsula, he also had this misgiving about the potential deleterious effect of European civilization on the unorganized but richly variegated Malayan landscape, life, and people. He foresaw and was concerned that the introduction of European civilization, while bringing modern ideas and progress, might lead “to a dead monotony of order and peace” (Clifford, 1993 [1897]: xvi). A similar worry was voiced by Richard Winstedt, the Director of Education of the Straits Settlements and Federated Malay States who, in his study of Malay magic, hoped that the modern materialist ideas would not obliterate magical beliefs and practices entirely and “leave Malay culture jejune” (Winstedt, 1961: vii).

Clifford and Winstedt’s misgivings coincide in turn with Max Weber’s apprehension over the process of societal modernization. In Weber’s analysis, the process of modernization is also a process of societal rationalization, which results in the

increasing domination of instrumental rationality and the decline of substantive rationality.

Instrumental rationality operates in concert with the principle of efficiency while substantive rationality instructs human action on the basis of moral and value deliberations. The two often work in tandem with each other in contributing to a stable modern society. Instrumental rationality assists the efficient fulfilling of needs of subsistence, while substantive rationality affords meanings and worldviews that help to structure the known and unknown of both the social and natural worlds, in ways that harmonize variegated and seemingly unfathomable life experiences.

In Weber's analysis, the progress of modern society resulted in the domination of instrumental rationality at the expense of substantive rationality. This is exemplified in his studies of the emergence of capitalism in Europe. According to Weber, the rise of capitalism was contributed to by the diligent and frugal attitudes that had their basis in Protestant ethics among Calvinists. However, as capitalism grew, it took on a life of its own and increasingly deserted the very ethics that promoted it in the first place:

For when asceticism was carried out of monastic cells into everyday life, and began to dominate worldly morality, it did its part in building the tremendous cosmos of the modern economic order. This order is bound to the technical and economic conditions of machine production which today determines the lives of all the individuals who are born into this mechanism ... with irresistible force In Baxter's view, the care for external goods should only lie on the shoulders of the "saint like a light cloak, which can be thrown aside at any moment." But fate decrees that the cloak should become an iron cage Today the spirit of religious asceticism ... has escaped from the cage. But victorious capitalism, since it rests on mechanical foundations, needs its support no longer (Weber, 1930: 181-2).

In sociology, this process of societal modernization, which is typified by the concurrent rise and decline of instrumental and substantive rationalities respectively, is in general called *societal rationalization*. Societal rationalization is an ongoing process that many human societies, both traditional and modern, experience. However, what sets the process of rationalization in modern societies apart from the rest is its pace and intensity, especially under the influence of modern science. The impact of modern science on the process of societal rationalization occurs on two fronts. First, knowledge of modern science does much to dispel and de-legitimize traditional and religious authorities and beliefs which have long served as the primary carriers of moral values and worldviews in human societies. Second, modern science provides the means and knowledge of refined techniques of efficiency. Scientific rationality makes possible minute, detailed, and precise calculation to improve productivity and efficiency. Both impacts of modern science, according to Weber, lead to the disenchantment of the world and the rise of the spectre of an “iron cage” in which human freedom is said to be curbed by the overwhelmingly calculative and instrumental pursuit of efficiency, giving rise to a society awash with “specialists without spirit” and “sensualists without heart” (Weber, 1930: 182).

The displacement of traditional cultural and religious beliefs as traditional societies rationalize leaves a cultural vacuum which is soon filled up by the culture of modern science. Modern science itself is a cultural construct loaded with unique ontology, values, and cultural authority. This culture of modern science soon achieves widespread admiration and global appeal, and modern science becomes a standard subject in the classroom of every country (Drori, et al., 2003).

1.2. Modern Science, Culture, and Nation Building

The introduction of scientific and technological knowledge to Malaysia is often perceived to be purely utilitarian in nature. From the founding of the Pathological Institute during the British rule in 1900 to the establishment of the Multimedia Super Corridor in 1996, science and technology have been repeatedly deployed purportedly to alleviate societal woes and stimulate economic growth.

With a tinge of rhetoric, the Vision 2020 of Malaysia stipulates that in order to become a fully developed nation, one of the nine challenges of the country is to establish “a scientific and progressive society ... that is not only a consumer of technology but also a contributor to the scientific and technological civilization of the future” (Mohamad, 1991).

The fact that science can be construed as a “civilizational complex” reveals to some extent the often obscured cultural character and authority of modern science. The heavy reliance on and nearly-unconditional embrace of modern science in developing countries, including Malaysia, could be understood as partly a result of the influence of the cultural authority of science (Drori, et al., 2003). And as a cultural authority, modern science inevitably challenges pre-existing cultural authorities which are largely of religious and traditional origins. Given these considerations, the development of science and technology in a particular social setting can be analyzed as an interaction between societal needs, scientific authority, and cultural/religious values.

While Weber harbors a strong apprehension regarding the process of societal rationalization, which diminishes a value-based substantive rationality such as the Protestant ethic, and gives rise to a dominant means-end purposive-rationality (Weber,

1930), studies show that perennial traditional and religious values are more enduring. Alatas (1968), for instance, argues that feudalism continues to shape practices of modern Malaysian society despite the adoption and practice of a British model of parliamentary democracy. Similarly, Bellah (2003) shows that the Tokugawa religion sits comfortably side by side with modernity in Japan.

In other words, while the interaction between tradition and modernity does result in the displacement of conventional practices by modernity, the process is often incomplete. Very often, the old and the new are able to co-exist, and at times complement each other (Rudolph and Rudolph, 1967). Consequently, to understand the process of societal rationalization mainly as a process of one dimensional encroachment of instrumental rationality on substantive rationality is to overlook the tenacity of time-honored ways of life and the commensurability and compatibility of more recent scientifically influenced behaviors with tradition. In fact, in Malaysia, some scholars suggest that the relatively easy passage of Malaysian society from tradition to modernity has been partly facilitated by entrenched traditional Islamic values (Bakar, 2003).

The practice of tradition, however, is not monolithic, and often comes with compromises and flexibilities to cater to the dictate of circumstances. For instance, in traditional Malay-Muslim society, evidence suggests that usury, although prohibited by Islam, was at times exacted in one form or another (Jomo, 1992: 133). More importantly, the practice of tradition and religion in actuality is often far from idealistic. For example, underlying a seemingly patriarchal social structure, there are often means in Malay *adat* (custom) for women to redress their plight, and consequently, achieve gender equity (Karim, 1992). The same applies to the practice of Islam in Malaysia. Islamic courts – a

vivid Islamic symbol – often in practice defy stereotype and become a place where gender relationship is equalized (Peletz, 2002).

The main thrust of the Vision 2020 of Malaysia is to make Malaysia a developed nation by the year 2020. This is expected to be achieved “without being a duplicate” of other developed nations (Mohamad, 1991). One of the defining features of Malaysia’s modernization, which sets it apart from other developed nations, is the preservation of the religious identity of Islam. With the continuous interest in Islam among the majority of Muslims in Malaysia, Islam is often made a political rallying point by the state to unite the people and to legitimize its rule (Nasr, 2001). This is especially evident in the last two decades, as characterized by a string of Islamization projects such as the establishment of the Islamic Bank and the International Islamic University, amid the intensification of industrialization at home and globalization abroad. In this multifaceted process of modernization, modern science plays a central role in defining the material meaning of modernity as technological and industrial success. Simultaneously, Islamization occurs to try to set the cultural meaning of success that has been hitherto dominated by modern science, which is manifested in the form of secularization. As a result, modernization and Islamization in Malaysia appear to be able to co-evolve. This is in contrast to the general European experience of modernization in which religious institutions are by and large marginalized. In other words, modernization in Malaysia in recent decades, including attempts to Islamize scientific knowledge, can be understood as being characterized by a mix of the processes of scientific disenchantment and religious re-enchantment.

1.3. Malaysia and the Process of Societal Rationalization

Due to its vicinity to the Malacca Straits, which served as the nearest passage between Europe and Far Eastern nations such as China, Malaya was an attractive and often indispensable territory to European empires. From the occupation of Malacca by the Portuguese in 1511, to the subsequent conquest by the Dutch in 1641, and the later colonization by the British in 1874, Malaya had come into contact with European civilization for centuries. The era of the Dutch and British empires were characterized by high scientific interest in Europe. Both the Dutch (Cook, 2007) and British (Drayton, 2000) were actively engaged in scientific expeditions and inquiries at home and abroad for political, commercial, and cognitive reasons. Although the Dutch involvement in the Malay Archipelago preceded British, its political, commercial, and scientific activities took place mainly in Indonesia. The introduction of modern science to Malaya in fact occurred mainly during the period of British colonization in the late 19th and early 20th centuries.

Malaysia serves as an interesting subject for the study of the process of societal rationalization for several reasons. First, unlike European societies, the introduction of modern science to Malaysia occurred in tandem with the process of colonization. The British intervention in Malay states, and the subsequent introduction of European systems of economy and governance, intensified the process of societal rationalization in Malaysia and made the process of modernization abrupt in comparison to most European societies. While the modernization process in Europe occurred over a period of several hundred years, British Malaya experienced its modernization spike in only a matter of decades. Within a short span of time, modern science, especially modern medicine and

medical services, quickly found a foothold in major towns and cities in Malaya, spreading new methods of medical care and fresh understanding of disease, nature, and the meaning of life. Second, unlike some other non-Western societies such as India which engaged actively in the debate about the value and status of modern science and the place of traditional knowledge and culture, the adoption of modern science in Malaya was relatively calm and unproblematic. There is no equivalent of India's Anglicist-Orientalist debate (Baber, 1996: 17-18) of modern science in Malaya, apart from the Kaum Muda and Kaum Tua contention in the early 20th century that generally cast the issue of modernity in a religious shade (Roff, 1962). In other words, the introduction of modern science to Malaya was relatively smooth, and did not encounter significant resistance from traditional knowledge bearers and practitioners such as shamans and village heads. Third, unlike European societies, the process of societal rationalization did not erode or marginalize the role of religion in Malaysia, especially among the majority Muslims. Islam remains one of the central pillars of Malaysian life, enshrined in the constitution and practiced in everyday life by the majority of Malaysians.

In brief, the process of societal rationalization in Malaysia is not only unique but to a varying degree does not reverberate with the path of societal rationalization as envisaged by Weber. In Malaysia, there is a great degree of congruity between the practice of modern science and the practice of religion, especially among the Muslim community. How this came about and to what extent the process of disenchantment occurred amid rapid scientification and modernization of Malaysian society is the central concern of this research.

1.4. Modern Medicine, Societal Rationalization, and Social Control

One of the earliest branches of modern science introduced to Malaya by the British was modern medicine. As happened to African colonies, which were infamous among the European colonialists as the “White man’s grave,” British presence and success in Malaya hinged upon the control of tropical diseases such as malaria. Medical research of tropical diseases thus became one of the early ventures and a central feature of British colonialism (Haynes, 2001). This however should not be taken as the sole driving force behind the development of colonial science and medicine. There was also a substantial shift in cognitive interests towards the valuing of factual and empirical knowledge, as exemplified by the conduct of modern science, as opposed to metaphysical reasoning (Cook, 2007).

Modern medicine trailed British commerce, expatriates, and troops to every nook and corner of the British Empire. The employment of modern medicine and medical knowledge in colonial society brought the natives into close contact with the culture and practice of modern science. As part of the system of governance, modern medicine soon permeated the daily life of colonial residents. Accordingly, modern medical services became a conduit through which modern knowledge of science and practices entered into the practice, mindset, and psyche of traditional Malaya society.

The impacts of modern medicine on native Malaya society were both physical and cultural. Modern medicine was a physical remedy for sickness as well as a cultural symbol of progress. As an instrument of governance, modern medicine intervened with colonial subjects who were both social-cultural and physical beings. Given the instrumental nature of colonization that was economically driven, the role of modern

medicine in Malaya was geared chiefly towards the disciplining of colonial subjects, both as healthy laborers and as well-trained but deferential subjects.

At a more general level, the management of native society was accomplished through the production of local scientific knowledge that at once provided colonial administrators with an ontological safety in an alien environment while informing them of the measures of imperial administration. The census, geographical survey, and the collection of a plethora of statistical data were efforts to organize, categorize, code, archive or disseminate, and eventually reproduce knowledge about British colonies that served both to assure colonial administrators of the place they ruled and of the way to rule (Cohn, 1996). The systematization of knowledge was the first step towards the systematization of a technique of social control. In areas where uncertainty remained, efforts were made to determine the degree of ambiguity through statistical analysis of census data (Hacking, 1990).

1.5. Research Problems and Research Questions

This research centers on the issue of societal rationalization in Malaya. Beginning with the introduction of modern science to British Malaya and looking at the increasing domination of instrumental rationality, this academic investigation pursues the following lines of inquiry, which can be divided into two major themes: One, the process of scientific knowledge transmission; and Two, the impact of modern medical knowledge in short and medium terms. The research problems thus are:

1. Sociologists of scientific knowledge contend that the development and expansion of scientific knowledge are closely shaped by prevalent socioeconomic interests.

To what extent is this claim true in the context of colonial Malaya under British rule? How much of scientific development in Malaya was driven by the political and economic considerations of the British, and what portion of them was driven by the internal dynamic of modern science?

2. According to Max Weber, the introduction of modern science, in general, accelerates the process of societal rationalization in terms of the increasing domination of instrumental rationality at the expense of substantive rationality. Given a social setting that was vastly different from Europe, to what extent had the process of societal rationalization in Malaya taken the form and shape of European societies? And what is the limit of the cultural influence of modern science in Malaya?

To further elaborate the research problems, the following research questions are posed to guide the enquiry:

1. Transmission of modern scientific knowledge from the metropolis to the periphery was often dictated by the interests of the metropolis. Under what social and economic circumstances did the transmission of modern science, especially modern medical knowledge, occur in British Malaya?
2. The relatively early entry of a medical research agenda into British colonial Malaya is intriguing given the few and weak modern scientific foundations Malaya commanded. What were the social economic forces at work behind the formation of scientific institutions such as the Institute for Medical Research? And to what extent had the internal dynamic of science aided its formation?

3. To understand science as an agent of societal rationalization is to treat science as an agent of social change. In what ways had the introduction of modern science, or more specifically modern medicine and medical knowledge, induced the changing of social beliefs, norms, and behaviors?
4. Modern science manifests itself both as a physical and cultural entity. Its physical presence is conspicuous in modern technologies. Its cultural presence, although less obvious, is equally strong. As a cultural entity, modern science commands a certain degree of cultural authority. How did this cultural authority play out in British colonial and postcolonial administration of Malaya?
5. Finally, as an agent of societal rationalization and a symbol of modernity, how did traditional Malayan society adapt to modern practices, values, and worldviews? What is the relationship between modern science and traditional and religious beliefs and practices? In particular, how do we understand the Islamization process in Malaysia in relation to scientific and modern developments?

1.6. Methodology

The development of modern science and technology, and its subsequent rationalization impact on society, happened over an extended period of time. As a result, the study of any society often involves historical exposition, tracing the origins of an event while seeking explanations of the nature of the event.

The study of history often involves both descriptive and analytical dimensions. In describing history, historians seek to reconstruct historical events as completely and

accurately as possible. In this regard, investigators try to check the authenticity and reliability of historical records. Like other fields of academic research, historians also seek to explain historical events. In doing this, historians look for patterns and trends of different historical events and try to unravel the underlying social structures that have contributed to social change.

The historical study of society is often subsumed under the banner of historical sociology. Calhoun (2003: 383-385) summarizes three main purposes of historical sociology. First, it serves to study social change. Since social change occurs over a period of time, it is necessary to take a longer view into history in order to understand the nature and causes of change. Second, historical study of society contributes to dispelling the illusion of false necessity. Without a look into the past, society often takes the present day social structures as naturally occurring. However, a survey of history often reveals that social structures vary with social conditions. The present arrangement of social structures may differ significantly from the past. Third, historical analysis is needed in order to better understand analytical categories that are used in social analysis. The concept of “societal rationalization” that manifests in different social settings at different times often signifies dissimilar meanings. As a result, methodologically, a combination of historical and sociological insights helps to identify the changing meaning of research concepts.

The research questions will be answered mainly through the help of written records, both official and unofficial, that can be found in government documents, books, journals, newspapers, biographies, and even stories. The research is based mainly on archival materials from the National Archive of Malaysia. I have also consulted the

libraries in the Institute of Medical Research, and the libraries of several universities in Malaysia.

1.7. Some Historiographical Considerations

The abundance of and relative easy access to British colonial administrative records, in comparison to the scarcely available native and immigrant documentations, has resulted in a reconstruction of colonial Malaya history that is largely based on colonial records. This has drawn criticism from some scholars who claim British Malayan history has been largely written from a “British perspective” which overemphasizes the views and concerns of British colonial administrators. They thus call on historians to rethink their research strategy, and make “Asia, not the European in Asia”, the focus of Asian history (Tregonning, *The Straits Times*, Nov 24, 1958, p. 9).

Critics suggest that colonial records are inherently biased towards British interests. History written through the lens of colonial administrators unavoidably places Britain as the main actor in British Malayan history, neglecting native initiatives and simplifying Malay-British relations (Milner, 1986). One way to counter this bias, according to these scholars, is to use indigenous source materials. The other is to interpret the records from the perspective of Malay concerns, rather than British needs, as William Roff did in his work *The Origins of Malay Nationalism* (Roff, 1967), or Anthony Milner in his book *The Invention of Politics in Colonial Malaya* (Milner, 1995). On this latter point, Milner (1986: 9) specifically points out that Indonesian historians are able to escape from falling into the trap of “British perspective” by posing research questions using sociological paradigms.

In providing a rejoinder to Milner's critics, Yeo (1987) argues that the predominant use of colonial records is beneficial because these sources provide important insight into British policy and administration (ibid.: 4). In responding to the critics, he argues that studying British colonial records does not naturally make one share the viewpoints of British administrators. Historians can read colonial records with a grain of salt. While the analyses of non-British records is important in studying British policies that were applied to non-British residents, the same may not be true in the study of British policies that did not directly affect the natives, such as the establishment of hill resorts as temperate retreat for British administrators. Also, using British records does not necessarily cause a historian to assign disproportionate British influence in colonial Malaya affairs and overlook the clout of traditional rulers. In fact, in indirect rule, British colonial records often indicate that the British needed the influence of rulers over the populace as much as the rulers needed British patronage (ibid.: 10-11). Eventually, it is the methods of the historian, not the sources, that will determine the significance of historical research. Perhaps a "hybrid" perspective (Ernst, 2007:513) that takes into account both the views of central and periphery, East and West, colonizer and colonized, will be able to provide a more nuanced understanding of science and colonialism.

With the independence of Malaya from British rule in 1957, the writing of Malayan history put a greater emphasis on the indigenous experience, in tandem with a more general Malayanisation of civil servants. This process took a Malay-centric turn after the May 13, 1969 racial clashes between mainly the Malay and Chinese living in the Kuala Lumpur area. The official interpretation of the incident as being caused by the economic backwardness of the Malays provided justification for the subsequent

implementation of Malay-focused policies such as the New Economy Policy. The event also strengthened the sentiment of Malay nationalism which led to efforts to consolidate Malay political domination. Since then, indigenisation of Malayan/Malaysian history has chiefly meant the writing of official history from a Malay, or Malay nationalist, perspective (Cheah, 1997).

1.8. General Research Approach

The aim of this research is to demonstrate the impact of scientific knowledge, or more specifically, modern medical knowledge, on the process of societal rationalization in Malaysia. In this thesis, science is understood as an active institutional agent of social change that directs and informs the process of societal rationalization. My emphasis on science as an active agent of social change is somewhat at odds with social constructionists who consider science as being passive and malleable. However, I do recognize the importance and validity of the social constructivist approach (Golinski, 1998) which emphasizes the uncovering of social and economic influences on scientific knowledge production. As a result, in a number of places in the thesis, I adopt a co-construction approach and probe the dialectical relationship between science and society. The following are the main strategies of this research: First, by using the social constructivist approach, I analyze the interplay of divergent social and economic interests that brought medical research and modern medical services to British Malaya. I argue that while the building of hospitals and implementation of public health policy were often touted as services to humanity, the primary force behind the institutionalization of public health in British Malaya was economic. The alleviation of illness and the search for

medical cures, I intend to show, were meant to maintain the health and strength of the labor force in mining and plantation industries while serving the health of expatriates who oversaw the operations of economic extraction.

Second, while arguing for the pre-eminence of economic interests in shaping the public health discourse and policy formulation in British Malaya, I also suggest that the coming of age of the germ theory of disease played a significant part in determining the types and forms of medical research and public health policy that were implemented. From the establishment of the Institute for Medical Research in 1900 to the increasing emphasis on public hygiene, the germ theory of disease showcased the active role science played in directing social agendas and enacting means of social control. As a result, to conceive scientific development largely as being propelled by social and economic interests, as social constructivists tend to do, misses the important and active function of science in bringing about social change. Consequently, the study of medical research and medical policy in British Malaya, or elsewhere, must also take into account the internal dynamic of science. Undeniably, the development of new scientific knowledge in British Malaya had to rely on societal supports, but once produced, new knowledge of science often took on a life of its own.

Third, the recognition that science is an agent of social change brings our attention to one of the most important conclusions concerning the impact of science on society, i.e. societal rationalization. From Weber (1930) to Habermas (1984), the development of modern society is centrally conceived as a process of societal rationalization that is characterized by the increasing deployment of scientific principles and detailed-oriented measures in the management of public affairs. Although in recent

decades, the conventional concept of the objectivity of science has been challenged (Daston and Galison, 2007), rationality remains the basis of scientific principle. The rationalization process brings not only bureaucratization but also disenchantment. The latter demystifies nature by explaining natural phenomena in terms of the working of physical principles without having to resort to magical and supernatural forces. In this thesis, the identification of the etiology of beri-beri disease, and its cure, at the Institute for Medical Research is used to exemplify the method and logic of scientific investigation and the process of disenchantment in the early stage of modernization in Malaysia.

Fourth, the endless pursuit of efficiency as society undergoes rationalization, often at the peril of sidelining aesthetic and moral concerns, also resulted in an increasingly regimented society. Using the analytical framework of Foucault, this research investigates the way medical knowledge and public health policy in British Malaya served the purpose of social control to ensure orderly and continuous economic extraction from commodities such as tin and rubber. The introduction of medical and public health policies, together with other scientific instruments, such as population census and geographical surveys, were meant to gain information that could be used to manage the colony and society in the most efficient way.

Fifth, societal rationalization is often segmented in the sense that it proceeds further in one realm of society, such as economic management, than in another. By studying the coexistence of traditional and modern medical practices in post-independent Malaysia, I argue that disenchantment is usually incomplete. I further contend that this is partly due to of the limits of modern scientific knowledge, which is not only open to

refutation, but more importantly, is unable to inform moral choices and thus leaves room for metaphysical discourse and re-enchantment of society. I also assert that the appeal of Islamization in other spheres of Malaysian society, but not in Islamization of scientific knowledge, speaks to both the limit and strength of scientific knowledge. The limit of scientific knowledge lies with its inability to inform moral choices thus leaving room for assertions of religious and charismatic authorities in Malaysian society. The strength of scientific knowledge, is situated in its capacity to defy moral tinkering, thus safeguarding continuous learning about and exploration of the natural world in Malaysia in a relatively autonomous sphere.

1.9. Objectives of this Study

Being mindful of diverse historical and sociological factors that have contributed to the shaping of modern society in Malaysia, this research was conducted to analyze the interactions between modern science and traditional society, and how these interactions contributed to the process of societal rationalization in Malaya/Malaysia.

Throughout the research, I strive to achieve the following objectives:

1. To unravel the specific social and economic interests behind the process of the transmission of modern medical knowledge, and the formation of scientific institutions, such as the Institute for Medical Research, in British Malaya.
2. To understand science as a cultural entity and the presence and influence of the cultural authority of science in British Malaya.

3. To understand the interaction between modern and traditional medicine, and how this interaction shapes the process of societal rationalization in Malaya/Malaysia.
4. To study the response of Malaysian society to the process of modernization and societal rationalization, especially in trying to balance the preservation of cultural and religious identities with the demands of modernity.
5. To examine the role of modern medical knowledge and services as instruments of social control in Malaya and what it means to the process of societal rationalization and modernization.

1.10. Significance of this Study

As an academic endeavor, this research may shed new light on the ongoing theoretical debates about the nature of the global spread of science. Through the case study of Malaya/Malaysia, the study will be able to provide new evidence about forces – such as social and economic interests, cultural authority of science, and societal values – behind scientific and technological developments in Malaya.

At a policy level, the researcher hopes to provide new insight into the question of societal rationalization in the face of an increasing trend of Islamization in Malaysia. I will examine to what extent and in what form scientific culture has taken root in Malaysia, to allow a deeper understanding of the process of societal modernization in Malaysia. Such understanding and insight, in turn, will hopefully have some bearing on policy formulation related to education, social welfare, cultural and religious affairs.

1.11. Summary and Conclusion

The entry of modern science and technology into Malaya occurred mainly through the process of British colonization. The arrival of modern science and scientific ideas to Malaya accelerated the process of societal rationalization, setting Malaya on a path of modernization that was similar to Western societies. However, unlike Western societies, the interaction between modernity and tradition produced a modern Malaya that continued to value and honor religious tradition, especially Islamic religion. The persistence, and in certain aspects the strengthening, of religious belief poses a challenge to Weber's contention about the inevitable decline of substantive or value rationality as traditional societies modernize and rationalize.

The successful co-existence of modern science and religion in Malaysia is intriguing since in European experience, the rise of modern science by and large necessitates the decline of religion. The Malaysian experience points to a greater congruity between modern science and religion, and the possible presence of areas of compatibility and complementarity between modern science and religion. The main focus of this research is the interaction between modern science and traditional society. Through the study, the interplay between tradition and modernity, and the nature and role of modern science in this process, hopefully can be better understood.

Chapter 2: Literature Review – The Sociology of Science and Knowledge

Our society is not one of spectacle, but of surveillance: under the surface of images, one invests bodies in depth; behind the great abstraction of exchange, there continues the meticulous, concrete training of useful forces; the circuits of communication are the supports of an accumulation and a centralization of knowledge; the play of signs defines the anchorages of power; it is not that the beautiful totality of the individual is amputated, repressed, altered by our social order, it is rather that the individual is carefully fabricated within it, according to a whole technique of forces and bodies.

Michel Foucault, *Discipline and Punish*, 1995: 217.

2.1. Introduction

Ever since the advent of Newtonian age, modern science has enjoyed a cultural authority that rivals, and increasingly supersedes, traditional and religious authorities (Adas, 1989). The spread of modern science in Europe, and around the world, is closely dictated by both its practical utilities (Jacob and Stewart, 2004) and positive cultural images that bestow upon science an unparalleled cultural authority (Drori, et al, 2003). Essentially, the cultural authority of science hinges upon the notion of the objective and universal knowledge of science. This idea of impartial science is further entrenched with the constant portrayals of scientific knowledge as model knowledge by the scholars of science, such as those of the Vienna Circle in the early twentieth century (Sarkar, 1996).

The cultural authority of science often shields science from social and cultural scrutiny. By and large, modern scientific knowledge is considered to be not amenable to cultural and societal contamination since the truth and falsity of scientific knowledge is ultimately determined by the laws of nature. This image of science, however, was challenged in the 1960s with the publication of Thomas Kuhn's *The Structure of Scientific Revolution* (Kuhn, 1962). The publication of the book coincided with the heightened civil rights movement around Western societies. The civil rights movement in general adopted a skeptical attitude towards authority, scientific authority included, and sought to reaffirm the universal value of freedom, justice, and equal partnership between different ethnic, gender, and cultural groups (Bauchspies, et al., 2006: 11).

Kuhn's book heralded a new era of social studies of science. Since its publication, substantial efforts have been made to determine and expose the presence of subjective spheres in scientific investigations. Under diverse headings - such as Social Studies of Science, Science, Technology and Society, Science Studies, and Science and Technology Studies - the social study of science increasingly exerts a place in academic circles, and various theories of science studies, with roots in diverse classical and contemporary intellectual discourses and dissimilar in their emphases, and at times critical of each other, have been expounded (Hess, 1997).

2.2. Theories of Science, Technology, and Societies

The rise of modern science and its subsequent impacts on modern societies have been a subject of inquiry by many sociologists. Classical sociological theorists such as Durkheim (Schmaus, 1994), Marx (McCarthy, 1988; McKelvey, 1991), and Weber

(Lassman, Velody, & Martins, 1989) had touched upon different aspects of science in their sociological analyses.

In general, classical sociologists had a positive view of the potential of modern science and the value of scientific knowledge. Durkheim, for instance, had a strong faith in our ability to arrive at objective social and natural knowledge. Although he was aware that ideas used in everyday communication were formed in specific social contexts, he nevertheless trusted that these ideas were not subjective, and could be applied to different societies:

From the fact that the ideas of time, space, class, cause or personality are constructed out of social elements, it is not necessary to conclude that they are devoid of all objective value. On the contrary, their social origin rather leads to the belief that they are not without foundation in the nature of things (Durkheim, 1915: 19).

In fact, it was his belief in the existence of objective social phenomena independent of individuals that prompted him to seek to determine the social forces that constrained individual choices. On this point, he defined social facts as

[E]very way of acting, fixed or not, capable of exercising on the individual an external constraint; or again, every way of acting which is general throughout a given society, while at the same time existing in its own right independent of its individual manifestations (Durkheim, 1964: 13).

Durkheim had a very different view about natural science knowledge compared to social knowledge. Although he believed in objective social facts, he nevertheless conceded that these facts were socially related. In the case of natural science, Durkheim however was fully convinced that scientific knowledge was totally independent of social environment and was thus completely objective. In fact, unlike Weber who held that

knowledge of natural science was morally neutral, Durkheim contended that scientific knowledge could be used to differentiate the normal from the pathological and thus guide moral choice. For instance, he argued that

[F]or societies, as for individuals, health is good and desirable; disease, on the contrary, is bad and to be avoided. If then, we can find an objective criterion, inherent in the facts themselves, which enables us to distinguish scientifically between health and morbidity in the various orders of social phenomena, science will be in a position to throw light on practical problems and still remain faithful to its own method (Durkheim, 1964: 49).

Compared to Durkheim, Marx was more ambiguous about the nature and benefits of science. On the one hand, he lauded science and technology as forces of emancipation. On the other hand, he was apprehensive of the fact that science and technology could be used to further expand the power of a select group of people in a society (Mulkay, 1979: 3-10). On the nature of scientific knowledge, Marx did not delve much into it although he once mused,

... nature becomes purely an object for mankind, purely a matter of utility; ceases to be recognized as a power for itself; and the theoretical discovery of autonomous laws appears merely as a ruse so as to subjugate it under human needs, whether as an object of consumption or as a means of production (Marx, 1973, quoted in Mulkay, 1979: 7).

This however, should not be taken as evidence that Marx was an advocate of subjectivist science. There is no doubt that, in line with his general apprehension over the exploitative nature of capitalism, Marx was concerned about the misuse of scientific knowledge to further subjugate the working class. But in general, Marx had a positive perception of the nature of scientific knowledge and did not question the neutrality of the content of knowledge of natural science (Mulkay, 1979: 9-10).

Unlike the more affirmative attitudes of Durkheim and Marx, Weber harbored an ambiguous feeling towards modern science. On one hand, he viewed favorably the value of science in empowering human society through the understanding of the working of nature. He also applauded the method of scientific investigation that allowed people to clarify issues and make informed choices (Gane, 2004: 59-60). Nevertheless, Weber also alerted us to the limits of modern science in guiding value choices. While science was able to tell us what “is,” it could not inform us of what “ought to be.” In line with his understanding of the nature of modern science, he echoed Tolstoi’s view that

Science is meaningless because it gives no answer to our question, the only question important for us: “What shall we do and how shall we live?” That science does not give an answer to this is indisputable. The only question that remains is the sense in which science gives “no” answer, and whether or not science might yet be of use to the one who puts the question correctly (Weber, 1970: 143).

After the early elucidation of the sociology of science by the founding fathers of sociology, modern science continues to attract academic interests. Over the years, scholars have continued to explore the nature and impact of scientific developments (Merton, 1938; Barber, 1952). Merton’s *Science, Technology, and Society in Seventeenth Century England* (Merton, 1938) was one of the earliest works that studied the influence of culture on scientific development. He applied Weber’s thesis of the Protestant ethic to explain the greater growth of interest in modern science among Protestants.

Many studies have been conducted to investigate social and cultural influences on the rise and fall of scientific endeavors of civilizations in different parts of the world (Needham, 1969; Huff, 2003). However, prior to the second half of the 20th century, cultural studies of science in general did not question cultural influence on the content of

scientific knowledge but focused mainly on the impact of social interests on scientific endeavors. For instance, while attributing the expansion of scientific interest among Protestants to religious fervor, Merton did not suggest the intrusion of religious elements into the content of scientific knowledge (Shapin, 1988). In general modern science was perceived to be objective, and a model of knowledge to be emulated by other branches of knowledge inquiry.

The credibility of scientific knowledge, however, was brought into question following the publication of Thomas Kuhn's *The Structure of Scientific Revolutions* in 1962. Subsequent analysis by Feyerabend (1975) added new momentum to the debate. Kuhn argues that the acceptance of novel scientific ideas does not fully comply with the objective criteria proclaimed by scientists. Whether a scientific idea makes its way into dominant discourse and text books depends very much on the consensus of the scientific community, which is often determined by authoritative, and often senior, scientists. In Kuhn's view, knowledge is objective only in the sense that it is consensually achieved. However, consensual knowledge is subject to change. Kuhn showed that newer, but more exact ideas often fail to impress the dominant scientific community until overwhelming evidence forces its way into the prevailing scientific discourse

Kuhn argues, counter intuitively, that the succession of scientific knowledge, rather than being incremental and progressive, is abrupt and paradigmatic. In Kuhn's analysis, the adoption of a new theory of science depends not solely on the plausibility and validity of the theory, but also on consensus within scientific community about the veracity of the theory amid contradictory or uncertain evidence. In light of the tenacity of old scientific theory, the overturn of an old theory often requires a Gestalt switch among

the scientific community before a new concept or theory is to be accepted. Kuhn contends that this Gestalt switch is psychological in nature. The community of scientists will hold on to an old theory until a moment when evidence overwhelmingly points to the accuracy of the new theory. In other words, scientific revolution happens not merely on the basis of the accrument of more reliable and accurate knowledge, but also on an abrupt change of mindset within the scientific community. In Kuhn's elucidation, a scientific revolution happens over four different phases. The first is the stage of normal science. In this phase, a widely accepted scientific theory is being taught and used unquestioningly. However, as scientific research progresses, new evidence will be unraveled that challenges the accuracy or completeness of the pre-existing theory. Science thus enters a state of controversy and crisis. In this stage, the scientific community in general will continue to cling on to the old theory despite fresh evidence of the incompetence of the old theory. Nonetheless, the controversy generated by the new theory will attract more research into it, and eventually, if the new theory is tenable, overwhelming evidence will force the hand of the scientific community off the old theory and they will embrace the new one. Science at this point enters the phase of scientific revolution. A new paradigm about the nature of things replaces the old paradigm. The arrival and widespread acceptance of the new theory and paradigm brings science back to the normal state from a revolutionary stage. Science thus stabilizes and enters the normal phase again, waiting to be superseded through another cycle of scientific revolution in the future.

After the Kuhnian formulation, the discipline of the social studies of science developed into two major intellectual streams. One school, sometimes called "Science

and Technology Studies,” emphasizes the social conditioning of science and technology. The other, “Science, Technology, and Society,” stresses the impact of science and technology on society (Cerezo and Verdadero, 2003: 153-4). In the 1990s, heated and extended debate on the production and consumption of scientific knowledge revolved around the social construction of science. Social constructivists contended, to a greater or lesser extent, that scientific facts are socially constructed and are susceptible to societal influence. At one end of the spectrum, proponents of social constructivism held that nothing in nature directs the construction of scientific facts. This relativist position about scientific knowledge drew intense criticism from both natural and social scientists who came to the defense of the objectivity of scientific knowledge. This episode of intellectual dispute has now come to be known as the “Science Wars” (Segerstråle, 2000).

2.2.1. The Sociology of Science and Scientific Knowledge

The consolidation of the Sociology of Scientific Knowledge as a full fledged academic discipline happened amid an entrenched view of objective and universal modern science. This view of objective and universal science is partly a legacy of the Enlightenment movement, and was made coherent by the so-called Vienna Circle – which consisted of members such as Rudolf Carnap and Otto Neurath – in the 1920s through the articulation of a philosophy recognized today as logical positivism (Sarkar, 1996). The logical positivists hold that truth can, and must, be arrived at through the evaluation of empirical evidence, and the adjudication of truth and false knowledge must follow strict logic. In this view, no knowledge can claim the status of science if it does not fulfill a minimum level of either empirical validity or logical coherency.

The position of logical positivism is grounded in the conviction that there is an objective reality independent of human existence which can be discovered and discerned through a combination of scientific method and human intellect. This understanding of science and nature continues to ground and shape the idea of science among scientists, while capturing the imagination of other professionals and lay persons. This idea and image of objective science is further articulated by Robert Merton in what has come to be known as the “ethos of science.” The Mertonian ethos consists of four institutional elements – Communalism, Universalism, Disinterestedness, and Organized Skepticism (Merton, 1973: 269-278). In this institutional view of modern science, Merton in general has a positive outlook on modern science. Scientific knowledge is public knowledge pursued and produced by disinterested scientists and has universal validity. By adhering to standard procedures, scientists produce knowledge that can be understood, reproduced, and challenged by other scientists. As a result, scientific knowledge is objective knowledge. And unlike traditional knowledge, scientific speculation is “organized skepticism” in which conjectures are investigated, and their validity determined, through standard scientific methodology.

In recent decades, this view of science has increasingly been challenged (Mulkay, 1979; Barnes, 1977). Although some scholars come to the defense of Merton (Elkana, 1976), his “institutional sociology of science” remains the main contrast, and backdrop, to the constructivist critique of modern science. Instead of touting modern science as a model of objective knowledge, social constructivists understand the production of modern science and technology, including the production of scientific ideas, as closely shaped by prevalent social, economic, and political circumstances. In this regard,

scientific knowledge, far from being neutral, is perceived partly to be a product of political negotiation, societal pressure, or even personal belief. In other words, scientific knowledge is socially negotiated, not objectively determined. At the more extreme end of the spectrum of the belief in scientific bias, sociologists of scientific knowledge seek to provide evidence of the social influence of science in the cognitive contents of science. For instance, mathematics, which is one of the most logic-driven subjects, is argued to be influenced by social interests (MacKenzie, 1978). In other words, scientific knowledge, instead of representing an objective reality, is said to be a social construct; there is “nothing in the physical world which uniquely determines the conclusions of [the scientific] community” (Mulkay, 1979: 61) and social factors are not “contaminants but constitutive of the very idea of scientific knowledge” (Shapin, 1995: 297).

Some critics view the analyses of constructivists as being redundant and a retreat in knowledge production (Gieryn, 1982). The constructivist, and at times relativist, discourses of scientific knowledge are often conducted using Kuhn’s analysis of scientific revolutions as evidential support, much to Kuhn’s dismay (Baber, 2000). The debate at the end culminated in the “Science Wars” in the 1990s, with supporters of physical and social scientists in both camps acrimoniously engaged, intersected with the “Sokal hoax” which cast a shadow over the stringency of the academic field of cultural studies (Editors of *Lingua Franca*, 2000). The “Science Wars” subsided as the twentieth century drew to an end, and some of the major proponents of social constructivism found their ideas had been overstated by others (Latour, 2004).

Although in general it is true that the priority of scientific research is driven by social, economic and political needs, much of the scientific knowledge taught in schools

nevertheless is grounded in a concrete understanding of nature. Scholars of the sociology of science and scientific knowledge span the relativist and objectivist spectrum. In between the extreme poles of objectivist and relativist views of science, there is a range of positions that in general are recognized as “moderate constructivist.” The middle ground sociologists of scientific knowledge in general agree that there exists a common and stringent standard of scientific practice that is used to determine the validity of scientific claims. However, as new understanding and knowledge emerge, valid claims of today may become false claims of yesterday. Like a map, scientific knowledge represents certain aspects of natural realities that can be exploited. However, as one’s understanding of a place changes, one redraws the map. In other words, scientific knowledge provides an accurate depiction of nature to a certain extent and can be subject to refutation and renewal (Kitcher, 2001; Gieryn, 1999).

2.2.2. Developmental Studies – Modernization and Dependency Theory

While constructivists study the nature of science with regard to the objective claim of scientific knowledge, other scholars look at the applications of scientific knowledge and their consequences on societies. Some of these studies deal with current issues which are spawned by new scientific and technological developments, such as biotechnology (Baber, 2004; Mehta, 2005), nanotechnology (Hunt and Mehta, 2006), and university-industry-government cooperation (Baber, 2001a; Etzkowitz 2003); others concern themselves with historical issues, such as colonial science (MacLeod, 2000; Harrison, 2005) and seek to understand the nature of scientific knowledge transmission from Europe to European colonies in the past century.

Two opposing theories, and their variants, are often used to illuminate the nature of scientific knowledge transmission from the European metropolis to the colonies. Modernization theory explains the introduction of a Western model of development, science and technology included, to developing countries as efforts to uplift the socioeconomic condition of these countries. Dependency theorists, however, view the process from a more critical perspective and suggest that the implantation of a Western model of development is a process of ongoing subjugation of developing nations by developed countries.

Modernization theory became dominant after World War II for several reasons. On one hand, the economic depression that beleaguered American society pointed increasingly to the need for government intervention. On the other, the seemingly successful planned economy of the Soviet Union which remained unaffected by depression elsewhere provided inspiration to Western nations with respect to the potential of planned economy. In addition, the successful execution of the Marshall Plan in Europe contributed to increasing interest and confidence in social and economic engineering (Baber, 2001b: 74).

In trying to explain the backwardness of developing countries, Modernization theorists take to comparing the social, economic, and cultural differences between developing countries and Western societies. They often come to a conclusion that it is the absence of certain characteristics in developing countries that contributes to their social and economic backwardness. Thus the solution is to have developing countries emulate and adopt standards, practices, and values of developed economies that are considered to be more advanced (Yearley, 1988: 5-8).

One of the chief proponents of a particular version of Modernization Theory is Rostow (1960). In his analysis, Rostow used pre-Newtonian and post-Newtonian phases as watersheds setting apart traditional and modern economies. He also conceptualized stages of economic growth, and more generally modernization, as a transformation of a society from a “traditional” to a “high mass-consumption” phase. Modeled largely after Britain, it was supposed to serve as a blueprint of progress for other less developed countries.

Underlying Modernization theory is the assumption that less developed societies lack certain Western characteristics – structural and/or psychological – that inhibit development (Chirot, 1982). The presence of a Protestant ethic (Weber, 1930) and legally autonomous corporations (Huff, 2003), are examples of special psychological and structural elements in Western societies that are said to have spurred the development of capitalism and modern science respectively.

However, Modernization theory has been criticized as being Eurocentric. Despite the professed good intentions of developed nations, less developed countries that follow the advice of consultants and governments of developed countries at times get underdeveloped, i.e. become worse off. Consequently, some scholars attribute the failure of developing countries to domination and subordination by developed nations. World-System theory, and its variant Dependency theory, thus suggests that less developed nations continue to suffer from underdevelopment as a result of dependency on, and exploitation by, developed economies (Frank, 1967; Wallerstein 1974).

Less developed countries are said to be locked in a situation where their economies are tightly integrated with the industrialized nations, and are thus subjugated

to the needs of the industrialized nations rather than their own. Given their superior economic and military strength, the developed nations are able to dictate the terms and conditions of international trade in their favor. Under this condition, certain countries not only fail to develop, but get “underdeveloped,” as the surplus of economy is extracted and appropriated by the developed nations. As a result, according to Dependency theorists, the “underdevelopment” of developing countries is not an outcome of historical backwardness. Neither is it a result of insufficient capitalist development in the mould of developed nations. On the contrary, it is an outcome of capitalist development in developing countries which makes developing countries subordinate partners to developed nations in a global capitalist economy (Amin, 1996). As a result, despite political independence, the less developed countries continue to suffer from economic dependency. The lack of economic development, consequently, is perceived to be more a result of economic exploitation by developed economies and less an outcome of the lack of capability on the part of less developed nations.

2.2.3. Science as an Agent of Societal Rationalization

The preceding sections discuss mainly issues of the social conditioning of science and technology. Both social constructivists and developmental theorists emphasize the ways social actors and forces shape and direct scientific and technological developments. In these analyses, science as an autonomous agent that is capable of imposing norms and values on society is often obscured. That science can act as an agent of social change, however, is one of the main sociological themes that has been elaborated extensively by

classical sociological theorists, such as Weber in his theory of societal rationalization and bureaucratization.

According to Weber, the advent of modern science gives birth to a worldview that has shaped the progress of Western societies in a unique and irreversible way. Modern scientific exposition of nature as a mechanistic construct that is devoid of divinity, empties nature of its mystical content and directly challenges traditional and religious accounts of nature. By removing divinity, and other supernatural forces, from the account of natural occurrences, a scientific worldview also robs nature of perennial meanings and purposes that come with traditional and religious expositions of nature. As science progresses and society modernizes in a secular direction, human undertakings and decision-making are increasingly conducted in relation to the effectiveness and efficiency of means rather than meanings of those undertakings in the scheme of nature. In order to maximize efficiency, chance occurrences and random actions are suppressed, and individuals are subject to more rigid social control. Consequently, Weber views modern society as evolving into an “iron cage” in which individual freedom is curbed, and social and political legitimacy is increasingly subject to means-end justification (Weber, 1930: 181-2; Weber, 1978: 228).

The concern that modern society is evolving into an iron cage and betraying the promise of human emancipation is central to the debate on modernity. As modern society increasingly emphasizes social order, stability, cohesion, and the continuity of economic prosperity, knowledge of science, both social and physical, is used to solicit and enforce conformity, engendering a disciplinary society in which individuals are subject to increasing surveillance (Foucault, 1995). In most cases scientific knowledge in modern

societies is perceived to be in service of modern states that enjoy the monopoly of violence over their subjects. As a result, science, and more fundamentally reason, is perceived to have become an instrument of domination, and a target of intellectual critique (Horkheimer, 1947; Horkheimer and Adorno, 1972). The critique of reason, science, and modernity culminates into a broad intellectual movement that can be subsumed under the banner of postmodernism. On different fronts, postmodern theorists deconstruct the stability and unified view of nature, and the validity and universality of scientific knowledge. Often, this leads to a relativist stand on knowledge and moral principles (Rosenau, 1992).

The critique of modernity draws diverse reactions from academics. Some relish the deconstruction of the myth and fallacy of modernity (Clifford, 1988; Haraway, 1989) while others abhor its lack of coherence and consistencies (Gross and Levitt, 1994). Among the defendants of modernity, Habermas is one of the most respected. In his *Theory of Communicative Action*, he concurs with Weber's insight over the increasing domination of instrumental rationality, but is less ambivalent in arguing that the one-sided rationalization can be corrected by the withdrawal of instrumental rationality from certain life spheres (Habermas, 1984). Habermas divides social spheres into the System and Lifeworld. The System, mainly in the realm of politics and economy, is a life sphere that is ruled by means-end instrumental rationality. In a modern society, the System is the domain of material reproduction. It provides for the material needs of humankind. The Lifeworld, alternatively, is a life sphere where meanings are defined, values are inculcated, and decisions are achieved consensually among members of society. In the Lifeworld, the cultural tradition of a society is reproduced.

The System operates according to instrumental rationality while the Lifeworld functions according to communicative rationality. In his analysis, Habermas suggests that the problem of modernity is a consequence of the colonization of the Lifeworld by the System, or the application of instrumental rationality in the Lifeworld, in place of communicative rationality. Accordingly, the solution to the malaise of modernity (Taylor, 1991) does not lie with the desertion of reason, but the withdrawal of instrumental rationality from, and the reinstatement of consensual-based communicative rationality to the Lifeworld. In this respect, modernity, according to Habermas, should be given a longer lease on life, and is still an “unfinished project” (Habermas, 1997).

2.2.4. Science as a Cultural Authority

The project of modernity is a legacy of the Enlightenment movement in Europe. The latter germinated in the 18th century with the advent of the Newtonian Age. European thinkers of that time were optimistic that with the increasing command of scientific knowledge, human society would be able to rid itself of ignorance, predicaments, and sufferings. In addition, the perception of modern science as being advanced knowledge provided the basis for the belief in the more advanced stage of European civilization compared to the rest of the world (Adas, 1989).

Although public trust in modern science has weakened in recent decades (Yearly, 1997), it remains the central source of reliable knowledge, and continues to receive worldwide recognition. Modern science is often associated with values such as rationality, objectivity, and universality. As a cultural authority, modern science remains active in bestowing legitimacy and validity to human deeds and words. It changes perceptions,

imparts universal values, builds social movements, shapes political culture, and fashions worldwide standardization (Drori, et al., 2003).

Modern science is laden with its own beliefs, values, rituals, and most importantly, a cosmology that is as comprehensive as those provided by any religion. In present day modern societies, scientific cosmology has replaced religious worldview in helping us to make sense of the natural world. The scientific cosmology – dubbed “sacred canopy” – is based on two assumptions: first, that nature is orderly, and second, that nature’s order is intelligible (ibid.: 30).

Within this scientized picture of the world, science is believed to be able to unravel orders, and to remedy disorders. Modern science commands an indisputable authority to define problems and prescribe solutions. The ascendancy of the environmental movement in recent decades, for instance, is construed as a result of scientific diagnosis of environmental problems. In other words, science helps to shape and position social actors, that is, individuals and organizations, within a scientized setting that is understood through a scientific lens. The process, however, is reciprocal. While science, through scientists, diagnoses problems, prescribes solutions, and creates social positions that we know as “environmentalist,” the advocacy of environmentalists, in turn, obliges more scientific research and knowledge creation and consequently, expands science. As a result, the global spread and expansion of modern science cannot be solely attributed to the functional utility of science. Often, it is an outcome of the exertion of the cultural authority of science (Drori et al., 2003).

Scientific authority, especially in relation to its image of objectivity, is a valuable asset to the state. Often, this authority of science is expropriated by the state, with the

tacit consent of scientists who rely on the state for research funding, to give an aura of objectivity and provide legitimacy to state rule (Mukerji, 1989). When a scientist disagrees with the state over policy issues, it is not uncommon that the scientist is isolated and his or her personal authority put into question in order to keep scientific objectivity on the side of the state. This for example was what transpired as Robert Oppenheimer openly disagreed with the United States government on the necessity of H-bombs as part of the United States' defense strategy (Thorpe, 2002).

The existence and the ubiquitous presence of scientific authority in modern society largely go uncontested. What remains at issue is the source of scientific authority. Brown (1993) suggests that in order for scientific knowledge to achieve a hegemonic status, it must be perceived to be specialized, useful to the dominant group, and achieve institutionalization. To most scientists, the basis of scientific authority lies with the ability of science to produce "truth," especially in the sense of the correspondence between scientific facts and nature. Collins (2001: 255-256), however, argues that the validity of scientific knowledge is much less certain than scientists tend to believe, and the authority of science lies not with its validity but virtuosity, that is, the meticulous and assiduous scientific methodology that makes scientific knowledge the most reliable and best knowledge we can have about nature.

2.3. Colonial Science

The inquiry into the nature of scientific knowledge transmission by social historians of science in the 1960s was concurrent with reflection on the effects of colonialism on postcolonial societies (MacLeod, 2000: 1-2). In general, there is recognition that colonial science cannot be analyzed independent of the process of colonization. The history of science must be studied within the social and cultural contexts that motivate and support the enquiry into the knowledge of nature (Shapin, 1982). The development of the knowledge of science and technology, and their subsequent deployment in colonies were understood to be closely associated with the operations, needs, and exigencies of colonial expansion. Far from enjoying an isolated and disinterested existence, science and technology were said to be part of the project of colonialism and served as tools of European expansion (Headrick, 1981; Drayton, 2000).

The critique of colonial science comes on the heels of Basalla's model of scientific knowledge transmission from the colonial metropolis to its peripheries. In his work *The Spread of Western Science* (1967), Basalla views the transmission of modern science from developed Europe to other less developed societies as a three-phase process. The initial phase involves the exploration of the "non-scientific" society, and the collection of fauna and flora by scientists from Western society. "Non-scientific" society thus serves as a reservoir of raw materials waiting for scientific exposition by Western scientists. With colonization, this process of transmission enters its second phase which is dependent "colonial science." "Colonial science" refers more to the state of scientific development than to political affiliation. It does not matter whether the scientists in practice are native or European. What is important is that at this stage, scientific activity

has “expanded and finally coincides with the spectrum of scientific endeavor in the nation, or nations, supporting the activity.” However, colonial scientists continue to depend on European colleagues since scientific culture has yet to take root in the colonies (ibid.: 163). The third phase of scientific development comes when “non-scientific” society achieves equal footing with European society in terms of scientific capability, and contributes to scientific advancement independently.

Basalla’s model is perceived to be Eurocentric by later scholars (MacLeod, 1987). His theory is said to have failed to take into account diversity among colonial societies, such as settler colonies of North America and Australia; and differences between Dutch, British, French and other European empires. More significantly, it overlooks the relationship between science and technology and the wider social, political, and economic context of European colonization. Basalla’s argument colors science as a progressive agent of development, without contemplating the adverse impacts of colonization on colonial societies that were made possible by modern science and technology. On top of that, the depiction of a unidirectional flow of knowledge from the European center to colonial peripheries overlooks the contribution of local knowledge in the colonies towards the advancement of modern science in the metropolis (MacLeod, 1987: 226; Arnold, 2000: 10-14; Drayton, 2000).

The study of colonial science provides new impetus to the studies of European colonization. The transmission of modern science to colonial settings is increasingly perceived as an interactive and complex process that involves indigenous and metropolis personnel, interests, and knowledge (Baber, 1996). More recently, the reflection on the transmission of modern science to European colonies has seen a diversification of

interests (Harrison, 2005). Taking the cue from postcolonial literature critique, scholars have also delved deeper into the conceptual terrain of “postcolonial science,” in which the idea of modern science is re-examined from the local perspectives of former European colonies (Anderson, 2002). More intense investigation into the reciprocal relationship between the colonial metropolis and the periphery in the production of scientific knowledge has also been conducted (Raj, 2006).

2.4. Colonial Medicine

The study of colonial science has also branched out into more specific disciplines such as colonial medicine. Given the importance of the health of colonial administrators, modern medicine followed closely in the footsteps of colonization, and often became one of the earliest branches of modern science that was introduced to European colonies. The studies of colonial medicine have received wide ranging attention and have spanned diverse geographical regions, from India (Arnold 1988; 1993; 2000; Bala, 1991; Harrison; 1994) and Africa (Vaughan, 1991; Feierman, 1985; Turshen, 1984), to Malaya (Manderson, 2002).

The inquiry into colonial medicine is often approached from the political economy perspective. From this standpoint, modern medicine is seen as a handmaiden of European colonization (Fanon, 1965; Navarro; 1981; Turshen, 1984). Instead of looking into the role of modern medicine in the curing of diseases at the individual level, which often conjures up an image of innocent, neutral, and welfarist modern medicine, scholars of colonial medicine cast their eyes to the wider social context of colonialism and locate

the function of modern medicine in assisting the process of colonial economic extraction, and in providing legitimacy to colonial rule.

Apart from seeing colonial medicine as a tool of the colonial empire, recent scholarship also points to the role of modern medicine in the construction of colonial modernity (Bashford, 2000; 2004). Like other branches of modern science, modern medicine informed and shaped the process of modernization in colonial societies as these societies underwent the process of modernization. Science exerts norms, meanings, and cultural content for human action. For instance, Vaughan (1991) contends that biomedicine was a cultural system that contributed to the understanding of “the African”:

Biomedical knowledge on Africa was thus both itself socially constructed (in the sense that its concerns and its ways of viewing its object of study were born of a particular historical circumstance and particular social forces) and at the same time ‘social constructionist’, in that it often sought social explanation for ‘natural’ phenomena. Furthermore, and perhaps even more importantly, biomedical knowledge played an important role in the wider creation of knowledge of ‘the African’ (Vaughan, 1991: 6).

She continues:

... the power of colonial medicine lay not so much in its direct effects on the bodies of its subjects but in its ability to provide a ‘naturalized’ and pathologized account of those subjects. Biomedicine helped produce a concept of ‘the African’ and an account of the effects of social and economic change which was plausible and socially relevant to colonial administrators and, at various points, to individual Africans themselves (Vaughan, 1991: 25).

But science does more than seek social explanations of natural phenomena. It also shapes our understanding of ourselves, both cultural and natural. It tells us what cultural practices are inimical to our health and what social behaviors are appropriate. Viewed from this angle, science becomes an agent of social change (Drori, et al., 2003). It

dictates good practices that are in line with our healthcare needs. For instance, our knowledge about disease-causing bacteria will bring our attention to the need for hygienic practices. In the process, modern medicine sets standards of care, norms, and moulds social characters.

2.5. Modern Medicine, Societal Rationalization, and Social Control

The introduction of modern science to European colonies was closely dictated by the need to secure control over unfamiliar and challenging colonial terrains by colonial administrators (Cohn, 1996). While the initial attention of colonial science was in the realm of economic production, it soon found its applications in political and social spheres. The intrusion of instrumental rationality into political and social milieus, for instance, was reflected in the tightening of control over individual freedom in society. In this respect, rationalization and scientific modernization are not perceived to be autonomous processes that accompany the process of modernization but rather processes that were structured by power relations, especially between the state and its subjects (Aronowitz, 1988).

However, social control in modern society is conducted in more subtle ways. While traditional states exercise their power mainly through coercion and the spectacular use of violence, modern democratic states exert political control largely through persuasion.

One area in which modern and subtler disciplinary power finds its expression is in medical practices. From *Madness and Civilization* (1971) to *The History of Sexuality* (1978), Foucault observes an increasing permeation of a technology of normalization in

which the responsibility of social control is increasingly being relegated to individuals through an emphasis on personal health practices. The changing emphasis of state power, from coercion to persuasion, also signals a move from classical sovereign power of the state to bio-power (Gane, 2004: 114). The latter is a technology of normalization that relies chiefly on scientific knowledge, which seeks to normalize and internalize modern state requirements in individuals. In the domain of public health, this is reflected in the increasing encroachment and intrusion of private and personal realms of health and cleanliness, requesting self-regulation of healthy habits and hygienic practice. As elaborated by Lupton:

The central strategies of disciplinary power are observation, examination measurement and the comparison of individuals against an established norm, bringing them into a field of visibility. It is exercised not primarily through direct coercion or violence, but rather through persuading its subjects that certain ways of behaving and thinking are appropriate for them (Lupton, 1997: 99).

Foucault's critique of modern medicine and public health signifies a major swing away from the "medicalization critique" of the 1960s and 1970s. The medicalization critique (Ehrenreich, 1978) itself is a challenge to the dominant Parsonian analysis of the role of modern medicine. The Parsonian paradigm stresses the functional role of physicians in maintaining social stability. The medicalization critique, in contrast, highlights the conflict between modern medical doctors and their patients that arises out of an unequal power relationship between the two. In this doctor-patient relationship, patients are perceived to be situated in a subservient position and are susceptible to the control and manipulation of physicians who are considered to be representing the interests of the state.

While the medicalization critique remains useful and valid to this day, it nevertheless simplifies the diverse and complex relationships among users of public health and the medical community. By moving away from the Marxist tradition of macro-analysis that diametrically pits state power against the populace (Turner, 1997: xi), Foucault sees the presence of bio-power as being diffused and occurring between different strata of society. Physicians are not the focus of medical power. They are only a node in the wider web of the state power structure.

The execution of bio-power relies on successful persuasion and acceptance among the general public of certain behaviors and thoughts as being normal, while other characters and mindsets need to be reformed. In the medical field, this persuasion is carried out and supported with physiological and anatomical evidences that are made visible through a “clinical gaze” and buttressed with the scientific exposition of knowledge and truth claims. Challenging the medicalization critique, Foucault holds that countering the power of medical doctors will not help to empower patients, for patients are linked to diverse sources of power in which both the doctor and patients participate. Moreover, the exercise of state power is often productive, not simply destructive. Patients are often accepting of modern medical knowledge and practices because, in many instances, they benefit from them in terms of better health and physical well-being.

In brief, the process of societal rationalization is understood as an incremental sophistication of the means of social control, from one that applies and displays violent physical force to one that encourages self-discipline of individuals. Thus the ordering of society becomes more subtle and in greater detail, giving rise to a panoptical society characterized by pervasive social surveillance (Foucault, 1995).

2.6. Summary and Conclusion

The social study of modern science is often approached from two seemingly contradictory perspectives. One perspective looks at how the production of scientific knowledge, both at practical and cognitive levels, is being influenced by social conditions. The other approach studies the social impacts of science.

To view the knowledge of science as being constructed by social needs tells only a part of the story. There is no doubt that social and economic interests direct scientific and technological developments; however, one cannot lose sight of the fact that diseases are very much a physiological phenomenon. There is natural truth in disease that ties to our biological being and cannot be swayed by social meaning or understanding of disease. However, one cannot overlook the fact that there are diseases which are given names even before the somatic basis is clear. In this context, disease causation is left to agreements among medical scientists, pharmaceutical corporations, and even the moral police. Disease, as a result, is said to be socially determined, or “framed” (Rosenberg, 1997; Fleck, 1979).

As the “Science Wars” (Segerstråle, 2000) fizzled out towards the end of the 20th century and with the subsequent September 11 attack on New York’s World Trade Centre, the postmodern critique of reason and modern science, and more generally Enlightenment philosophy, lost some of its steam (Latour, 2004). Although modern science continues to dominate public discourse, most recently with a global consensus on the veracity and threat of global warming (Intergovernmental Panel on Climate Change, 2007; <http://www.ipcc.ch/>), its credibility has suffered and there is increasing demand for

transparency and public participation in scientific decision-making that has significant impact on public policies (Porter and Phillips, 2007).

With this multifaceted understanding of the relationship between science and society, I will in the next few chapters investigate the process and consequences of the transmission of modern medical knowledge and services to British Malaya.

Chapter 3: British Colonialism and Colonial Medicine in Malaya

...there is no gainsaying the fact that the chief [concern] is the health problem among Europeans, for once disease commences to make havoc there comes in its train a wish on the part of the exile to pack up and flee to more temperate climes where the constitution can be given a fair chance. Without health in Malaya, or in any other part of the tropics, nothing else really matters for the moment; but, with health, the other worries and troubles of life can be fought with comparative equanimity.

Times of Malaya, May 2, 1912, p. 6.

3.1. Introduction

Malaya was conveniently situated adjacent to the Malacca Straits which offered the nearest trade route between China and Europe. This geographical centrality made Malaya an attractive and often indispensable territory for European empires that sought to establish a foothold in the Far East. From the first occupation of Malacca by the Portuguese in 1511, to its subsequent control by the Dutch in 1641, and the British intervention in 1874, the people of Malaya have long been in contact with Europeans and their civilization. However, the introduction of modern science to Malaya occurred mainly during the period of British colonization, partly due to the fact that modern science came to prominence relatively late during the height of British imperialism.

One of the immediate issues confronting British colonial administrators in Malaya was expatriate health. Apart from the usual need for medical care, the colonial setting imposed an additional health hazard since colonial economy activities in Malaya, which were largely commodity-based and involved the clearing of jungle, often destabilized

ecological balance and triggered disease, such as malaria outbreaks. As reported in a local newspaper,

...there is no gainsaying the fact that the chief [concern] is the health problem among Europeans, for once disease commences to make havoc there comes in its train a wish on the part of the exile to pack up and flee to more temperate climes where the constitution can be given a fair chance. Without health in Malaya, or in any other part of the tropics, nothing else really matters for the moment; but, with health, the other worries and troubles of life can be fought with comparative equanimity (*Times of Malaya*, May 2, 1912, p. 6).

As a result, modern medicine followed closely in the footsteps of colonial administrators to colonies, and was one of the earliest forms of modern scientific knowledge that came into contact with native society. Although the introduction of modern medicine and the expansion of modern medical services in Malaya were chiefly dictated by the process of economic extraction, the impact of modern medicine was to spread beyond the boundaries of mining sites and rubber estates, and helped to intensify the process of modernization and societal rationalization in Malaya.

3.2. Modern Medicine as a Physical and Cultural Entity

Like many other types of scientific knowledge, modern medicine displays both material and cultural characteristics. As a physiological remedy, modern medicine relieves illnesses and restores bodily health. And as a cultural entity, modern medicine is a symbol of modernity, progress, and human success in taming nature. Often, a patient who consults modern medicine is also consulting the suitable practice of modern behaviours (Lupton, 2003). In the context of colonialism, modern medicine was dispensed both as a medical antidote and a cultural product (Meade & Walker, 1991;

Pyenson, 1993), and served as a cultural agency, and an agency of Western expansion (MacLeod and Lewis, 1988:1).

Accordingly, when a medical school was being proposed in the Federated Malay States in 1905, it was not only meant to revive health but also to serve as conduit to educate natives about the importance of sanitary practices. In supporting the establishment of a medical school, the Governor of the Federated Malay States was reported as thinking that

[I]t had a great work before it, not only in curing disease but also in opening the minds of the population with whom they were brought into contact to the necessity of adopting sanitary and remedial measures (*Times of Malaya*, July 5, 1905, p. 5).

As a medical cure and a cultural artifact, modern medicine presented itself as a superior remedy for tropical illnesses and provided an additional aura and legitimacy to colonial rule. In this regard, the power to govern is said to partly rest on the power to heal (Waldby 1996: 5). While immediate political and economic concerns were part and parcel of the everyday dispensary of colonial medicine, equally significant was the longer term cultural influence of modern medicine and medical services as they found their way into the everyday life of traditional native society.

3.3. British Presence in Malaya

British official presence in Malaya can be dated to the ceding of control of Penang Island to the English East India Company on August 11, 1786 by Sultan Abdullah, the ruler of Kedah, who was then eager to seek British protection against Siamese and Burmese threats. As a trading centre and port of call, Penang left much to be desired. As

a result, Singapore, which was located at the southern tip of the Malacca Straits, was later sought as a new settlement by Stamford Raffles, who was thus often credited as the founder of modern Singapore (Barley, 2002). Notwithstanding Dutch attempts to forestall it, Singapore was successfully acquired by the British from Sultan Hussein, who was the lawful but displaced ruler of Johor, on February 6, 1819. Malacca, the other settlement, was obtained from the Dutch through the Anglo-Dutch treaty of March 17, 1824 in exchange for the British colony Bencoolen that was located on the west coast of Sumatra. In 1826, the three city ports – Penang, Singapore, and Malacca – were made into a collective administrative unit called the Straits Settlements. Among the three settlements, Singapore stood out as the most prosperous.

Formal British intervention in inland Malaya took place when the Pangkor Treaty was signed in 1874 between the British government and Sultan Abdullah, a deposed ruler of the Perak State. In this treaty, the ruler was to admit a Resident in return for British patronage. The British Resident served as an advisor to the ruler in all matters of the state except those related to traditional customs and religion of the Malays (Khoo, 1974). While in theory the British Resident was only an advisor, in practice, the Resident was the *de facto* ruler.

Like British presence in the Straits Settlements, the intense British involvement in peninsula Malaya was also primarily economically driven (Khoo, 1966; Bassett, 1964). By the time of the British intervention in Perak in 1874, tin mining had shown promising economic return. The industrial boom in Europe impelled the British to ensure uninterrupted supply of raw materials, such as tin, to Europe (Wong, 1962). Perak was then a major tin mining site in Malaya. However, civil wars among rival princes and

recurring conflicts between Chinese secret societies often upset the tin supply. The disturbance of the tin supply soon became a British concern and as a result, the British willingly obliged when Sultan Abdullah sought British help to reinstate him to the position of the Perak ruler.

3.4. The Introduction of Modern Medicine to the Strait Settlements and the Peninsula Malaya

At the early stage of British involvement in Malaya, medical doctors and staff were mainly seconded from India, which oversaw the operation of the Strait Settlements until 1867 (Phua 1987: 10). The need to recruit lower rank medical staff, such as apothecaries, from India was mainly due to the lack of natives in the Straits Settlements who had both the knowledge of modern medicine and were proficient in English. However, secondment of medical staff from India was not only costly, but was also faced with much reluctance on the part of the staff. As a result, students from Straits Settlements were sent to study in India as an alternative:

Prior to 1870, all the assistant surgeons or apothecaries, as they were then styled, were lent by the Indian Government for a certain term of service in the Straits. They were mostly, if not entirely, drafted from the Indian army, all graduates of the Madras Medical College. As it was not possible to get men from India to fill vacancies here, the local Government decided upon getting Straits students to qualify themselves in the Madras Medical college, at the termination of which they were bound down to serve the Straits Government for 15 years It was in 1871 that the first batch of three students who had previously undergone a competitive examination, was sent to India at Government expense. (*Times of Malaya*, May 6, 1912, p. 9).

Despite the training of native students in India, the demand for medical staff was not met. And the lack of training among lower rank medical staff, who were mainly the

natives, drew some criticism. As reported, with some degree of exaggeration, in a daily newspaper,

A correspondent in the Negeri Sembilan calls attention to the incompetency and occasional inattention to duty of the subordinate staff of the Seremban medical department

It has been the practice in Selangor and therefore probably in the other States as well, to leave Hospitals in charge of Tamil dressers, who naturally cannot be expected to know anything of surgery or medicine. In some cases where the Hospital placed is a large one, an Indian apothecary is placed in charge, who at an emergency will cut off a man's foot, or perform other surgical operations (*Malay Mails*, June 28, 1897, p. 2)

The demand for better qualified medical staff such as dressers and apothecaries, who were mainly natives, was also aired by doctors. A former State Surgeon of Negeri Sembilan complained in a local newspaper that

Until dressers-in-charge know how to describe symptoms as they see them and are able to take down a plain straight forward history of a case in the simplest possible language and in the fewest possible words, we shall not make much progress, and in order that they may do this they must have some elementary training (*Malay Mail*, June 16, 1899, p. 3).

With the increasing demand for and expectation of the quality of medical staff, a medical school was mooted. In 1905 the King Edward VII College of Medicine was established, mainly to graduate lower rank local medical staff, such as dressers and apothecaries (Oppenheim, 1955).

The establishment of hospitals and training of local medical staff was concurrent with the enactment of various health legislations as British colonial administrators fought tropical diseases at different fronts. Initially, there was little interest in tightening the control of disease through legislation in the Straits Settlements. Medical services were provided and administrated mainly through the *laissez-faire* approach. This changed in

1867 when the Straits Settlements became one of the British crown colonies administered from London and independent of India. In 1868, three laws came into effect in the Straits Settlements. They were the Quarantine, Registration of Births and Deaths, and the Vaccination Ordinances. Two years later, the Contagious Diseases Ordinance was also passed, which brought prostitution, hitherto left to its own devices, under the control of government. By the end of the nineteenth century, medical service, after three decades of expansion centered on hospital services, was extended to sanitation work (Phua 1987: 17-29).

Unlike modern hospitals, early hospitals in the Straits Settlement were far from satisfactory. There was a serious lack of facilities. Hospitals were often equipped with only beds and were in an unsanitary condition. Very often, migrant workers entered hospitals only when they were terminally ill, literally making the hospital a death house. As a result, desertion was one of the major issues in hospitals. In 1882, 484 patients absconded from hospitals in Straits Settlements (ibid.). Even in better times, the shortage of staff meant unqualified personnel were allowed to care for patients. As demonstrated in the Annual Report of Selangor:

The past year has tried severely the resources of the department and at times the wards of some of our hospitals ... have been much overcrowded With an increase of nearly 50 per cent in the number of patients under treatment in the wards much extra work has been thrown upon the subordinate staff of Apothecaries and Dressers, and praise is due to them for the way in which they have met this press of work, at the same time, it is impossible, with the present staff, to do justice to the patients (State of Selangor Annual Medical Report 1900, p. 2).

The introduction of modern medicine and medical service to Malaya went through a similar path as the Straits Settlements. Early health initiatives focused mainly

on the curing of disease. During this stage, constructing hospitals, training, and recruiting physicians were the chief undertakings of the British colonial administration. As British involvement gained a stronger foothold in Malaya, the role of modern medicine took on a greater significance, and moved in the direction of preventive medicine. As Britain consolidated its position in Malaya, it also assumed a paternalistic posture in the provision of modern medical services and regulation of public health in Malaya (Segaran, 1982).

3.5. Perspectives of Colonial Medicine in Malaya

While the study of British colonialism in Malaya quickly gained importance after Malayan independence in 1957 (Chai, 1964; Sadka, 1968), the study of colonial medicine and public health policy in Malaya came relatively late. Among the meticulous studies of colonial medicine and public policy are those conducted by Phua (1987) and Harun (1988). Situating their arguments within political economy, they critically analyze the role of modern medicine and public health policy in facilitating the process of British colonialism in Malaya.

In *Sickness and the State: Health and Illness in Colonial Malaya*, Lenore Manderson (1996) continues the tradition of political economy critique. However, she extends her analysis substantially with a focus on the role of modern medicine in shaping the modern state and modernity in Malaya. As the emphasis of medical service shifted from curative to preventive medicine, modern medicine took on a greater role in public affairs, and increasingly became a disciplining agent of the colonial government.

3.6. Colonial Medicine and Economic Extraction

The presence of the British Resident system in Perak, and later in other Malay States, paved the way for the intensification of the commodity economy in the Malay States. The expansion of the economy of tin mining and rubber plantations saw an influx of migrant workers from India and China. These workers were mostly male adults who left their families behind to seek better fortune overseas. They worked under harsh conditions in Malaya that neither their physical nor their psychological states were familiar with and prepared for. Some were already frail before they left. Once they arrived, they lived in unsanitary and crowded quarters, and often suffered from malnutrition (Chee, 1982: 400).

Given the charitable and humanitarian images of modern medicine in alleviating sickness and suffering, the transmission of modern medical knowledge from the colonial metropolis to the peripheries was often imbued with humanitarian concerns. At times, the introduction of modern medical services to native society was understood as a form of “charity” to the native society. As a result, “[t]he report of the State Surgeon of Selangor for 1896” was touted as “practically a report on a huge charity scheme which the Government continues to run, from year to year on behalf of the people of many nationalities who come to seek their fortunes in the Federated Malay States” (*Malay Mail*, Aug 13, 1897, p. 3).

However, given the high cost of modern medical services, the implementation of health and medical policies often had to be conveyed in economic terms. In the Report of the Advisory Committee for the Tropical Diseases Research Fund for 1910, Ronald Ross, who was a prominent British medical doctor, remarked:

It seems to me best to approach the prevention of [tropical] disease, not so much from its humanitarian as from the economic point of view. Disease always causes a large expenditure of money The prevention of disease should be looked on economically as insurance against the useless expenditure caused by such maladies (Fremantle, 1911: 347).

Early health and medical services in colonial Malaya were provided primarily to colonial administrators, military and police personnel, and European residents. Accordingly, early hospitals in Malaya were built close to expatriate quarters and military barracks. In a visit to a hospital at Taiping, a tin mining town in Perak, Frank Swettenham, the then Assistant Colonial Secretary for Native Affairs, observed that almost all of the sixteen patients in the hospital were policemen (Vethavanam, 1957:2).

In Penang, a rudimentary general hospital was built in 1800 for military use and it was not until 1826 the public was allowed admission with a charge (Phua 1987: 12). In fact, there was no civilian medical service in Penang in the early days of British administration. Civilian patients were taken care of by the army medical service (Harun, 1988: 56). Not until Penang become a Presidency in 1805 was modern medical service extended to civilians (ibid: 61). And for migrant workers, the majority of whom were Chinese in Singapore, care for disease and the diseased was largely assigned as a community affair. Some of the care was provided by ethnic Chinese business leaders, such as Tan Tock Seng, who financed the building of a Pauper Hospital in 1843 (Phua 1987: 15). Other services were provided with the money collected through the Pork Tax levied against the Chinese, for whom pork was a staple food.

Outside military and colonial administrative needs, expenditure on tropical medical research frequently required proof of sufficient financial return. In fact,

economic justification seemed to be the only means by which to seek and argue for colonial intervention in matters of migrant health. In reviewing the book *Hygienic Management of Labour in the Tropics* by Dr. Gerrard, a reader said:

It has been laid down so often in the company reports that the good health of an estate is one of its most valuable assets that the need of treating labourers on plantations with every care as to their housing and health is an elementary axiom in good management. The company that stints funds to equip its estate with sound coolie lines and thorough systems of drainage and water supply is going to wake up one day to find itself extremely unpopular with imported Tamil or Javanese labour. Negligence in this regard leads to the boycotting of the estate, to increased expenses to bribe labour, to sickness among the white staff and consequent inefficiency in the management, to the growth and spread of weeds, to inadequate planting, to impoverished dividends, to exhaustion of working capital, to the bankruptcy of the concern and the impoverishment of the shareholders. This we say is made evident at nearly every meeting and it is now found that what half a century ago would have been regarded as humanitarianism pure and simple is really bed-rock economic common sense (*Times of Malaya*, July 17, 1913, p. 9).

The opening of forests for mining and plantations disturbed the ecological balance and introduced new conditions for the spread of diseases. Unlike the natives, the migrant workers did not have well-developed social structures to provide them social support. This made them vulnerable to the assault of diseases. The crippling effect of disease on labour can be seen from one example. In 1875, after a month of work in a Klang Valley tin mine, of the 87 Chinese workers, only 18 survived an attack of fever (Gullick, 2000: 6).

The need to ensure a smooth process of economic extraction obligated the colonial administrators to pay attention to the dire health conditions of migrant workers. As the debilitating effect of disease affected economic productivity, health and medical services to the workers was eventually rounded in as part of the items in colonial

economy administration. In appealing for financial contributions from rubber planters in F.M.S. to the London School of Tropical Medicine, the London City Sub-Committee for the Rubber Trade made the following appeal:

No one can view with indifference the enormous annual wastage of human life, due to the ravages of Tropical diseases, and all connected with plantation rubber must recognise the duty of doing everything possible to improve the health conditions, but we desire to emphasise the fact that this appeal is made on business as well as humanitarian grounds. It may safely be said, that as the health conditions on these plantations improve, profits from Tropical industries, such as rubber, will increase. We recognise that a great many rubber planters – both companies and private individuals – are doing all they can in the way of providing good water, comfortable houses, hospital accommodation, skilled medical treatment and nursing, and are taking strong preventive measures in the way of special drainage and sanitation, but the ability to do this with success and to cope with Tropical diseases, is largely due to the patient study and research which the London School has been prosecuting for the past twelve years (*Malay Mail*, Dec 21, 1912, p. 5).

In brief, the introduction of modern medicine and medical services to British Malaya was tightly bound with the activities of economic extraction. While the provision of medical care and the improvement of health conditions among the natives were in line with the liberal ideas of humanity in Europe during that period of time, modern health and medical services in British colonies were presupposed upon greater economic return. It is in this context that Arnold attributes the introduction of modern medical services to British India as a part of “the accountancy of [the British] empire” (Arnold, 1988: 16).

3.7. The Modern Scientific Worldview and British Attitude

The ascendancy of science as a source of reliable knowledge and cultural authority in the 18th century – an era generally known as the age of Enlightenment – continued to shape the mindset of European bureaucrats and men of science at the turn of

the 20th century. Armed with knowledge of modern science, British colonial officials and scientists often assumed a condescending attitude towards the natives. During that period of time, the British outlook was in general positivistic. They were critical of the Malays who “embraced Islam and based their reasoning upon God’s word rather than upon the fallible experiments and observations of men” (Wilkinson, 1957[1906]: 32). In a more sympathetic tone, the Malay belief was said to also have its merit since although “it is bad for scientific research ...[it] has the merit of creating earnest and devoted men” (ibid.).

In the eyes of British colonial administrators, Malaya was “Europe in history” in the sense that Malay culture was still at a primordial stage that Britain had surpassed. For instance, in referring to the changing culture in Malaya amid intensified British presence, Winstedt (1961: 3) observed that “[t]he knell of theocratic culture, that started to totter in Europe two centuries ago, is sounding now in a Malay world, where religion and politics are beginning to be conceived as separate activities.” Similarly, when discussing the subject of Malay superstition, Frank Swettenham (1913: 194) noted that the evil spirits known as *Bajang*, *Polong*, *Pelsit* and *Langsuior*, were inherited or acquired by the practice of witchcraft and “as little reasonable as the ‘proof’ of the exercise of similar powers in the Western witch not so many centuries ago.”

Shrouded in this worldview of incremental and phase progress, British administrators in general would include in their mission the goal of transforming the native society into a more progressive society. In Malaya, this idea was best represented by Swettenham, who perceived the Malays as being in an “unregenerate” state, and

hoped to bring them up to the “regenerate” state of existence. As he understood it, the arrival of the British signalled

... an entirely new order of things. The idea of government became a reality. Slavery, debt-slavery, and forced labour were abolished. One central authority and only one, was recognised. Powers of life and death and punishment in all its forms were reserved for the Ruler and those acting in his name. Every complainant was heard, Courts of Justice (though perhaps not of law) were instituted throughout the land and their doors were open to rich or poor, to *raiyyat* or to *raja*, without respect of persons. Road, railways, and telegraphs were constructed in every direction and – greatest innovation of all – the land was made the absolute property of those who cultivated it. Work was plentiful, wages high, and the labourers few; so all classes became richer, as the resources of the country were exploited by the Chinese and other immigrants (Swettenham, 1907; quoted in Allen, 1964: 57).

However, the change was not to be smooth, especially when other currents of change, such as Islamic influence, were also taking place. The well-intentioned sanitary measures, for instance, might be counter productive if the way they were implemented offended Malay customs. As observed by Wilkinson (1957[1906]: 40):

While English-made laws may be superior, in the abstract, to the customary or religious law of the Malays, they cannot command the respect which accompanied immemorial custom or divine injunction, they obviously rest on mere force, and their violation does not necessarily lower the criminal in the eyes of the community. Again, while there can be no question of the real value of European medical science, the execution of sanitary measures has often (it is to be feared) to be left to European doctors who, in ignorance, offend terribly against native custom, and to petty officials who have no belief in their work and simply take it up in order to prey upon native householders ignorant of what is wanted and only too willing to pay to be left alone.

In a display of respectable statesmanship, Wilkinson criticized the condescending attitude of British officials as “native prejudices” that would not reflect well the prestige

of the British Empire. He decried the flawed handling of Malay subjects in terms of their custom and tradition because:

... racial dominion rests upon character – not upon wealth, nor even upon intelligence. It is a matter of real regret that the patriotism of the Malays, their self-respect, their reverence for immemorial law, their loyalty to their rulers, their traditions of courtesy, and their love of study for its own sake – things that contain the germs of national progress – should be continually depreciated and dishonoured as not being “business.” No economic prosperity need altogether blind us to the element of truth in the criticism passed by Socrates on certain admired types of statesmanship: “they have filled the city with markets, docks, and suchlike trash, instead of soberness of thought and strength of character” (Wilkinson, 1957[1906]: 40).

Wilkinson’s show of high statesmanship was an exception rather than the rule. At the turn of the 20th century, the dominant ideas were those of positivism and Darwinism. Together these ideas conjured up an image of the evolutionary progress of human society from that of a primitive to a civilized stage. And an advanced nation such as Britain was considered to have legitimate power to introduce changes, imbue progressive ideas, and improve the conditions of lesser nations in order to bring them to a higher state of progress.

This prejudicial view of the colonial natives filtered down to a general consciousness that obligated British officials to bring change and progress to the natives whenever the chance arose. And in the administration of modern medicine and medical services, the close encounters between British medical staff and natives were perceived as part of the civilizing mission. Hospitalization, for instance, was hoped to have a “civilizing effect” on coolies through contact with Europeans (Manderson, 2002: 66).

3.8. Superior Knowledge and the Legitimation of Colonial Rule

More than a tangible and indispensable component of colonial economy, modern medicine was also a cultural symbol of progress that lent additional credence to British colonization. The status of modern medicine as a cultural artefact of superior refinement often peppered the remarks of colonial doctors, both of British and local origins. For instance, in addressing the problem of the shortage of medical staff, it was hoped that the training of local doctors “in the long run will dispel the mysticism and magic from the traditional healing art of the peninsula” (IMR, 1950: 32).

As a cultural artefact, modern science enjoyed a distinctive status in the cultural landscape, offering not only practical solutions to diseases but also representing an idea of universal knowledge. It was not uncommon that scientists of different nations and political ideologies worked in the same laboratory. Nevertheless, the prestige and the symbol of progress and national strength that came with science also made modern science a subject of competition among different colonial empires. As a result, modern science supported imperialism not only in the economic realm, but also in enhancing the image of imperialist power in distant territories and rival imperial capitals (Pyenson, 1985).

As technical knowledge, modern medicine relieved illnesses and afforded a semblance of charity to colonial subjects. In its cultural outfit, modern medical knowledge represented a type of superior knowledge, and consequently, a superior rule. The provision of health provided additional legitimacy to British colonialism in Malaya and other British colonies (Chee, 1982; Manderson, 1987; Bashford 2004). In fact, in India, as Arnold (1988:3) put it, “the only excuse for colonialism is the physician.”

The cultural discourse of colonialism in British Malaya was constructed around the “otherness” of the native. The construction of an image of the “Other” was a necessary stereotype to represent, although crudely, the world so that one could stabilize his/her perception of social realities and pave the way for the control and management of the “Other” (Gilman, 1985: 17-18). Viewed in this light, the British needed native stereotypes to differentiate, explain, and eventually control the native society.

Given the confidence of the British with their more advanced knowledge of science and medicine, it was not difficult to understand why, by and large, the native society was seen as lagging behind in terms of civilizational attainment. At times, this sense of superiority caused colonial administrators to arrive at the conclusion that the subjection of the natives of the Peninsula Malaya “to powers greater and more civilized than themselves” was considered to be “an advantage to themselves and to all who have relations with them” (Harry Ord to Buckingham, cited in Sadka, 1968: 40). This subordination was especially legitimate when the colonial administrators thought that the “Malays like every other rude Eastern nation, require[d] to be treated much more like children and to be taught; and this especially in all matters of improvements, whether in the question of good government and organization or material improvement” (Sir Andrew Clarke, quoted in Barr, 1977: 4-5).

In medical discourse, one finds a similar propensity of viewing traditional medicine and medical practices as being primitive, superstitious and invalid, as compared to modern medicine that was advanced, rational, and scientifically grounded. In the eyes of colonial medical doctors, traditional Malay medical beliefs were “essentially pagan,” with the *pawang* (shaman) and *bomoh* (shaman who specialized in the healing arts) at the

forefront of these practices (IMR, 1950: 16). Traditional Malay healings, in the minds of colonial medical doctors, were merely activities that were once rife in Europe but were now in decline. It is not a coincidence that one finds articles written by British medical doctors with titles such as *Some Superstitious Beliefs Occurring in the Theory and Practice of Malay Medicine* (Gimlette, 1913), or *Curious and Superstitious Native Ideas of Causation of Diseases and their Treatment* (Avetoom, 1905).

Both “curious” and “superstitious” practices were considered a result of ignorance on the part of the Malays and it was the duty of British doctors to try to convince the native “how wrong and destructive to life his method of treatment and his ignorance of ordinary sanitary laws” (Avetoom, 1905: 9). It was at this juncture that British doctors, armed with modern medical knowledge, also served as civilizing agents. The deployment of modern medicine from the colonial center to the periphery, as a result, did more than alleviate physical pains and save lives; it also intended to bring progress to primitive ideas and cultural practices.

At times, administrators in colonies had to come to the defense of the East in order to lure workers to colonies. While Said (1978) has rightly pointed to the importance of the construction of the imagery of non-Western societies as a justification of dominant rule, on a more minute level of day-to-day operation, the construction of the image of the non-West might take a favorable tone. For instance, Dr. Daniels, who in 1903 served as the second director of the Institute for Medical Research in Kuala Lumpur, in the first of a series of lectures on “Tropical Hygiene” given at the office of the London Chamber of Commerce, made favorable remarks about Malaya:

[T]he main object was to point out to those persons who were going to the tropics for the first time that the Tropics were nothing like so bad as they were painted. Taken all round, life there was more pleasant than it was in England, and it was also more profitable. The only drawback was that there was a great deal more ill-health ... but with the alteration of the mode of life and with quite elementary precautions against disease the actual mortality and sickness in the Tropics had been enormously reduced (*Times of Malaya*, April 13, 1910, p. 9).

According to Arnold (1988: 7), the emergence of the discipline of “tropical medicine” was to portray and to give credibility to an image of the tropical world as primitive and dangerous in contrast to the safe and sanitized temperate world. Dr. Daniel’s remarks thus were uncommon and aimed to attract new recruits to Malaya in light of overwhelming negative publicity about life in Malaya.

In summary, modern medical knowledge brought to Malaya not only the treatment of diseases, but also the “the habit of accurate observation and a broad humanity to the suffering and needy” (IMR, 1950: 30). Contrasting the “slumbering culture” of the Malay with that of “the spirit of enquiry” (ibid.), the British placed themselves in the forefront of knowledge production, technological innovation, and cultural enrichment. Colonization was thus legitimized and science and medical knowledge aptly provided the necessary basis.

3.9. The Universal Cultural Authority of Science

Although science played a significant role in justifying colonization, to view science merely as a cultural construct that was employed to legitimize British rule underestimates the cultural authority and autonomy that science exerted over colonial administrators. Also, to conceive science merely as an instrument of domination fails to

address the tendency of modern medical doctors, regardless of their ethnicity, to admit to the superior status of modern scientific knowledge compared to their own traditional medicine. In Malaya, a Chinese doctor trained in modern medicine would be equally adamant about the need to eliminate superstition and introduce modern medicine and “prophylactic measures will undoubtedly be listened to, if the people understand them” (Lim, 1904: 16). There is more than racial superiority in the desire to introduce modern medicine to the native society and to purge natives of superstition and ignorance.

The fact that modern science receives overwhelming endorsement from nations and peoples of diverse cultural backgrounds and ethnic origins speaks to the cross-cultural authority that modern science enjoys (Drori, et al., 2003). This towering cultural authority of science is made all the more vivid from evidence that even religious leaders sought scientific endorsement of religious doctrines. For instance, in Britain during the Victorian period, church leaders who were hostile to the spread and teaching of modern science often conceded to the authority of science and resorted to scientific grounds to support religious beliefs (Cannon, 1978: 13).

In British Malaya, scientific authority was shared among colonial administrators and there was a common understanding that science was a treasure that mirrored a nation’s status and strength. The presence of the overriding cultural authority of science was demonstrated during times of dispute when parties in disagreement sought to reinforce or put across their arguments by leveraging the cultural authority of science. One of these episodes of dispute happened over the role and function of the Institute for Medical Research.

The Institute for Medical Research was established in 1900 to find solutions to the problem of beri-beri and malaria diseases that plagued tin miners. However, merely four years into service, the value of the Institute for Medical Research was questioned by the new Governor of the Federated Malay States, John Anderson, who was less than enthusiastic about the Institute. He intended to downgrade the institute to a division of the Medical Department from its initial independent status as a federal institution.

When the idea was conveyed to the Colonial Office in London, the Colonial Medical Advisor, Patrick Manson, objected strongly and wrote a 27 point reply to the Governor to argue for the continuation of the status of the Institute for Medical Research as a federal institute. At the very beginning of the reply, Manson referred repeatedly to the importance of science and medical knowledge to the prestige of the British nation and empire:

It was recognised that an undue proportion of the great discoveries of modern times in tropical medicine had been made by the scientists of other countries, as for example the vibrio cholera by a German, the bacillus of Leprosy by a Norwegian, the plasmodium of malaria by a Frenchman, the bacilli of Plague and Dysentery by a Japanese, the transmitting agency of Yellow Fever by an American, the parasite of tropical anaemia by an Italian and so on (Patrick Manson to John Anderson, 1904, CO 273/305).

And,

With a view to correct this not very creditable state of affairs the Schools of Tropical Medicine were established and the scheme of colonial laboratories formulated. The former have already proved a great success and there is every reason to believe that the latter would be equally so if planned and carried thro on sound lines; [at] all events the combined scheme commends itself to everyone who recognizes the importance of the health factor in colonial development and the importance of prestige to the nation (ibid.).

While these comments were rhetorical in nature, they nevertheless pointed to a common appreciation of the status of science among colonial administrators. In their eyes, science was an enterprise that the British must build and be ahead of other nations. Scientific strength reflected national strength and scientific achievement was national achievement. In other words, science became a national symbol and a source of national pride.

The sense of being at a more advanced stage of knowledge production in the evolutionary chain provided British administrators and medical doctors with yet another set of cultural frameworks, which placed the British ahead of other European empires in terms of scientific accomplishment. In the world of British colonial administrators, the scheme of things evolved from a lesser to a richer stage. Accordingly, when the Portuguese arrived in Malaya in 1511, they were considered to have added little to the available stock of knowledge in Malaya. This is evident from the records of the IMR:

When the Portuguese occupied Malacca in 1511 the art of medicine in Europe was not yet free from the bonds of mediaeval obscurantism [T]he first adventurers from the West could add but little to the medical lore which, via Islam, was already permeating the Malay Peninsula from the Arabic world” (IMR, 1950: 27).

In this framework, the contribution of Western medical knowledge to colonial societies came only after the reign of British rule. The encounter of the natives with the West therefore saw an increasing transfer of better and reliable knowledge and the passage of colonial empires in Malaya from the Portuguese and Dutch to the British was thus one of a growing enlightenment with Britain being at the pinnacle (IMR, 1950: 27-28).

This common appreciation of the value of science and the superior sense of cultural possession among British colonial administrators served to reinforce a sense of

belonging and national identity among the British administrators. It exemplified the presence of an overarching cultural authority of science that presided over the British administrators. To view modern science merely as an instrument of colonial domination misses the point that even the British colonial administrators were subject to the cultural authority of science. This cultural authority to a very large extent was universal and recognized few national, cultural, and ethnic boundaries.

Thomas Barlow, in his Presidential Address at the International Congress of Medicine in London in 1912, praised the presence of international brotherhood among physicians and envisioned a trans-national and trans-racial cooperation among physicians of diverse backgrounds in the fight against diseases. After showering accolades on British medical scientists, he continued to commend physicians of other nations:

Our foreign brethren were not less illustrious in the bed-roll of medical and surgical achievement. Virchow, the Nestor of morbid anatomy, honoured and beloved by us as by his own countrymen, delivered a historical discourse on the value of pathological experiments. Volkmann gave a critical survey of the recent advances of surgery. Robert Koch, gave – (cheers) – gave what may truly be called a path-breaking demonstration of microbial findings ... Von Langenbeck ... spoke for military surgery From the United States came Austin Flint, the accomplished physician and master of physical examination(*Malay Mail*, Sept 10, 1913, p. 7).

When cheering the success of the advancement in tropical medicine, he continued to extol “our American brethren for their splendid hygienic work in Cuba, in Panama, in the Philippines, and in Costa Rica.” Towards the end of his address, he not only applauded the broader communities that had contributed to the success of modern medicine, but also dreamed of a “World Medicine” that recognized no racial and national boundaries. He said:

It is impossible even to enumerate the varied ways in which medicine has co-operated with economics, social legislation, and philanthropy, which we sum up briefly as public health.... Surely I have said more than enough to justify my contention that we have come into a godly heritage and that heritage is like a lofty and magnificent tableland of knowledge and efficiency. The gaps are being filled; we are no longer isolated, but are working side by side which are inseparably connected. Every day we gain fresh help for the auxiliary sciences, and we realize more and more the unity and universality of medicine May this Congress add to the common store of fruitful and useful knowledge; may it increase our good fellowship, our mutual understanding and co-operation, and may it help to break down the barriers of race and country in the onward beneficent march of World Medicine (*Malay Mail*, Sept 10, 1913, p. 7).

We can observe some semblance of the “Republic of Science” (Polanyi, 1962) in the works here. Scientists shared among themselves certain convictions, and most importantly, a common knowledge and methodological base that were universal in nature. At the second biennial congress of the Far Eastern Association of Tropical Medicine in 1912, Fraser and Stanton in arguing for their deficiency theory of beri-beri disease drew the attention of the audience to the fact that their theory was corroborated in many other countries. At the conclusion of their presentation, they said:

That the accuracy of the opinion of this Association, recorded in 1910, has received further and more complete confirmation by investigations in Japan, China, French Indo-China, the Philippine Islands, Siam, Netherland-India, the Straits Settlements and the Federated Malay States, namely, that beri-beri is associated with the continuous consumption of white (polished) rice as the staple article of diet (*Malay Mail* Sept 17, 1912, p. 7)

The universality of science was not merely a matter of universal knowledge claim but was also reflected in the norm of scientific practice. For instance, in recruiting scientists to the Institute for Medical Research, it was set down as a rule that recruitment was “open to all irrespective of nationality” (IMR, 1950: 39) and the first Director of the

Institute, Dr. Hamilton Wright, insisted that research in the Malayan institute should have no restrictive bounds and should admit scientific workers from other lands. Modern science thus was both a contested prize of national prestige and a focus of transnational cooperation.

In summary, the practice of modern science in colonial settings often gave an impression that modern science was a tool of empire and not a universal enterprise that could be readily relished by colonial subjects. A close look however shows that British colonial administrators were also subjects of the cultural authority of science that was being upheld among British colonial administrators. In the case of Malaya, the universal nature of modern science was easily discerned and the appreciation of modern science continued to grow into post-independent Malaya at a time when British rule in Malaya was re-examined critically.

3.10. Colonial Medicine and Local Cooperation

Although modern scientific knowledge had a universal appeal especially among scientists of different countries and ethnic origins, it needed to be translated into local cultural meanings when it was put to use in different colonial settings. The dissemination and implementation of modern health policy often required the mobilization of diverse resources and people, especially at the local level. For instance, in France, the introduction of modern medical services and ideas needed the cooperation of a network of peoples to accomplish the “Pasteurization of France” (Latour, 1988). In Malaya, it was a common practice to engage local *penghulu* (village headmen), school principals,

and police to enforce medical policies in the 1880s such as mandatory vaccination for smallpox.

When modern medicine was first introduced to Malaya, the natives and immigrant communities were apprehensive about modern medical treatments and often shunned hospitals. In Negeri Sembilan, Dr. Hennessey, in his report on the Kuala Pilah District, remarked that the Malays stayed away from hospitals for various reasons:

Some object to the discipline in the hospital which suggests to them a prison rather than a place to get well in, others are filled with a fear of the knife which they imagine is used on the slightest pretext, and others imagine that it is a disgrace to live in an institution. According to them it is only the poor who, from sheer necessity and lack of friends, are obliged to seek such treatment. Some very quaint superstitions are common – e.g., a fixed belief that doctors poison cases they do not understand for shame at their lack of success, that the rich man and the white man get better medicine because good medicine is expensive. The superstition that the hospital is haunted by the ghosts of those that die there is universal (Negeri Sembilan Administration Report for the Year 1912, p. 21)

The same can be said about the Chinese. In the Annual Report of the Federated Malay States for 1897, the following observation was made:

The prejudice of the Chinese against European medicine seems to be decreasing and in proportion as it decreases, we may look for an improvement in the death-rate from diarrhoea and dysentery. If the Chinese would recognise the importance of early treatment in these diseases, a great deal might be done to reduce the number of deaths as is strikingly shown by the death-rate at the General Hospital, District Hospital and Gaol, where they are respectively for diarrhoea, 21.6, 60.5, 10.3. (*Malay Mail*, August 19, 1898, p. 2).

The introduction of the technique of vaccination to Malaya, for instance, was not well-received among the Malays due to religious sensibilities (Tate, 2005: 49). Even

though vaccination for smallpox was made mandatory and often enforced with the help of the police, the success of vaccination programs often relied upon local elites and village headmen. As Sinclair, the Residency Surgeon of Selangor reported,

I once taught Raja Bot to vaccinate, and he became an expert operator and a capital ally, and I may also say the same of Haji Mat Musi of Ulu Selangor and Raja Indut of Sabak. These *Penghulus* [village headmen] were of great use to me in furthering vaccination in the State and in breaking down prejudices against this simple, but most important, operation (Selangor Government Gazette Vol. 1, no. 18, September 5, 1890, p. 462).

The same tactic was applied in other states. In Perak for instance, village headmen were engaged to spread the message to villagers:

The number vaccinated amounted to 4676 ... an improvement of 5.14 per cent on the previous year. A circular has been issued to penghulus to use their influence to bring in cases for vaccination (Perak Annual Report 1896, p. 20)

To extend the success of vaccination program, school masters were also engaged since *penghulus* sometimes were too busy. School masters were not only the better educated people in a village but schools were also located nearer to villagers (Tate, 2005: 51).

It was sometimes difficult to persuade the locals to discard entrenched local habits even with the help of community leaders. For instance, Travers, a Residency Surgeon of Selangor who tried to convince Chinese workers about the futility of taking early baths to cure malaria fever, was unsuccessful. As Travers observed:

There is an absurd idea prevalent among Chinese that a cold bath in the very early morning acts as a protection against malarial fever. Anyone visiting the mines before day-break will see rows of coolies throwing water over themselves from wooden buckets. When it is considered that a man's vital strength is at about its lowest ebb at that hour in the morning, it is difficult to believe that this severe shock, rapidly lowering the temperature of the body,

cannot but weaken the coolly, and render him a more easy prey to malarious influence than he would otherwise be.

I have tried in many cases to dissuade the mines-owners from enforcing this barbarous custom but although listened to with much politeness and consideration, I invariably notice that the bathing goes on all the same. The proper time for the coolly to bathe is after his day's work is done, and when the air and water are warmer (Selangor Government Gazette, no. 7, vol. 28, March 1895, p. 115-116).

The introduction of modern medicine to colonial society often required the cooperation of community leaders, first to allay the fear of modern medicine, and second to provide leadership in the implementation of modern medical policies. This was needed despite the presence of the universal cultural authority of science shared among scientists and elites. Community leaders such as village headman helped to bridge the gap between modern knowledge and practice with traditional beliefs. As a result, the transmission of scientific knowledge, or more generally, the success of colonialism, often required local collaborators (Tarling, 1989).

3.11. Metropolitan and Peripheral Knowledge

During the early days of colonialism, it was common for colonial administrators to assume that native society possessed less reliable knowledge about others, themselves, and their social and natural environments. However, there were surprises. For instance, a short piece of news recorded the adept knowledge of Malays about the malaria-causing mosquitoes. It was reported that:

The Malays in the Klang District recognise four species of mosquito The fourth, they hold gives people fever, and they regard it as venomous – 'bisa'. They describe it as standing on its head and raising its legs in the air whilst in the act of sucking the blood, which is known to be the habit of

anopheles [T]hey seem to have held the theory of Malaria being mosquito-borne long before the white man struck upon it. They speak of it as quite an ordinary affair and agree that if the mosquito larvae could be destroyed there would be no more mosquitoes to give people jungle fever (*Malay Mail*, August 20, 1900, p. 3)

In other words, modern medical knowledge did not arrive in a land of *terra incognita*. Modern medical knowledge entered the scene of a colonial society which had long speculated on the cause and practiced the cure of diseases for centuries. Through experience and trial and error, a substantial corpus of valid traditional knowledge had been gathered, providing answers to numerous tropical diseases. What modern medicine achieved that traditional knowledge could not, was the ability to methodologically and scientifically determine and screen out false assumptions about diseases.

Many colonial administrators were pragmatists. Often, effective traditional knowledge was adopted and shuffled from one colonial location to another. For instance, a method of fighting cocoanut tree beetles was transposed from the Malabar Coast in India to Malaya, and no question was asked about its origin and status. As evident from the Selangor Government Gazette:

District Officers are instructed to use their influence with the native owners of cocoanut plantations in order to induce them to clean their trees periodically and rid them of beetles. The palms should be ascended once every month or six weeks. The lowest leaves, if showing signs of drying up, should be chopped off and the trunk cleared of any old leaf-stumps and of ants'-nests, etc., which the latter may have harboured. At the same time the top shoots should be carefully examined. If they are of a yellowish, sickly colours, the beetle is probably the cause. There is no difficulty in finding the hole, as an accumulation of short, lose fibre marks the spot. This fibre should be removed and a wooden or metal probe pushed into the hole (one of the side ribs separated from a frond will answer the purpose.) The beetle is soon transfixed and pulled out. A little sand should be thrown into the hole The method was a system used on the Malabar Coast (*Selangor Government Gazette* Vol. 1, no. 18, September 5, 1890, p. 462)

The studies of tropical diseases in the colonial peripheries often had unexpected impacts on the colonial metropolis. As astutely observed by Freemantle (1911: 349), Patrick Manson's study of elephantiasis and Ronald Ross' study of malaria brought to England the idea that flies, fleas, ticks, and other insects were effective carriers of infectious diseases that needed to be paid attention to by the public health authorities. Recent scholarship has also shed new light on the intense interaction between colonial peripheries and the metropolis in scientific knowledge production (Drayton, 2000; Raj, 2006).

3.12. Summary and Conclusion

Modern science manifests itself both physically and culturally. Physically, modern science displays its efficacy in countless technological feats such as skyscrapers, bullet trains, weaponry, and ever-changing technological gadgets. Culturally, modern science is a symbol of truth, and is often associated with progress and advanced civilization. As a cultural entity modern science comes with its own values, ideas, and worldviews that are widely endorsed in modern societies.

As a result, the impact of modern medicine in Malaya can be understood from these two aspects. As a physical remedy, modern medicine contributed to the improvement of the native population's health while facilitating the success of the colonial economy. And as a cultural entity, modern medicine elevated the status of colonial administrators. In both physical and cultural dimensions, modern medicine afforded additional legitimacy to British rule.

However, to view modern medicine merely as an instrument of colonial rule gives an impression that science was merely a passive tool of subjugation in the hands of colonialists, and obscures us from discerning that the colonialists were also subjected to the overriding cultural authority of science. In this regard, modern science enjoyed a relatively independent existence beyond narrow scopes of nation and racial categories. This was instanced by the presence of a semblance of the “Republic of Science,” where scientists from different nations and ethnic groups worked together in each other’s laboratories and shared scientific discoveries. The independency of modern science also allowed for a critique of colonialism without having to sacrifice the learning of modern science that was brought along with the process of colonization in Malaya.

Chapter 4: Modern Scientific Research in Malaya: The Institute for Medical Research

... a great many rubber planters – both companies and private individuals – are doing all they can in the way of providing good water, comfortable houses, hospital accommodation, skilled medical treatment and nursing ... but the ability to do this with success and to cope with Tropical diseases, is largely due to the patient study and research which the London School has been prosecuting for the past twelve years.

Malay Mail, Dec 21, 1912, p. 5.

4.1. Introduction

As discussed in the last chapter, modern medicine was introduced to Malaya along with the process of colonial economic extraction. It manifested both as physiological remedy and cultural symbol of progress. In either capacity, it provided legitimacy to colonial rule. In this chapter, the establishment of the Institute for Medical Research will be investigated to understand the social and economic context of the formation of this institute, and it will be shown how new knowledge of medicine, specifically the germ theory of disease, played an important part.

Scientific institutions, like other social institutions, carried with them the aspirations, culture, and values that were reflective of the scientists and administrators who ran the institutions. In the case of the Pasteur Institute, the overt embodiment of French national interests, and to a lesser degree, French culture, in the institute spoke to the intricate relationships between science, culture, and nationhood (Moulin, 1992).

While external social factors often dictated scientific research priorities and drove scientific developments, the internal dynamic of scientific knowledge also contributed to the development of science by opening up new research fields and interests. The establishment of the Institute for Medical Research in Malaya was a case in point. Its formation was a result of a convergence of social and economic factors and the emerging germ theory of disease at the turn of the 20th century.

As the new germ theory of disease spurred high hopes and attracted new resources into its further development, the theory also stole the limelight from other rival theories and in the case of beri-beri research, diverted attention and resources from the correct deficiency theory of beri-beri disease. Whether this distraction had actually delayed the understanding of the etiology of beri-beri disease is open to contention, but the role of scientific theory in determining research direction as well as social actions, is not in question.

4.2. Colonial Research Laboratories

One major branch of scientific activity that defines the intensity of scientific culture and aptitude is scientific research. While the teaching and learning of scientific knowledge signals one's interest in the knowledge, the establishment of a scientific research institute often requires far greater commitment and often symbolizes the aspiration for independent knowledge production.

In Malaya, the establishment of scientific research institutes, such as the Institute for Medical Research, was fast tracked. These research institutes were established as scientific knowledge was being introduced and applied to Malayan society. The rapid formation of a research institute in Malaya by British colonial administrators was not surprising given the tendency of colonial administrators to view colonies as part of the greater British Empire. In this outlook, a research institute established in a colony was only “another” laboratory, among the many that existed both inside and outside the colonial metropolis.

As discussed earlier, the incentive to establish a scientific research institute was crucial for both economic reasons and cultural pride. In appealing for research funding for the London School of Tropical Medicine from the business community, Mr. Beealey, who visited Manchester on behalf of the city of London’s fundraising committee, said:

[I]n the vast tropical possessions which the British Empire has acquired the great business concerns that might be carried on, otherwise, are made impossible because of the prevalence of tropical diseases The London School both cured cases of diseases at its London Hospital and trained medical men to go out as medical officers to tropical parts ... while the first course [cured cases of disease in London] was good, it was better to send out men to kill disease in its home and keep it off the trade routes.... The school had already trained 1,200 medical men. What was wanted, above all, was the endowment of research. The London School would do much better work with more money. The effect of work that had already been done in tropical diseases was that in 27 years the death-rate of European official in the tropics had dropped from 90 to 18 a thousand (*Times of Malaya*, July 11, 1913, p. 4).

It was obvious that scientific research, like other social enterprises, was closely woven into the web of British colonial interests both at home and abroad. Social interests were brought into the laboratory and laboratory results were communicated at social functions to further scientific pursuit.

4.3. The Institute for Medical Research

The Institute for Medical Research was established in 1900 specifically to address the problem of beri-beri and malaria diseases in Malaya at a time when the germ theory of disease was increasingly becoming popular (Gest, 2003). Prior to the germ theory, miasma theory was the received wisdom of the day. According to miasma theory, diseases, especially in tropical areas, were due to the warm and humid environment, which released putrid and poisonous gases to the environment. In fact, the etymology of the word “malaria” is “mal-air”, or bad air, as reported in a newspaper in Malaya:

At the present time a stern warfare is being waged against that terribly fatal and widely spread disease known by the name of Malaria. The name malaria comes from the Italian “Mala aria,” i.e. “bad air,” and up till a few years ago it was generally considered that it was due to a poison generated by damp soil and rank vegetation under a hot sun (*Malay Mail*, April 9, 1902, p. 3).

The tropical climate was believed to have a deleterious effect on the health of expatriates. Arnold argues that this understanding of the tropical environment was in line with the broader depiction of the tropics as a primitive and dangerous place in contrast to the safe and sanitized temperate world in Europe (Arnold, 1988: 7). Prolonged exposure of Europeans to a tropical climate without reprieve would cause

... a gradually increasing lassitude and incapacity for active and energetic work or recreation, this is almost invariably remedied by a change of air and surroundings ... but should, from one reason or other, the required change be unobtainable, the want of tone is apt to go on to a kind of melancholic state, which is most difficult to treat ... not only taking away all pleasure from the life of the individual suffering from it, but totally unfitting him for intelligent work of any sort (*Malay Mail*, Aug 13, 1897, p. 3).

To temper the ill effects of the tropical environment, European expatriates were provided leave to recuperate in the temperate environments of high hills or in Europe every several years of postings in tropical colonies. It was suggested that

In dealing with the subject of leave for European Officers of the Government, the State Surgeon advocates eight months' leave for four years' service. This would enable an officer to get a colder climate for a sufficient length of time to build up his health, and would come frequently enough to prevent him from being to a great extent broken down in health before he got his leave (*Malay Mail*, 19 August 1898, p. 2).

The understanding that diseases were environment-bound gave rise to a passive, if not defeatist, attitude towards tropical diseases. As long as miasmatic theory held sway, little could be done except to provide temperate leave to expatriates. However, with the rise of the germ theory of disease, miasma theory slowly lost its shine, paving the way for a more active engagement with tropical diseases, and giving rise to the establishment of medical research institutions such as the London School of Tropical Medicine in England and the Institute for Medical Research in Malaya.

The formation of the Institute for Medical Research was also part of the larger effort to build research laboratories in different British colonies in collaboration with the London School of Tropical Medicine. Malaya and West Africa were two favorite locations identified at that time for the establishment of medical laboratories and the study of tropical diseases. Besides, like the formation of the London School, the founding of the Institute for Medical Research was justified on the grounds that it would alleviate the morbid labor conditions in Malaya, and increase the efficiency of economic extraction. Finally, the formation of the Institute for Medical Research relied heavily on the enthusiasm of several individuals, especially Patrick Manson, who was often called

the “Father of Tropical Medicine” (Haynes, 2001). Dr. Manson, however, could not have pulled the project off without the unwavering support of the Secretary of State for Colonies, Joseph Chamberlain, who was a leading proponent of the policy of “constructive imperialism,” which demanded active intervention of the imperial state in the economic development of colonies (ibid.: 10). In Malaya, High Commissioner Frank Swettenham was a staunch supporter of the project.

The Institute for Medical Research was to forge a symbiotic relationship with the London School of Tropical Medicine. The latter was perceived to be the parent institution from which the Director of the Institute for Medical Research was to be appointed. It was hoped that the Director, upon the completion of his posting in Malaya, would return to London with a new understanding of tropical diseases. As reported in the Reports on the Federal Malay States for 1901,

Dr. Hamilton Wright, the very able Director [Institute for Medical Research], has now succeeded in completing its organization and equipment, with the result that Sir Francis Lovell, who visited Kuala Lumpur on his tour in the East in connection with obtaining support for the London School of Tropical Medicine, was compelled to express his admiration of the establishment [Institute for Medical Research] and to pronounce it to be the best equipped British institute of the kind in Asia, not excluding British India.

Proposals for affiliating the institute with the London school are under discussion, and if carried into effect will be to the advantage of both. The London school, it is hoped, will periodically supply a skilled Director, his salary being paid by the Federated Malay States, who would return to his post in London with the added experience of tropical diseases gained locally, without cost to the parent school, in “an unrivalled field for research” (Reports on the Federal Malay States for 1901, p. 23).

The Institute for Medical Research soon became a centre of medical research excellence. It was in this research institute that the prolonged mystery of beri-beri disease was resolved. With this success, one of the most deadly diseases in colonial Malaya was brought under control. The feat in decoding the puzzle of beri-beri disease motivated Casimir Funk in Europe, who then tried to identify the missing nutrient that caused beri-beri disease. He successfully isolated the responsible chemical compound that he named *vital amines*; or Vitamin B as we know it today (Funk, 1922). The words *vital amines* were later used to denote all vitamins. Today, the Institute for Medical Research remains a prominent medical research center in Malaysia and continues to provide medical research leadership on a wide range of topics, including the more recent genetic research of diseases (Jegathesan, 1992).

4.4. Tin Mining, Beri-Beri, and the Miasmatic Theory of Disease in British Malaya

The medical scene during the first half of the 19th century was dominated by the miasmatic theory of disease. The miasma theory explained disease as being fomented by an unsanitary environment that produced disease-causing foul air. In this view, disease was air borne, and a healthy person might be infected through the inhalation of unclean air. This understanding informed the contagious – anti-contagious debate in England, in which the latter argued for the relaxation of quarantine measures that impinged upon the liberty of individuals. For the anti-contagion faction, quarantine measures did not serve their purpose since diseases could easily break the man-made quarantine barrier and spread through the air (Worboys, 2000: 38-39).

In Malaya, the miasmatic theory went down well with the observations on the ground. For instance, it was realized that outbreaks of diseases often accompanied the opening of jungle, and incidents of disease subsided over time. The opening of the jungle was said to cause the release of poisonous gas, which “when set free, may be perfectly innocuous when expended in the normal channel of growth and sustenance of health and abundant vegetation” (Selangor Government Gazette no. 7, Vol. VI, 28th March 1895, p. 116). As reported in the Selangor Government Gazette,

It has been found that both in the opening up of estates and laying down of railways, that most disastrous results have immediately followed the felling of virgin forest and opening up the earthworks. The history of the railways and estates in Selangor and other States has shewn (sic) this very clearly. The death-rate among several gangs of Tamil coolies on the Sungei Ujong line rose to as much as 20% per annum, and on several parts of the Kuala Kubu extension of the Selangor Railway work was seriously impeded.... [T]he health of the coolies has been excellent. The opening of the Batu Caves Coffee Estate was followed by very serious and continuous sickness among the coolies, the death-rate improving steadily from year to year, until, at the present time, the estate having been opened for several years, the health of the coolies is excellent. (Selangor Government Gazette no. 7, Vol. VI, 28th March 1895, p. 115).

This, coupled with the lack of hospitals in the vicinity of mining centers, escalated the morbid condition and mortality rate of tin mine workers. Although efforts were being made to bring sick workers from tin mines to a Pauper Hospital, the admission of patients at the terminal stage of their illness did little to alleviate the situation. As indicated in the following report,

Most of the coolies attacked do not come directly into hospital but wander about the mining villages in search of native treatment until, given up by their own countrymen, they are brought to hospital in a very weak and sometimes hopeless state.

In October four ambulances carts began to make daily trips to the mines, picking up cases of sickness and bringing them to the Pauper Hospital. These carts invariably return to the hospital crowded with patients in an advanced stage of disease, many of whom die shortly after admission into hospital. The number of admission and death-rate from beri-beri in the Pauper Hospital increased almost immediately after these carts began to make their daily rounds (Selangor Government Gazette no. 7, Vol. VI, 28th March 1895, p. 116).

In the absence of other medical evidence, the miasmatic theory continued to dominate the medical scene. It was not until the final years of nineteenth century that the germ theory of disease made inroads into tropical medical research and gradually replaced the miasmatic theory. While poisonous gases continued to be suggested as a major source of tropical diseases, ideas of conducting research with microscopes began to surface. As the microscope was mainly used to observe microbial germs, the suggestion to use it indicated the increasing presence of the germ theory of disease in the minds of colonial doctors and administrators. This is evident in the following report:

That [disease], as shewn (sic) by its apparent connection with newly opened districts, it is closely allied to other diseases of a malarial nature dependent for their origin on an earthborn poison generated in the soil, has, as far as its manifestation in Selangor is concerned, been ... established beyond a doubt In the absence of sufficient time and proper appliances for careful microscopical research, little has been added to our scientific knowledge of beri-beri during the year (Selangor Government Gazette no. 7, Vol. VI, 28th March 1895, p. 116)

With increasing evidence and popularity of the germ theory of disease, the miasma theory completely lost its ground by the first decade of 20th century. It was reported in a newspaper that

... the tropics are no longer haunted by the spectre of lethal miasma brooding over the death dealing swamps which we now know for the nurseries of

mosquitoes. With the poisonous mist, which might even, it was believed be suddenly liberated by the process of digging, nothing could be done, so that the tropics easily earned their dark reputation as the White Man's Grave, which, however appropriate it may have been a hundred years ago, is losing the last of its significance (*Times of Malaya*, May 6, 1912, p. 4).

The exit of the miasma theory of disease in tropics signalled the coming of age of the germ theory of disease. With the new theory, the battle over tropical diseases took on a new fervour in colonial laboratories. The passive and sometimes fatalistic attitude was replaced by the passionate pursuit of disease-causing bacteria.

4.5. The Germ Theory of Disease vs. Spontaneous Theory

Prior to the prevalence of the germ theory, spontaneous generation was the dominant theory of physiological decay in Europe. In the early 19th century, the general observation was that diseases, either parasitic or infectious, tended to be limited to specific geographical locations. There was little evidence to suggest contraction of disease from external sources. As a result, it was assumed that disease was generated spontaneously in the sick body (Farley, 1997: 34-36).

However, the recognition of the presence of an intermediate phase in the life cycle of animals and insects, and the realization that some of the stages of the life cycle took place in the host animal, gave rise to the idea that disease might be transmitted from one place to another, and was contagious. One area where contagion theory eventually proved effective was in the research of malaria disease. In this respect, Patrick Manson, the "Father of Tropical Medicine," was credited with his observation of the presence of the filarial nematode worm, which was picked up by a mosquito and metamorphosed in the mosquito's stomach into an adult nematode. However, the idea of vector hosts escaped

him, and he continued to hold that human infection happened through the consumption of food containing a nematode. Manson believed that nematodes were released to the environment when a mosquito died, and infection occurred if the contaminated water or food was consumed. It was Ronald Ross who discovered the transmission of malarial parasites from mosquito to human blood during the process of blood sucking by the mosquito. As a result, it was realized that the malarial parasite could be transmitted not only by ingestion, but also by inoculation (Farley, 1997: 37-40).

The understanding that disease was a result of intrusion by foreign germs challenged the spontaneous generation theory. In due time, this view of disease causation was to dominate the medical scene, and paved the way for the spread of the germ theory of disease. The germ theory was inconceivable without the idea of “infection,” i.e. the introduction of germs from a sick body to a healthy body causing the latter to fall sick.

4.6. The Germ Theory of Disease and the Establishment of the Tropical Medical Research Institutes

Pasteur’s success in vaccinating a victim against rabies on July 6, 1885 signaled the beginning of the bacteriological age (Gest, 2003). The bacterial knowledge of disease causation soon spread to Britain. The arrival of the “bacteriological era” in British public health was marked by the adoption of the diphtheria antitoxin. At that time, previous preventive measures failed to contain diphtheria. The control of diphtheria was achieved through efforts of intensive laboratory analyses that led to the eventual successful production of the diphtheria antitoxin. One spin off of the diphtheria epidemic was the establishment of countless laboratories both for the purposes of diagnosis of the disease and the production of antitoxin. It was during that time that the British Institute of

Preventive Medicine (BIPM) was established to explore bacteriological research in Britain. By the mid-1890s, bacterial germ theories of disease had become the dominant theories that were used by medical practitioners in Britain (Worboys, 2000: 237-275).

European empires' experiences with tropical diseases had not been easy. In fact, the atrocious malaria disease, which was initially wrongly determined as an infectious disease, was so devastating to European expatriates in West African regions that West Africa was often dubbed the "White Man's grave" (Curtin, 1990). However, the discovery of germs as disease-causing agents, and the confidence that came from prior experiences of curing these diseases, gave extra conviction and optimism to colonial administrators of the possibility of colonizing disease-stricken tropics. Patrick Manson once said:

I now firmly believe in the possibility of tropical colonisation by the white races. Heat and moisture are not in themselves the direct causes of any important tropical disease. The direct causes of 99% of these diseases are germs ... to kill them is simply a knowledge and the application of this knowledge ... (quoted in Johnston, 1898: 1169)

With this new found knowledge and confidence, Patrick Manson proposed to establish a medical school partly to provide training in tropical medicine to British doctors but ultimately to domesticate tropical diseases (Haynes, 2001). The London School of Tropical Medicine was eventually established in 1899. Armed with the new knowledge of bacteriology, the enthusiasm to study and combat tropical diseases was high and quickly spread to colonies. The Institute for Medical Research was established in Malaya in 1899 (IMR, 1950).

Prior to the widespread acceptance of the germ theory, disease prevention focused mainly on the cleanliness of the external environment, especially with respect to air quality. However, with the coming of age of the germ theory of disease, sickness prevention was increasingly geared towards understanding the etiology of diseases. Hardy (2003) has divided early preventive medicine in Britain into three phases. Before 1865, preventive policies were concerned mainly with environmental cleanliness in order to reduce the exudation of poisonous gas. From 1865 to the mid-1890s, preventive medicine underwent a process of transformation that was informed by the changing conception of disease causation, from that of environment to germ. And after the mid-1890s, preventive medicine in Britain was informed by a new orthodoxy, i.e. bacteriology.

The understanding that diseases were caused by bacteria provided new hope for intervention. If tropical diseases were caused by tropical environmental conditions, as proposed by miasmatic theory, disease intervention was less conceivable since to alter the environment was much less practical. It was unsurprising that tropical research institutes began to flourish during the height of the bacteriological theory in the late 19th century, amid rising confidence in the ability to control tropical diseases through the etiological study of tropical diseases.

Of course the internal development of scientific knowledge alone would not have been able to bring about the London School of Tropical Medicine. In appealing for financial contribution from rubber planters in Federated Malay States for the London School of Tropical Medicine, the London City Sub-Committee for the Rubber Trade made the following statement:

No one can view with indifference the enormous annual wastage of human life, due to the ravages of Tropical diseases, and all connected with plantation rubber must recognise the duty of doing everything possible to improve the health conditions, but we desire to emphasise the fact that this appeal is made on business as well as humanitarian grounds. It may safely be said, that as the health conditions on these plantations improve, profits from Tropical industries, such as rubber, will increase. We recognise that a great many rubber planters – both companies and private individuals – are doing all they can in the way of providing good water, comfortable houses, hospital accommodation, skilled medical treatment and nursing, and are taking strong preventive measures in the way of special drainage and sanitation, but the ability to do this with success and to cope with Tropical diseases, is largely due to the patient study and research which the London School has been prosecuting for the past twelve years (*Malay Mail*, Dec 21, 1912, p. 5).

In short, the development and institutionalization of scientific knowledge was determined by both the internal dynamic of scientific knowledge development and the external resources that were available to carry out scientific activities. Neither factor by itself could provide sufficient explanation for the expansion of scientific knowledge locally or internationally.

4.7. The Institute for Medical Research – Social and Economic Factors at Work

The advent of the germ theory of disease, while it accentuated laboratory research, did not itself constitute a sufficient factor in spurring the establishment of the Institute for Medical Research in Malaya. The formation of the Institute for Medical Research in Malaya had to rely on a combination of factors such as political will, economic justification, and enthusiasm of individual administrators both at the centre and periphery of the British empire. This was especially critical given the fact that it was not uncommon for scientific research to be conducted away from the scene of the disease. Thus the establishment of medical laboratories outside the metropolis required additional

justification. For instance, the formation of the London School of Tropical Medicine was objected to by the President of the Royal College of Physicians in 1898, for he saw no difference between tropical disease and temperate illness:

“[T]he study of tropical disease is not so entirely distinct from the study of disease generally as Dr. Manson ... might lead one to think. The methods of investigation, carried on in the pathological laboratories of every properly organized medical school for detecting morbid conditions of the blood are identically the same, though not quite the same stains are used” (quoted in Manson-Bahr and Alcock, 1927:215).

However, the growing importance of tropical colonies to the British empire, the need to train doctors with specific knowledge of tropical diseases, the newly found confidence that grew out of the germ theory of disease, and the relentless lobbying by Patrick Manson coupled with the unwavering support of Joseph Chamberlain converged and precipitated the formation of the London School of Tropical Medicine in Britain. In addition, the change of colonial policy with the appointment of Joseph Chamberlain as the new Secretary of the State for the Colonies saw a change from a *laissez faire* approach in the colonies to “constructive imperialism.” Under Chamberlain’s leadership, Britain intervened actively, including the setting up of research laboratories in its colonies for greater political control and economic extraction (Worboys, 1976: 83-84).

The Institute for Medical Research was not the first medical institute that has been established in European colonies. Prior to that, the French had its Saigon Institute in Indo-China (1889). Subsequently, medical research centers had been established in Bandoeng (1891), Tunisia (1893), Nahrang (Indo-China, 1895), and Bombay (1896) (IMR 1950:37). The establishment of a string of medical institutions in colonies shows

that the success of Pasteur Institute in France was quickly emulated in tropical colonies of European empires.

To some extent, the establishment of British medical research institutes took its cue from the French success in erecting Pasteur institutes in France and other French colonies. In Malaya, as in other places, the reputed Pasteur Institute provided inspiration for other European empires to establish medical research institutes of their own. In fact, the idea of a research institute was so common and popular that a reader in Malaya wrote to *Malay Mail* and asked “Shall we have a Pasteur Institute?” (*Malay Mail*, April 1, 1897, p. 3). Another reader, very likely a medical doctor who claimed to have served in Selangor, and nicknamed himself as “Antitoxin,” suggested that it was not just a Pasteur Institute that was needed but a larger “Institute of Preventive Medicine with a Pasteur Department” (*Malay Mail*, April 12, 1897, p. 3). “Antitoxin” drew his idea from “recent strides which have been made in Bacteriology in general.”

One of the ardent supporters of the idea of establishing a medical research institute in Malaya was Frank Swettenham, who was the Residential General of the Federated Malay States. In supporting the establishment of the IMR, he had the following to say:

These States have prospered exceedingly and I cannot imagine any better use to which some of our means may be devoted than a scientific and sustained research into the causes and if possible the means of preventing and curing such scourges as beri-beri and all forms of malarial fever ... I am so satisfied that we are neglecting our opportunities that I have recommended the establishment of a pathological institute to be placed under the direction of a medical man who has been specially trained for the work under one of the great pathologists. Such an institution would be of the greatest use to our surgeons, and, in the hands of a capable man, might prove of incalculable benefit to humanity (IMR, 1950: 37-38).

The promotion of modern medical service and research often took into consideration both humanitarian and economic needs. While some authors tended to emphasize the humanitarian aspect to promote “moral and material well-being of native populations” (IMR 1950: 37), others pointed to the repeated need to tie medical investment with economic return. For instance, at a dinner of the Seamen’s Hospital Society, Lord Landsdowne, as Secretary of State for War, said that “of all the enemies the British soldier had to encounter, tropical diseases were the most formidable” (Fremantle, 1911: 331). Equally important, the cure of disease was also a saving for the British coffer. In Malaya, the increase in the admissions of beri-beri patients to hospitals corresponded to the drop in tin production from 1894 to 1898, signaling the importance of labor health to mine production (Daniels, 1906: 44-45).

In the Report of the Advisory Committee for the Tropical Diseases Research Fund for 1910, Ronald Ross remarked,

It seems to me best to approach the prevention of disease, not so much from its humanitarian as from the economic point of view. Disease always causes a large expenditure of moneyThe prevention of disease should be looked on economically as insurance against the useless expenditure caused by such maladies (Fremantel, 1911: 347).

The Institute for Medical Research in Malaya was also an offshoot of the London School of Tropical Medicine. The idea was to have laboratories in different colonies tackle diseases locally, while the London School of Tropical Medicine served as the parent institution. The Institute for Medical Research was among the few centers established in British colonies (Jegathesan, 1992).

Although empires competed with each other, there were areas where empires could find mutual benefits and forged temporary alliances. In addition, there were also areas that were less political and could easily allow for cooperation between rival empires. The exchange of scientists and scientific knowledge and expertise, for instance, took place as the French and British guarded each other in areas of economic pursuit (Delaye, 2004). The cooperation involved disease treatment and sharing of scientific expertise through personnel exchange.

In Malaya, prior to the establishment of the Institute for Medical Research, patients who needed extra care and examination were sent to the Pasteur Institute in Saigon for observation and treatment. However, for reasons of convenience and cost saving, suggestions of having an institute of its own in Malaya soon emerged, as remarked by Dr. Travers:

The treatment by inoculation discovered by Mr. Pasteur is an extremely simple one and it is to be regretted that with a large and competent staff of medical men in the Straits Settlements and the Native States it should be necessary to go to Saigon or Batavia An institute could be established in connection with a hospital in some central place at a very small cost, which could be shared by the various settlements (Annual Report for Selangor, 1895, quoted in Segaran, 1982: 229).

The idea of having a research institute similar to the Pasteur Institute was echoed by the Selangor Resident, who hoped the delay in treatment and traveling expense could be done away with. His enthusiasm was supported by the High Commissioner of the Federated Malay States who, while presenting \$500 to the Pasteur Institute as “a mark of gratitude for their useful services,” also hoped that “ere long a similar institute will be established in one of the states” (quoted in Segaran, 1982: 229).

When the Institute for Medical Research was finally built, it was a welcomed development that was considered to be vital to the health of medical institutions in the British colony:

It is needless, in the present day, to refer to the practical value of a scientific institution such as this, engaged in enquiries on the obscure causes of disease with the hope of bringing within reach of curative treatment maladies that have hitherto defied treatment. Such institutions are now considered a necessary part of ordinary medical administration.

Kuala Lumpur, centrally placed as regards the Federated Malay States and the Straits Settlements, is admirably situated for the purpose, and the new department should in no long time render us independent of the Saigon Institute (Reports on the Federated Malay States for 1900, p. 20-21).

Even though there was mild rivalry between scientific institutions of different colonial empires, scientists nevertheless cooperated in research. When the Institute for Medical research was established, scientists from the Pasteur Institute of Saigon visited and conducted research:

Among other independent workers who made use of the institute was M. Carogeau, a member of the Pasteur Institute, Saigon, deputed by that institute to study veterinary pathology One , and a somewhat startling, result of his investigations was the announcement that the disease which intermittently devastates the herds of buffaloes and kine, and which we have hitherto termed rinderpest, is septicaemia haemorrhagica (Reports on the Federated Malay States for 1901, p. 23).

The Institute for Medical Research also served as a meeting place for doctors and researchers from around the world to conduct and exchange research experience, practicing what we today call the “Republic of Science” where scientists shared selflessly their ideas and efforts (Polanyi, 1962). In 1904, the Director of IMR reported that:

Dr. G. L. Tuck, Travelling Scholar, Emmanuel College, Cambridge, worked at the Institute during the greater part of the year and performed valuable work in connection with the blood worms of cattle, the mycology of the mouth and beri-beri. Dr. Finlayson, Municipal Bacteriologist, Singapore, engaged in co-operation with Dr. Daniels in a study of the Ampang water supply and the working of the water supply in Singapore and the Federated Malay States (Federated Malay States Annual Report for 1904, p. 16).

The establishment of the Institute for Medical Research came on the heels of the formation of the London School of Tropical Medicine. Both institutions were formed at a time when laboratory research of the etiology of tropical diseases enjoyed wide legitimacy. This legitimacy was contributed by the creditability of the germ theory of disease which rose to prominence in the last two decades of 19th century. When the idea was first mooted, enthusiastic supports from personnel at the highest level of colonial administration such as Secretary of the State for the Colonies, Joseph Chamberlain, and Colonial Medical Advisor Patrick Manson, were crucial. Relentless pursuit at the colony by Residential General Frank Swettenham was equally significant. In addition, the success of these institutions also needed to be measured in terms of their attractive financial return. These factors taken together contributed to the formation of medical research institutions both at the colonial centre and periphery.

4.8. Germ Theory and the Search for the Etiology of Beri-Beri Disease

One of the most significant achievements of the Institute for Medical Research was solving the puzzle of beri-beri disease. During the late 19th century and early 20th century, beri-beri was one of the most deadly diseases crippling the tin mining coolies in Malaya. In Selangor, it continued to rank first in causing the largest number of

admissions to hospital and the greatest number of deaths (Selangor Government Gazette no. 7, Vol. VI, 28th March 1895, p. 116). A lack of knowledge and cure left medical officers in a helpless and hapless position trying to speculate the reasons behind the unusually high mortality rate. At a Chinese hospital at Bentong:

... 365 patients were treated with 273 deaths. Three hundred and sixty of these were Chinese coolies, the remainder being Tamils. The health of the sinkhehs, or newly imported coolies, at Bentong, was exceedingly bad. The younger Chinese immigrants generally succumbed to beri-beri, of a severe type, after three months' exposure in this locality. Although due allowance may be made for exceptional circumstances, such as poor physique, want of acclimatisation, traditional belief in Chinese medicine, etc., the death-rate was very high in the "Toong Shoon" hospital. It was 74.7 per cent. for death due to all causes (Pahang Medical Report for 1900, in The Pahang Government Gazette, Monday, 1st July, 1901, p. 15).

The outbreak of beri-beri disease in British Malaya happened mainly among immigrant Chinese workers. The disease was caused by Vitamin B deficiency, and vitamin B was largely deposited in rice hulls. With the advent of rice milling technology, vitamin B was removed during the milling process that separated the rice hulls from the rice kernel. The processed rice, deficient in Vitamin B, was called polished rice. Failing to realize the potential harm of polished rice, immigrant workers quickly fell prey to beri-beri disease.

Prior to its outbreaks in British Malaya, beri-beri had been recorded in various places, and studied in Japan. The disease, known as Kakké, was studied by a naval surgeon Takaki Kanehiro who, by modifying the diet of Japanese cadets on the ship according to European standards, correctly identified the cause of the disease as malnutrition (Carpenter, 2000:10-13). Some early reviews of the disease, such as the one by Le Roy de Méricourt in 1868, had also concluded beri-beri, like scurvy, is due to

dietary deficiency. However, Takaki's argument was quickly dismissed by a strong number of academics when they were asked to evaluate Takaki's achievements by the government for the conferment of an honor to Takaki. The suppression of Takaki's theory, and subsequent promotion of bacteriology theory by Ōgata Masanori, who was one of the evaluators of Takaki, diverted attention away from the deficiency theory to the infectious theory of beri-beri disease. The successful promotion of infectious theory, which led to extensive bacteriological research in laboratories, engendered the transition of hospital medicine to laboratory medicine (Oberländer, 2005).

In the late 19th century, there were four main theories explaining beri-beri (Wylie, 1988: 94). The first explained the disease in terms of physical agency; the second took it as being caused by poison; the third, the most accepted explanation at that time, held that beri-beri was an infectious disease caused by a micro-organism. The last theory, which in hindsight was the correct one, held that beri-beri was caused by nutritional deficiency.

The debate revolved around the etiology of beri-beri disease and in many ways exemplified the tenacity of popular scientific paradigm in the face of counter evidence. In this regard, Kuhn (1962), in his analysis of scientific revolution, argues that the acceptance of scientific knowledge was not determined by scientific facts per se, but consensus on the admittance of this scientific evidence by the scientific community at large. In the search for the cause of beri-beri disease, the evidence that favored deficiency theory was often ignored, partly because of the popularity of the germ theory of disease. While the actual cause of beri-beri disease eventually saw the light of the day, the germ theory of disease distracted many researchers, causing delay in the identification of the cause of the disease (Williams, 1961).

On the bright side, some researchers suggest that the germ theory of disease had actually done a service to the study of beri-beri disease. Cartell (1977: 124), for instance, contends that it was the prevalent germ theory of disease, although misplaced, that put beri-beri disease into the limelight. However, whether beri-beri caught the attention of the medical profession, and colonial administrators, often was determined by social economic urgency. In the case of Malaya, the search for a beri-beri cure became a priority due to the crippling effect of the disease on migrant workers, which in turn obstructed colonial economic extraction. The urgency to find a solution to beri-beri disease might have drawn researchers to bring germ theory to bear upon the disease. However, the attention nevertheless was negative in that it diverted attention from the deficiency theory of beri-beri disease. This was admitted by some of the doctors who had worked at the Institute for Medical Research:

Most of us were at that time obsessed with the possibilities of microbiology and the ambition to discover a new living organism to explain the cause of beri-beri Herein perhaps lay the reason for the failure of early workers like Hamilton Wright and Daniels (IMR, 1950: 46).

The germ theory of disease gained favor with the identification of minuscule living units that could only be seen through a microscope. This was achieved by the French chemist Louis Pasteur. Soon microbial research became “the center and goal of medical investigation” (Castiglioni, 1947: 809). It was amid this bacteriological hype that Cornelis Pekelharing was sent to Dutch colonies in the East Indies (Indonesia), after studying bacteriology in Berlin with Robert Koch, to investigate the beri-beri outbreaks. Together with his assistant, Winkler, he wrote:

Beriberi has been attributed to insufficient nourishment and to misery: but the destruction of the peripheral nervous system on such a large scale is not caused by hunger or grief. The true cause must be something coming from outside, but is it a poison or infection? (Pekelharing and Winkler, 1888: i, quoted in Carpenter, 2000: 33).

This signals the beginning of the diversion of deficiency theory to theories that considered the intrusion of external agents, either poisonous substances or bacteria. Eijkman, who took over after Pekelharing retired, launched several attempts to test the infectious theory but with no success. He later by chance realized the link between rice and beri-beri disease. The connection of rice to beri-beri disease came to light in one occasion where the usual rice supply to experimental chickens was replaced accidentally by a new cook with military rice, and caused beri-beri disease in chickens. However, Eijkman continued to hold that cooked military rice contained a kind of organism that caused beri-beri (Carpenter, 2000: 38-39).

It was in Malaya that the final victory of deficiency theory was given by Fraser and Stanton in what came to be known as the Durian Tipus experiment (IMR 1950: 104-112). In this experiment, a group of Javanese laborers engaged in road construction in a remote area of Negeri Sembilan were chosen by the researchers as experimental subjects. As the main rival theory of disease was infective theory, a location that had no prior incident of beri-beri was selected. The remote experimental location also ensured no experimental subject would have access to outside foods. The experiment was conducted in a controlled environment where external influences could be contained and the effects of the experiment could be easily attributed to stimulations administered.

All laborers were inspected to ensure they were not beri-beri patients. The three hundred laborers were divided into two groups. One group was stationed at Kuala Ayer

Baning; the other was stationed at Durian Tipus. Initially, all subjects were fed parboiled rice. However, after about a month, those at Durian Tipus were issued with white rice. After about three months, the first case of beri-beri was detected in the Durian Tipus group. More cases were detected as time passed. Conversely, no beri-beri cases occurred in the other group that was fed parboiled rice. And when the Durian Tipus group was reverted to parboiled rice, the outbreak of disease stopped and beri-beri patients recovered from the disease.

From this observation, Fraser and Stanton concluded that the causative agent of beri-beri disease was white rice, and it took 87 days for the symptom of the first case to appear. And the contact between subjects from the white rice group and the parboiled rice group did not incur infection to the latter, thus refuting the infective theory in beri-beri disease. In 1910, a meeting of the Far Eastern Association of Tropical Medicine accepted that there was sufficient evidence to support the association between beri-beri and the consumption of white (polished) rice (Cartel 1977: 130).

4.9. Summary and Conclusion

Constructivist analysis of scientific research often leads us to the hidden influence of social, economic, and political interests. In the case of the establishment of the Institute for Medical Research, one could easily trace the motivation to economic needs and the political will of several key individuals such as Joseph Chamberlain, Patrick Manson, and Frank Swettenham. This chapter, however, goes a step further to argue that the coming of age of the germ theory of disease afforded additional impetus for the research institute to be established in Malaya at the turn of 20th century.

Science, in this regard, was shaped by, and was shaping, society. Scientific progress in many instances was a result of the combined effect of internal disciplinary development of knowledge and external economic and political support that afforded the allocation of resources to scientific research. The germ theory of disease contributed to the mushrooming of research laboratories both in England and British colonies. The establishment of the London School of Tropical Medicine, and subsequently the Institute for Medical Research in Malaya, would not have happened if the miasmatic theory of disease continued to hold sway. The miasmatic theory attributed disease causation to the putrid air of the tropical environment. Since to change the environment was not practical, the remedy was to provide expatriates brief respite in temperate environments periodically by either returning to England or visiting hill stations locally. The maturation of the germ theory of disease opened up a new opportunity in which disease could be addressed directly by restricting and eliminating disease causing microbes.

To understand the formation of the Institute of Medical Research in British Malaya, one has to look not only within the confines of the social and economic conditions of British Malaya, especially with regards to the spread of diseases and their crippling effect on economic development, but also the wider context of the British empire. It is not a mere coincidence that the formation of the Institute for Medical Research came on the heels of the formation of the London School of Tropical Medicine. They were all part of the larger British agenda to enlist the service of the medical profession and medical knowledge to improve health conditions in colonies on economic and humanitarian grounds, and not to be left out, the pride of empire.

While the development of scientific knowledge, and institutions, in many instances follow the internal development of knowledge of science, the formation of a medical institute entailed a greater involvement of resources that required political commitment. This is especially true if it happened in a British colony like Malaya, which had neither the knowledge workers nor the ancillary/auxiliary facilities that could be capitalized upon. The rationale behind the establishment of the IMR, therefore, could be found within the larger social, cultural and economic context of the British Empire, and the broader function of modern medicine and public health in British Malaya.

Chapter 5: Disease, Modern Medicine, and Social Control

Therein is the difficulty, for if he [doctor] would perform his work well, he must keep himself in touch with the ever expanding science of his profession, and he must ever remain a student. The keen mind is apt to revolt at seeing golden opportunities to advance knowledge, and combat disease Yet he must ever remember, he is but one wheel among many in the administrative machine, the smooth working of which depends on the faithful performance by each of his daily round. If I might liken his science to the oil which is necessary for the running of the machine, then, I would say, happy is the man who neither overlubricates nor yet allows his engine to seize. But the greater fault is the latter.

Watson, 1907: 82

5.1. Introduction

This chapter follows from the ideas presented in the previous one in analyzing the ways modern science actively influenced its own, and society's, developments. The advent of the germ theory of disease, as has been shown, both directly and indirectly motivated the establishment of the Institute for Medical Research. Here, the analysis goes a step further to scrutinize the process of medicalization in Malaya in which one sees an increasing regimentation of society as a result of the advancement of medical knowledge.

The process of modernization gave rise to increasing rationalization of society. In this process, state control of individuals gradually moved away from the exercise of coercive state power to the use of persuasive power. With the advancement of scientific knowledge about "man" and society, more and more, social control was administered

through measures that targeted individual behaviours to encourage self-discipline of individuals.

In the medical field, Armstrong (1993) identifies four regimes of public health that developed in the past few centuries. These are quarantine, sanitary science, social medicine, and “new” public health. Briefly, the evolution of these regimes of health from quarantine to new public health coincided with the development of a new form of social control, from that of the exercise of sovereign power to disciplinary power. The former relies on the external coercive force of the sovereign while the latter hinges on internal self-discipline of individuals. The means of social control, in this understanding, evolves increasingly from the control of physical space to social-psychological space. The latter stresses the importance of individual behaviour, such as personal hygiene and social interactions. The changes from quarantine to “new” public health also witness the intensification of social control, implemented through social institutions such as education, health, penitentiaries, etc (Foucault, 1971; 1995) One of the unexpected, but logical outcomes of surveillance is the “the discovery of danger everywhere” (Armstrong, 1993: 407).

The process of rationalization resulted in the intensification of more minute and detailed state control of individuals, often in a less obtrusive manner through surveillance and self-discipline of individuals. This is reflected in the medical field in which the increase of knowledge about diseases ushered in preventive medicine in place of curative medicine. Preventive medicine requires interventions prior to disease outbreak. Often, this means greater state intrusion on individual conduct and encroachment of private spheres. For instance, at the beginning of 20th century, with the advancement of medical

knowledge, the British government began to assert a greater role in matters of public health. This was a shift away from the more liberal approach of the earlier period. By the early 20th century,

.... public health was “repoliticised,” away from the mainly liberal agenda of rights, responsibilities and the “Condition of England”, to the politics of expertise and the duties of the state to maintain the health of the nation or British race. As mentioned above the term ‘preventive medicine’ has been said to best capture this shift, though the label ‘state medicine’ continued to be used and older terms, such as hygiene, were recast in a modern scientific guise (Worboys, 2000: 238).

The shift from curative to preventive medicine signals the expansion of the public domain of health and the contraction of the private sphere of life. While the curing of disease involved localized treatment of individual patients, preventive medicine made issues of private health a public concern, in which the government claimed to be responsible and had the right to intervene in the lives of individuals. This intervention was assisted by prevalent scientific and medical knowledge, especially the germ theory of disease. The bacteriological understanding of disease first prompted the implementation and enforcement of sanitary measures that focused on hygienic practices throughout Britain and British empires. However, as new medical knowledge made its way to the public, attention began to fasten on individuals both as the targets and vectors of microbial disease. As observed by Worboys:

The shift from environment to people as the main sources of infection meant that it became imperative for public health agencies to know who was infected with preventable diseases and where they were, so that cycles of transmission could be halted. Public health authorities, as they now significantly styled themselves, rather than sanitary authorities, also targeted particular channels of transmission and the points of passage between bodies where bacteria were vulnerable to natural and artificial disinfectants (Worboys, 2000: 234).

This contributed to an increased regimentation of society as medical attention shifted to individuals instead of their environment. A panoptical society that increasingly stressed bodily control and surveillance was in the making.

5.2. Modern Medicine and the Regimentation of Colonial Society

In general, there were two forms of disease control by the state over its subjects in the British Empire. One was through physical coercion whereby invalids who carried infectious diseases and posed potential hazards to public security were incarcerated. The other was through governmentality of subjects, in which the subjects were conditioned to exercise self-restraint and personal hygiene. Bashford (2004: 186) however identifies a third category which can be located in between coercion and conditioning, which is coercion with consent, similar to Gramsci's notion of "hegemony" (Gramsci, 1992). In this respect, expert knowledge and state authorities were used concurrently to obtain acquiescence to segregation of patients in places like sanatoriums (Arnold, 1993: 240-244).

The control of diseases and peoples is part of the process of governance in which the state uses its legitimate power to dictate social behaviours. In the analysis of state power, Foucault's concept of "governmentality" is often employed. Contrary to the Marxist macro structural formulation of the concept and exercise of power, Foucault understands power to be diffused, dispersed, and localized in different strata of society. In this respect, the exercise of power in its most sophisticated form occurs through the production of self, in which the exercise of power is not through coercion but self-

disciplining and self-subjection (Turner, 1997: xi-xii). In British colonial settings, the census, geographical surveys, and the collection of a plethora of statistical data all served to implement a form of governmentality in which its power was exercised through the production and employment of knowledge about colonial subjects (Cohn, 1996; Hacking, 1990).

Using a Foucauldian perspective of governmentality, Baxstrom (2000) studies the management of Indian labour on plantations in British Malaya. The control of Indian labourers who were uprooted from their native country and cast into a new environment presented a challenge to colonial administrators. The British delegated the task of regulating Indian labour to Indian representatives, or the *kangany*, who navigated through the Indian community as patron, leader, and adjudicator in public and private affairs of the community. The system created a dependency of Indian labourers towards the Indian representatives through whom the British exercised control over labour in the public domain of work and the private realm of family affairs.

The attenuating of social control to a finer, subtler and more precise measure and regulation of population, for instance, can be discerned in the politics of the population's diet. By the 1930s, the concern for public health increasingly moved beyond the issue of nutritional deficiency to that of nutritional optimization. As stated in a report, the aim of nutritional policy

... should not be only the negative one of eradicating deficiency diseases but the wider and more positive aim of securing, so far as economic circumstances and medical knowledge permit, that the populations under their charge secure optimum nutrition (Economic Advisory Council, 1939, quoted in Ng, 1999: 8).

Modern medicine and medical services brought health and increased disease stability to Malaya. However, it also demanded individuals open up more to state scrutiny and management of their lifestyles and behaviours. In the process, the state claimed a greater and greater share in the management of private affairs, leading to the shrinkage of privacy and individual rights.

5.3. Legislation and Preventive Medicine in British Malaya

With the British intervention in the Malay Peninsula through the 1874 Pangkor Treaty, hospitals and basic modern medical services were quickly established to cater to the needs of colonial administrators, police, and migrant workers. In the first decade of British involvement, modern medical services mainly functioned in the firefighting mode, in which medical care revolved around the curing of illness. In this phase, provision of physicians and building of hospitals were the main concerns of British colonial administrators (Strahan, 1948). From 1880 onwards, as the colonization process proceeded, accompanied by the deeper penetration of British presence in Malaya, preventive medicine began to take root with the enactment of various legislations. These included the enactment of the Conservancy Regulations that mandated the formation of the Sanitary Board in 1880, the prevention of infectious disease legislation in 1884, the compulsory registration of births and deaths, and compulsory vaccination in 1892, and the legislation that allowed for quarantine measures in 1893 (Milne, 1948). The enactment of various legislations can be viewed as part of the wider process of standardization occurring in England as exemplified by the standardization of measuring units (Schaffer, 1997).

The introduction of the British legal system to Malaya as “modern methods of government” was part of the larger measure of social control that was necessary to allow for effective management of colonial society and efficient economic extraction. Often, colonial administrators were proud of the enactment and implementation of new legislation as a symbol of modern progress, as indicated in the following report:

As is natural in a new country – that is, new to the rest of the world and modern methods of government – the year has been fruitful in legislation. There is no need to enumerate the enactments passed, but we are on the eve of laying before the various State Councils some very important measures (Reports on the Federated Malay States for 1899, p. 6).

When individual health became a public concern, individual behaviour was then subject to state regulation. Health regulations and measures were erected in accordance with prevalent scientific teachings. For instance, in order to contain the spread of diseases such as dysentery and diarrhoea that were caused by food contamination, the number of licences issued for selling raw meats such as pork, which was one of the main sources of bacterial infection, was strictly regulated (Arffin, 2001: 112).

The disciplining nature of public health in British Malaya was made graphic with the constant help sought from the police. In the 1890s, when there was an outbreak of contagious disease, such as small pox or cholera, the case had to be first reported to police by relatives of the patient. The police would then report it to the Medical Officer who would visit the patient immediately to determine if the public was at risk. In case it was, a court directive would be obtained to transfer the patient to a government hospital (ibid: 132).

In Malaya, health legislation could be divided into two major categories. One type of legislation focused on upgrading social conditions. These included the enactment of labour laws and the establishment of Sanitary Boards. The other category of legislation catered to preventing the spread of contagious diseases. These were legislations that dealt with mandatory vaccination and quarantine (Segaran, 1982: 58-61). In both instances, preventive medicine aimed to stem disease spread prior to its occurrence, often demanding ceding of individual rights to the state in return for greater health security.

5.4. Colonial Sanitation and Sanitary Boards

One of the major initiatives to come out of preventive medicine in Malaya was the establishment of the sanitary boards. Similar to medical development in Britain, the extension of medical services to sanitation works signalled a shift of emphasis from disease curing to disease prevention. The emphasis on sanitation works came after two decades of health expansion in Malaya which centered on hospital services and curative medicine (Phua 1987: 29).

The establishment of Sanitary Boards, such as the Kuala Lumpur Sanitary Board in 1890, the first of its kind in British Malaya, was partly an outcome of administrative specialization and the pursuit of economic efficiency (Arrifin, 2001: 39-42). With the establishment of Sanitary Boards, a new position, “Sanitary Inspector,” was eventually introduced. The inspector had to possess sufficient medical knowledge to be able to recognize dangerous infectious diseases and have understanding of sanitary works (Segaran, 1982: 182-183). Sanitary inspection was part of the disciplinary process.

Individuals in Malaya, for the first time, would be fined \$20 to \$25 for the selling of contaminated milk (Ariffin, 1996: 111).

The disciplining of society could not be done without constant surveillance of individuals in society. The 1902 State of Selangor Enactment No. 17 that defined the powers and duties of the Sanitary Board prescribed extensive and microscopic surveillance and intervention of the public. Among other things, it controlled:

- a. The regulation and control of buildings and building operations;
- b. The laying out and maintenance of reserves for recreation and other purposes, the enclosure and care of unoccupied premises, the planting and preservation of trees and shrubs, the laying out, cleaning, watering, lighting and control of streets, canals and bridges;
- c. The control and supervision of
 - i. Drains, latrines, cesspools and dust-bins;
 - ii. Wells and water-tanks;
 - iii. Stables and cattle-sheds and places for keeping sheep, goats, and swine
 - iv. The sale of fresh provisions and the licensing of persons to hawk food-stuffs;
- d. The establishment and regulation of markets and slaughter-houses ;
- e. The regulation ... of bakeries, dairies, laundries and street stalls; the seizure and disposal of unwholesome fish, flesh or other provisions;
- f. The regulation, inspection and licensing of common lodging-houses, eating-houses, jinrikisha stables, theatres, native inns and other places of public resort ...;
- g. The establishment and regulation of public bathing places ...;
- h. The removal and disposal of refuse and night soil ...;
- i. The prevention and abatement of nuisances and the regulation of dangerous, unhealthy or offensive trades or occupations.

As sanitary efforts gained momentum, legislative control inched closer and closer to private space. In order to control infectious diseases such as dysentery and phthisism, which contributed to high mortality rates among migrant workers, the colonial administrators had to interfere deeper into private dwelling. In an annual report, Dr. Watson, who was the District Surgeon of Klang, Selangor, suggested that:

It may be profitable to enquire in what way an insanitary (sic) house acts prejudicially on its inhabitants. It does so mainly by polluting the air respired by the inhabitants. Hence it is necessary to drain the site of the house, to have the roof rainproof, to have the walls and floor dry and capable being washed, to have a space round the house and windows to allow of ventilation, and to have drains and privies in proper position and of proper construction to prevent the air being polluted by waste products (*Malay Mail*, Oct 21, 1904, p. 3).

As sanitary measures were refined, intrusion into private space in the name of sanitary inspection was legitimized. For instance, the Contagious Diseases Ordinance no. 10 of 1867 in Hong Kong, which was a British colony, superseded earlier ordinances and allowed for entry without warrant into premises suspected as illegal brothels (Levine, 1998: 676-677).

Sanitation also called for the segregation and dispersion of population. In the process, it changed the landscape of the city, building new settlements while erasing old ones. From the rat-catching campaign, for the prevention of bubonic plague, the cementing of roads to ease the cleansing of spit that resulted from the casual spitting habit of the Chinese, to the more elaborate efforts to disperse overcrowded residential areas that were prone to the spread of infectious disease, disease control became part of the public affair that saw the intensification of interference with habits and geography of residence (Arrifin, 1998). And with the building of a sewage system and a clean water supply, health conditions were to improve substantially over the next decades.

The colonial government would try to regulate as much as possible sanitary practices of the public. However, there were places that were beyond the reach of the administrative arms. For example, in regulating the sanitary practice of hawkers, a Health

Officer of Perak North had to resign the case to the *penghulu* (village head). In a dispatch, the Health Officer wrote:

At present all hawkers of prepared foods in Sanitary Board areas, require as a condition of their licence, to be examined by me. Hawkers outside Sanitary Board areas, are neither licensed nor examined by this department, although all coffee shops, both outside and inside Sanitary Board areas are licensed and inspected by Sanitary Board Staff. While I agree that the suggestion made is a sound one, I regret that on account of the difficulty of carrying this work out, I am, with the staff available, unable to undertake it. If I may make a suggestion, I would ask that the Penghulus see that their kampong (village) dwellers, patronise only licensed premises. This would probably, to a large extent, get rid of the hawker (H.O.P.N. 203/33, March 11, 1937).

It would be a mistake to assume that all sanitary efforts were top down. The public demanded, with equal fervour, state intervention in public affairs. In a letter to the Editor of *Malay Mail*, a resident who signed off as “A Town Resident” from Seremban remarked:

The rainy season is on us and almost every house has a malarial patient. What is the cause of so much malaria and other incidental sickness in this place when hot-beds of malaria in other countries have been freed from its full grip? In simple words it is due to lack of interest and sympathy on the part of the administration. As for money the State Treasury is overflowing but as for making use of the surplus to better the health conditions of the people living in the town, men with energy and grip, men who can tackle a matter of this sort, are wanting.

Enactments and committees on paper may silence the looker-on from afar and disarm criticism, but facts are stubborn things and the man who lives in the town and knows every bit of it cannot be deceived.

I will give you an instance of neglect. Just about 25 or 30 feet away from the Seremban passenger station and within the Railway premises is a railway store. Nearly the whole building is surrounded by stinking, dirty water (*Malay Mail*, Oct 10, 1912, p. 7).

Over the years, sanitary control expanded with increasing complexity. From the initial sanitary inspection, the administration of public hygiene in Malaya eventually moved on to include more difficult projects involving engineering, medical research, and social education (Segaran, 1982: 129). As reported in the following daily newspapers, the Director of Public Instruction had asked principals of all schools informing them that

a course of lectures in Practical Hygiene for school teachers will be given at the Straits and F.M.S. [Federated Malay States] Medical School, and asking them to furnish names of those of their teachers who are desirous of taking up the course

The object of the Government is doubtless to give school children some idea of hygiene through their teachers A fairly large number of native children go to school so badly and uncleanly clad, and possess habits so unsatisfactory from a hygiene point of view, that nothing could be better than teaching them to be and to keep clean. Among their bad habits is an inclination to wipe their slate, and a fondness of eating a lot of trash, going to school shoeless, and sometimes hatless, are also things to do away with (*Times of Malaya*, March 21, 1906, p. 4).

In England, the “sanitary movement” during the second half of the 19th century played an important role in the growth of British population. By educating the British population about the importance of clean drinking water, air, and living conditions through various sanitary regulations that were overseen by sanitary boards in towns and cities, the mortality rate in England was greatly reduced, reflecting a general improvement of the health of British population (Szreter, 1988).

5.5. Global Medical Surveillance

In tandem with the process of globalization, diseases traveled vast geographical areas and disease control often required cross national efforts. One of the areas in which international cooperation was needed was the collection and sharing of information. In an

address to the British Medical Branch Association, Malaya Branch on September 27, 1926, Brooke, the Director of the League of Nations Far Eastern Bureau made an analogy of medical services with military adventures where the collection and usage of intelligence was central to the success of military missions. In his words,

Preventive medicine is a form of warfare, warfare against the pathogenic forces of nature, against climatic conditions, against superstition, ignorance, and apathy; and in this war we can learn much by lessons of analogy from the organisation of the great fighting forces of the Crown (Brooke, 1926: 7).

Titling his speech “A System of Intelligence as a Handmaiden of Hygiene,” Brooke exhorted the importance of collecting and maintaining proper medical records, not just at the local level, but on a global scale. As he put it, “the epidemiologist and statistician are the nervous system of the whole scheme and the provision of prompt and accurate information, with an intelligent interpretation of such information, become a matter of paramount moment” (Ibid.).

As epidemic diseases travelled with global trade, seafarers and foraging pests, such as rats on ships, disease control was soon to become an international concern and resources were pulled together to form a system of global surveillance. A case in point was the institutionalization of quarantine measures in connection with Yellow Fever whereby ships sailing and engaging in Levantine trade were quarantined, together with the crews, for 40 days (Eager, 2002 [1903]).

In 1923, an agreement was reached between the League of Nations and the International Health Board of the Rockefeller Foundation for the latter to manage a clearinghouse of epidemiological intelligence and public health statistics. Among the tasks entrusted to the International Health Board of the Rockefeller Foundation were:

- a. Study of the simplest and most reliable methods of obtaining information regarding the incidence of disease and the progress of epidemics.
- b. Comparative study of public health statistics of different countries.
- c. Study of the world distribution of particular diseases.
- d. Comparative study of the incidence of particular diseases in different countries and their public health statistics, with a view to determining the nature and practical significance of observed differences between them.
- e. Study of the periodicity of epidemics and the factors which cause or influence such periodicity.
- f. Organising, with the concurrence of the public health administrations of the countries affected, missions of enquiry regarding the development of epidemics, or for other purposes referred to in the preceding paragraphs.
- g. The publication and distribution of special reports and periodical bulletins.
- h. A review of the public health of the principal countries of the world with a view to the issue, if circumstances permit, of reports on the subject as a whole.
- i. Organising a rapid interchange of information in regard to particular diseases in cases in which immediate action appears to be necessary.
- j. The employment at headquarters or elsewhere of experts provided with requisite assistance and technical equipment (Brooke, 1926: 8-9).

In order to coordinate efforts of disease surveillance at the global level, different outposts were formed at different colonies. At the turn of the 20th century, Singapore, being an international seaport and central hub of the Far East was soon made a disease information collection and dissemination centre for the “Eastern Arena.”

The Singapore Bureau, subsumed under the Health Section of the League of Nations, received at the end of each week telegraphic reports and information about epidemic diseases from major ports of Asia, Australia and the east coast of Africa. This information was then broadcasted through the French Wireless station at Saigon that was to be received in Geneva, which would then disseminate the information to all health administrations of Europe (ibid: 10).

It was clear that by the 1920s, international cooperation had become one of the important agendas in the combat of infectious diseases. The management of disease

began with the management of information. And information was obtained through global surveillance.

5.6. Leper Settlements: A New Challenge in the Control of Infectious Disease

One of the key measures in the control of the spread of diseases was the segregation of patients. At the turn of twentieth century, leprosy was “re-discovered” in many European colonies around the globe, threatening not only members of native societies, but also colonial administrators. The urgency to combat leprosy in European colonies sparked new debates on the necessity and effectiveness of leper segregation. The identification of the bacillus *Mycobacterium leprae* as a possible source of leprosy by the Norwegian physician Gerhard Armauer Hansen in 1873, while adding new credibility to the contagion theory of leprosy, did not fully establish the contagiousness of leprosy. It was generally held that children were most susceptible to the disease and only prolonged and intimate contact with a patient could cause infection (IMR, 1950: 252-253). As a consequence of the lack of knowledge, leper segregation as a health policy was not fully endorsed by the British government in the mid-nineteenth century.

The concern for the spread of leprosy, along with the search for a cure, culminated in the organization of the First International Leprosy Conference in 1897 in Berlin. At the conference, a consensus on the effectiveness and necessity of leper segregation as a measure to contain the spread of leprosy was by and large reached (Pandya, 2003). With segregation policy increasingly gaining acceptance and legitimacy, a string of laws and regulations was enacted across European colonies to allow for mandatory segregation of leprosy patients (Bashford, 2004: 88). Amid the rush to build

leper colonies, little attention was paid to the welfare of lepers in settlements. Often, lepers were exiled to islands or areas removed from society and they were either totally forgotten or survived in a state of neglect. The mortality rate for lepers was very high, often more than 20% (Joshua-Raghavar, 1983: 22-23), and there were many incidents of escape from the settlements.

The dismal living conditions in leper settlements and the biblical association of the disease prompted countless “Missions to Lepers” in British colonies (Gussow, 1989: 202). In providing individual care to the lepers, missionaries fulfilled their twin goals of alleviating the suffering of the sick and spreading the Christian faith. In this process, missionary service complemented the role of the colonial state in its fight against tropical diseases and enhanced the legitimacy of colonial rule (Worboys, 2000b).

As the nineteenth century drew to a close and the twentieth century unfolded, increasing calls were made to improve living conditions of lepers in settlements. At the Third International Leprosy Conference in 1923, a new appeal was made to European colonial administrators to uplift the standard of care in leper settlements (Levison, 2003: 228). In Britain, Sir Leonard Rogers, who was an expert on leprosy, called for a more “modern” treatment of segregated lepers and argued for voluntary admission of leprosy patients to settlements (Bashford, 2004: 89-93).

A “modern” administration of leper settlements required effort that went beyond fulfilling the basic needs of housing and feeding the inmates. The leper settlement was a unique institution. It bore an ambiguous status as a health and a total institution, the latter as understood by Goffman (1999). On one hand, the leper colony was a recuperating centre that aimed at curing and rehabilitating leprosy patients. On the other hand, it was a

prison-like establishment in which leprosy inmates were forcefully confined. In Anderson's words, lepers were "carceral citizens" (Anderson, 1998: 721). They were innocent citizens incarcerated for reasons of illness rather than criminality. In theory, unlike prisoners, leprosy patients were entitled to their citizenship and civil rights.

The ambiguity of lepers' status and the tension of lepers' identity as "carceral citizens" caught the keen eyes of Joseph Chamberlain, the British Secretary of State for the Colonies. In stating his support for leper segregation in Malaya, he remarked: "I am inclined to favour the planning of regular leper communities where, as far as possible, family life can be enjoyed, and the *atmosphere of home may prevail over that of prison* (emphasis added)" (Editorial, *Malay Mail*, September 22, 1899).

Ideally, lepers were to be admitted, much like the admission of patients to a hospital, on a voluntary basis. However, this was not the case because, in general, leprosy patients, like any other individuals, avoided social isolation. The challenge to the British authorities, in the control of lepers in settlements, was how to exercise hegemonic rule over segregated lepers with a minimum use of force and the least violation of patients' civil rights. The analysis of this section focuses on the shift of emphasis from the exercise of coercive to persuasive power in the administration of leper settlements, especially after the mid-1920s. In the Sungei Buloh Leper Settlement, the acquiescence of lepers to segregation was acquired by emphasizing the fact that the inmates would feel at home in the new setting. Towards this end, the settlement was organized in such a way that it provided a "natural and fair atmosphere" and inmates lived a life resembling the external social environment. In a word, segregation was sought to be normalized.

Leprosy was brought to Malaya by Chinese migrant workers in the late 19th and early 20th centuries (Gullick, 1989: 260). As a disfiguring disease, it often evoked fear among the public. In Malay villages, families with members who had contracted the disease were persuaded to live at the outskirts of villages. Thus, the lepers were partially segregated from the rest of the village. Although villagers were eager to see mandatory segregation instituted as a policy, British colonial administrators were slow to react because of the uncertainty surrounding the contagiousness of leprosy. The indifference of British administrators prompted some members of the Perak State Council to cynically ask for lepers to be sent to London (*ibid.*: 261).

The controversy concerning leper segregation was not new in this region of the Malay Archipelago. It had been debated at length in the Strait Settlements in the middle of the nineteenth century. The Strait Settlements was a British administrative unit established in 1824 and consisted of three city ports situated along the Malacca Strait, namely Penang, Melacca, and Singapore. By the second half of the nineteenth century, Singapore had emerged as the key port of call among the three. As an entrepôt, Singapore had attracted not only merchants from different continents but also disease-stricken beggars, vagrants, and lepers who spread fear of contagion and presented an unappealing sight in public places.

As early as 1828, a senior surgeon in Penang had floated the idea of depositing of lepers to nearby Jerejak Island (Lee, 1978: 263). However, uncertainty over the contagiousness of leprosy caused much hesitation on the part of colonial administrators. In the mid-nineteenth century, the consensus in medical circles in Britain was that leprosy was not contagious, and forceful confinement of lepers was considered contrary to British

laws of civil liberty (ibid.: 276). In April 29, 1867, a report was issued by the Secretary of State for the Colonies to the Governor of the Straits Settlements, informing the latter that any law or practice that existed in the colony for compulsory seclusion of lepers should be abrogated. A Select Committee was then formed in 1869 to study the issue of leper segregation in depth.

In general, the committee arrived at the conclusion that a separate establishment for lepers located on an island was desirable, and that the segregation of lepers did not amount to forced confinement as long as lepers agreed to stay willingly. In order to encourage lepers to stay on the island in settlement, the following suggestions were made:

...all reasonable methods should be employed to make residence in the Leper Island attractive to these unfortunate people. Ample rations should be supplied to them, not only of rice, but of meat, fish and curry stuff, etc. and a reasonable allowance should be given of spirits, chandoo and tobacco. Assistance should be given to them in the first formation of vegetable and fruit gardens; and fishing tackle might be supplied to those capable of using it. Perhaps small money allowances might also be granted with advantage. By such means the Committee believe that there will be no difficulty in inducing the large majority of the pauper lepers to remain willingly on the Leper islands (Select Committee on Pauper Hospitals, 1871; quoted in Lee, 1978: 277).

While the British colonial administrators often viewed their subjects as less civilized human beings, the administrators nevertheless intended to treat the lepers, who were mostly Chinese migrant workers, as equal subjects of British citizenship under the British laws. At a time when the legitimacy of leper segregation could not be firmly established, the “tensions of empire” (Cooper and Stoler, 1997) lay between the need to uphold liberal values, and extend them to non-Europeans, and the pressure, especially from the public, to take lepers off the street. The Select Committee on Pauper Hospitals,

which looked into the matter, eventually concluded that lepers needed to be segregated not by force but by inducing them to stay in settlements voluntarily so as not to violate British laws that prohibited leper segregation. Nevertheless, the Committee suggested that lepers who absconded from the leper settlement “have to be dealt with by committal and re-committal under the Vagrancy Act (Select Committee on Pauper Hospitals, 1871; quoted in Lee, 1978: 277). In short, while the application of persuasive power was foundational to the management of leprosy citizens, coercive means remained at the disposal of the state.

Consensus on the contagiousness of leprosy was finally reached in 1897 at the First International Leprosy Conference. The British, however, were slow to react partly because “the segregation and maintenance of upwards of 100,000 souls [in India] is a large undertaking” (Pandya, 2003: 174). In Malaya, Mr. Chamberlain, the Secretary of State for the Colonies, finally decided on mandatory segregation, while being sympathetic to leper isolation. Mr. Chamberlain was keenly aware of the ambiguous status of leper settlement and urged an “atmosphere of home” to “prevail over that of prison”, and “such settlements appear to afford the best chance of arriving at some sort of satisfactory solution of the main difficulties which beset compulsory segregation” (*Malay Mail*, September 22, 1899, Editorial).

Despite the kind-hearted wish of Mr. Chamberlain, in general, living conditions in leper asylums left much to be desired. Life within leper asylums tended to be “dull, brutish, and short” (IMR, 1950: 253). Every year, a large number of lepers absconded from these asylums. For instance, in 1899, of the 264 lepers received in the Kuala Lumpur Leper Asylum, 46 died and 64 absconded, and only 135, i.e. about half of the

original inmates, remained in the asylum by the end of the year (Selangor Administration Report 1900, p. 14). The frequent escape of lepers from asylums was a constant nuisance for colonial administrators. The idea of keeping lepers on an island removed from society was proposed, since fencing off an asylum might not discourage absconders. Suggestions for improvement also included the idea to make leper colonies self-supporting communities, in which inhabitants produced their own food and built their own houses. Thus, as recorded in the Selangor Government Gazette:

... the present arrangements for the isolation of lepers is not satisfactory: a barred-in ward in which absconding lepers can be locked up, and a guard to watch the asylum will do a good deal towards preventing the lepers from straying but will not check it altogether. The members of the Medical Congress very strongly recommended that a colony for Chinese lepers be established on an island on the coast in some central position, to which lepers, from any of the Federated States, could be sent. It was suggested that the lepers be encouraged to build their own houses of materials to be provided by Government, and to cultivate the island, keeping pigs for their own consumption and growing vegetables and fruit. The present leper asylums could be utilised for the treatment of milder cases of leprosy and as forwarding stations (Selangor Government Gazette 1899, p. 3)

Despite the early concern for the well-being of leprosy patients in settlements, the objectionable living condition in the Kuala Lumpur Leper Asylum remained much the same for the next two decades. In fact, leper escape was so common that it had become a standard practice to record in various annual reports the number of absconders. It was not until a riot broke out in the Kuala Lumpur Leper Asylum in 1922 that serious efforts were made to improve living conditions in leper asylums, as evident in the following report:

The conditions of this Asylum at the beginning of the year were far from satisfactory. On January 6th a riot occurred amongst the lepers and the Medical Officer in charge was assaulted. A large force of Police was called in and after some trouble the lepers were brought more or less under control.

During the outbreak and before the Police arrived a number of lepers escaped having burst open the gate when the watchman ran away. Later in the year the Dresser who had been in charge of this Asylum for a number of years was discovered to be stealing chandu which was supplied for the use of the lepers. He was suspended from duty and put under arrest. Later he was brought to trial, convicted and sentenced to three months' rigorous imprisonment. There is little doubt but that he had been defrauding the Government and the lepers for some considerable time and it is probable that some of the ring leaders amongst the lepers had been sharing the plunder (Federated Malay States, Medical Report 1922, p.11, in Supplement to the "Federated Malay States Government Gazette", July 27, 1923).

The leper riot in the Kuala Lumpur Leper Asylum was a watershed in the management of leper colonies in British Malaya. After the riot, Dr. Travers, a Residency Surgeon in Selangor, took charge of the Kuala Lumpur Leper Asylum and oversaw its reformation. With great enthusiasm and dexterity, he engineered the transformation of the Kuala Lumpur Leper Asylum from one that resembled a prison into a community centre based on a policy of inclusion. Lepers were re-conceptualized and transformed from passive subjects to productive members of the settlement and the monotonous life of the settlement was made alive with entertainment and amusements. As reported:

The Asylum has been entirely reorganized and is now in a fairly satisfactory state. A Eurasian, who is himself a leper, has been appointed Steward. He has done invaluable work and has the lepers of all nationalities under his control. There are no non-lepers employed at the Asylum The public has subscribed to a "Lepers Aid Fund" with the object of providing comforts and amusements for the inmates. Musical instruments, etc., have been bought. Anyone visiting the Asylum now can listen to a band which the lepers amuse themselves with (Federated Malay States, Medical Report 1922, p.11, in Supplement to the "Federated Malay States Government Gazette", July 27, 1923).

The ingenuity, insight, and cultural sensitivity of Dr. Travers could be seen from his acceptance of inmates' cultural festivals. Instead of disapproving of traditional

cultural practices of migrant workers as outdated and unscientific, Dr. Travers permitted the building of worship places in the asylum, which encouraged lepers to stay. For instance,

A Hindu Temple was erected through the kindness and generosity of Mr. Coomarasamy and opened on the 24th of August. This temple has the effect of keeping the Indian lepers in the Asylum, and not one attempted to abscond during the Indian festivities (Federated Malay States, Annual Medical Report 1923, p. 7, in Supplement to the "Federated Malay States Government Gazette", July 11, 1924).

The policy of inclusion was further extended by relegating the day-to-day jobs of running the asylum to inmates, saving valuable resources of colonial administrators while making the inmates feel more at home amidst the distress of social isolation. The result was dramatic. Within two years, most of the inmates were admitted on a voluntary basis, and at an early stage of diagnosis. The improvement was reflected in the following report:

The number of lepers accommodated in the asylum was 524, and it is satisfactory to record that most of the admissions are now voluntary and are made at a comparatively early stage of the disease. Medical treatment is optional, but good results are reported in the case of the large proportion who elect to undergo treatment. The treatment is that known as "Tai Foong Chee," being a preparation of chaulmoogra and other ingredients. With the exception of watchmen all employees at the asylum are lepers who have been trained as dressers, attendants, cooks, gardeners, washermen, etc (Selangor Administrative Report 1924, p. 8).

With the increasing number of lepers pouring in from various places, suggestions were made to build a new leper settlement. In 1926, the Leper Enactment Act was passed, which required compulsory notification and isolation of leprosy patients. A new leper settlement was then built in Sungei Buloh, Selangor in 1930 (Jayalakshmi, 1994).

5.7. The Sungei Buloh Leper Settlement and the Technology of Acquiescence

The Sungei Buloh Leper Settlement was planned and built to provide a model for accommodating lepers not only in Malaya but elsewhere (Federated Malay States, 1933: 1). The settlement covered 57 acres of land. There were 13 large wards and about 150 separate dwelling houses, which could accommodate nearly 1000 people. The settlement formed a community with its own offices, sick wards, sterilising room, housing area, and farm land (ibid.: 2-5).

In general, there were three main aspects of leper segregation that needed to be addressed. First, the lepers had to be housed; second, the lepers had to be controlled; and third, the lepers had to be given appropriate treatment, both mental and physical (ibid.:1).

By the mid-1920s, experiences of the Kuala Lumpur Leper Asylum had largely demonstrated the effectiveness of a collaborative and consensual method of leper segregation which was to become the operating principle of the new Sungei Buloh Leper Settlement. The Sungei Buloh Leper Settlement was designed to mimic the external social environment. Apart from houses with their own gardens, there were also shops and farmland. Education facilities were also provided to leper children. The teacher was an educated inmate. Other settlement work, such as grass cutting, general labour, nursing, clerical work and most of the routine administration, was also conducted by inmates themselves (ibid.: 7). For married lepers, married quarters were provided to create “a much more natural and pleasing atmosphere” (ibid.: 8).

In the settlement, physical constraint was not encouraged and psychological control was accomplished in such a way that tenants felt comfortably at home. The main thrust of the technique of control was to form a “natural and fair atmosphere” in the

settlement to make patients forget their confinement and live a “normal” life in the settlement:

An attempt has been made in the Federal Leper Settlement to avoid any suggestion of control by coercion whether physical or by the attainment of a routine stupor among the patients. The Settlement is not on an island, there is no wall, only a demarcating wire fence – and any of these legally detained patients could escape if they wanted to. There are no outside guards or police, and the Settlement is only a mile from the main road to the capital. In spite of this, very few ever attempt to escape and most of these return voluntarily in a very short time. The second method is by the provision of ample opportunity for recreation, by placing the work and partial control of the institution in the hands of the patients themselves, and by the attempt to achieve a natural and fair atmosphere (ibid.: 5).

In the settlement, measures of control were administered through mundane activities, such as social and drama clubs, which were welcomed by the inmates. Hygienic habits and practices were introduced and incorporated into the leisure programs in an undetectable manner. Conditioning came in a silent form and it seeped into the consciousness of inmates undetected and was internalized. Eventually, inmates were socialized and reformed into new citizens whose habits were congruent with the needs and requirements of modern citizens. It was reported that

The clubs form athletic and exercise groups, they organize inter-racial football and other games, and they aid the staff by disseminating ideas of cleanliness and self respect among the other patients. Through these clubs also patients are taught the practical points that affect their disease, the food they should eat, cleanliness, the symptoms they should watch for, and what they may expect from treatment (ibid.: 6).

The internalization of the norms of modernity was further strengthened through a magazine produced by inmates themselves. In general, the magazine served two purposes. First, it conveyed to the outside world the lives of lepers in the community, especially

those with relatives inside, thus assuring the public that segregation was handled with success. Second, it allowed for the expression of “thought and imagination” among inmates, particularly from those who contributed optimism and enhanced the morale of inmates. The magazine was

A little periodical of stories, essays and verse, it is called “Dawn”, a name that seeks to express the optimism based on courage and endurance that is so striking a feature of leper psychology in an unspoiled environment (ibid.: 6).

The leper settlement had a capacity of 1000 inmates. For a settlement of this size, only a dozen leper police were stationed there. Unlike civil police, these policemen concerned themselves only with “organizing exercise groups, helping the older people and the children, acting as messengers in the Settlement, and generally helping to create an atmosphere of courtesy and good-will” (ibid.: 8). The limited need to apply physical force signalled the success of the technique of persuasion. From the perspective of the Director of the Sungei Buloh Leper Settlement, the settlement was a great accomplishment. In a self-congratulatory note, the Director remarked,

It must strike the ordinary observer that here are a thousand men and women, isolated by law, chosen not for their civic qualities but because they are lepers. The majority of them, save for their disfigurement, are able bodied. They are a cauldron-pot of nationalities, of languages, of religions. Every ingredient that would contribute (and does outside) to unrest, friction and brutality is there. Of set deliberation there exists no force that could make the slightest effect on lawlessness. Yet these thousand human beings are a model of harmony and order (ibid.: 11).

And,

In no other country does the same field exist for the study of the differing racial varieties of this disease, for the observation of relative incidence and

its causes, and for the consideration of the effects of national diets and habits on the course of the leprotic process (ibid.: 12).

To some extent, instead of limiting the liberty of inmates, the Sungei Buloh Leper Settlement provided inmates with liberty that was not available to them while they were living in society among the populace. Like the Culion leper settlement in the Philippines under American jurisdiction, these “carceral citizens” might not suffer a deprivation of liberty; rather, they enjoyed its creation (Anderson, 1998: 723).

5.8. Summary and Conclusion

British colonization introduced modern health services to Malaya. In the initial years, medical services were mainly curative in nature. Hospitals were built in major towns, and near mining sites and rubber estates. With the progress of medical knowledge and the deepening of colonization, medical care moved away from curative to preventive medicine.

By the second half of the 20th century, preventive medicine was further expanded with the inclusion of the concept of “social medicine.” The introduction of social medicine signalled an expansion of medical care from mainly physiological analysis of disease and illness to include also social examination. In this regard, the control of disease increasingly meant the control of the social, both at individual and communal level (Teh, 1948).

Underlying the concept of social medicine was the idea that sickness was no longer perceived merely as a physiological disorder of an individual but could also be a result of social dysfunction. Disease was an issue of individual health as much as a

concern about the social conditions of the disease. Doctors were asked to pay attention to a patient's social environment and heredity in order to determine external factors that affect health. As a result, medical care was not only a matter of curing illness but increasingly it was about the promotion of health.

One impact of the implementation of preventive medicine was the expansion of state interference with individual lives and behaviours. While curative medicine also involved discipline of patients - for instance, hospitals were often fenced to prevent patients from absconding and to restrict handling of outside food by relatives of hospitalized patients (Tate, 2005: 42) - preventive medicine extended state discipline to healthy individuals to encourage healthy lifestyles and hygienic practices in order to curb disease prior to its outbreak.

Chapter 6: Traditional Medicine and Societal Rationalization

... the Malay has such faith in his "Pawang" (traditional medicine man) for the results must be disappointing, and moreover their practices, as those of witchcrafts and sorcery, are forbidden by Mahomedan teachings. His Highness the Sultan informs me it is because it has now obtained so long in Perak and has become an "Adat" (custom) in the country, and that it would not be possible to enforce a check against these practices. His Highness considers, however, that in time the Malay will become a believer in western methods of treatment and in the power of the White Man's medicine.

Times of Malaya, Dec 7, 1909, p. 5.

6.1. Introduction

Before the arrival of British doctors with their modern medical knowledge, native society relied mainly on traditional medicine and shamans for health and medical advice. With the introduction of modern medicine, the place of traditional medicine was increasingly marginalized. The decline of traditional medicine was an outcome of a combination of factors. Apart from the growing trust in and status enjoyed by modern medicine, the lack of state allocation to assist traditional medical practices was partly to blame. At times, the marginalization of traditional medicine was blamed on British colonialism. For instance, according to Chattopadhyaya (1977: 425, quoted in Bala, 1991: 18), the policy "was one of maintaining control over Indian society by dismissing indigenous medicine as mythological."

In Malaya, the attitude of British colonial administrators towards traditional medicine was more of indifference than repression. This was understandable since traditional medicine was intertwined with the practice of traditional culture, which in the context of British colonialism in Malaya, was supposed to be left to the Malayan rulers. Given the sensitivity associated with the traditional culture and religion of the natives, the British were careful to not interfere, at least overtly, with traditional medical practices. In the Ordinance to provide for the Registration of Medical Practitioners in the Colony (1905), a section read as follows:

Nothing contained in this Ordinance shall be construed as to prohibit or prevent the practice of native systems of therapeutics according to Indian, Chinese or other Asiatic method (quoted in Harun, 1988: 130).

As traditional societies underwent modernization, traditional medical practices were increasingly being sidelined but not eliminated. While the coexistence of traditional and modern medicine remained, one often finds modern medicine was made the primary choice and traditional medicine only played a supplementary role (Hamid, 1983).

6.2. Reservation Regarding Modern Medical Services

When modern medical services were extended to non-Europeans in Malaya, initially for reasons of labour health and later as part of the initiative to better health conditions of the natives, there was significant reservation among native and immigrant populations regarding modern health services. Most Malays shunned hospital stay and sought only outpatient treatment. For instance, in Perak in 1897, only 430 Malays were

treated as inpatients compared to 5622 who visited outpatient dispensaries (*Malay Mail*, April 19, 1898, p. 3).

The Chinese also stayed away from hospitals and only visited them at the terminal stage of their diseases; this practically rendered hospitals death houses (*Malay Mail*, July 23, 1897, p. 2). In an interesting comparison between Chinese and Indian patients, it was realized that the negative attitude of the Chinese towards hospital stay had cost the administration more expenditure:

Where heavy work is required on Estates Chinese labour is undoubtedly the most satisfactory. It is expensive, however, and from the doctors' point of view unsatisfactory, as these coolies object to going to hospital and often do not come under treatment until their disease is far advanced. This entails a longer stay in hospital and heavier expense to the Estate, than if the disease had come under treatment in the earlier stages. The average stay in hospital of Chinese and Tamil patients has been compared by the writer for the purpose of contrasting the relative costs. It was found in 1913 that the average stay in hospital of the Chinese coolie was 22.50 days compared with that of the Tamil of 8.34 days. The cost of their keep and treatment in hospital was estimated at 30 cents a day, 20 cents for food and 10 cents for medicine. It is thus seen that the total average cost of each Chinese coolie admitted is \$6.75 compared with \$2.50 in the case of the Tamil. Neglected Beri-Beri, a disease not found among Tamils, and extensive ulcers, often venereal in origin, only occasionally found in Tamils, account for the longer stay required by Chinese and the consequent heavier expense involved (*Malay Mail*, Nov 9, 1914, p. 8).

One of the difficulties faced by British colonial administrators in attracting the natives to use hospital services was the lack of trust among the Malays toward the Western public health system. In the early 20th century, the concept of a hospital was new to the natives. The idea of leaving family members alone in hospital in the hands of strangers was alien to the Malays. There was also concern about whether the medical practices and the food served were in line with Islamic teaching. As a result, the hospital was not popular among the Malays and as part of the resolution the British decided to

build hospitals that catered specifically to the Malays. In a report, F.J. We'd, the District Officer of Kuala Kangsar, remarked that:

The Malay hospital which was completed at the end of the year I trust will turn out to be a success. I think that ... the Malay will be found to patronise it when he knows that there his food will be cooked in accordance with Mahomedan tenets, and that should he go to hospital his wife may accompany him, remain with him, and nurse him [T]hough it may take a year or two or even more I think with proper management the Malay prejudice will be overcome (*Times of Malaya*, Dec 7, 1909, p. 5).

At the time of British colonialism, the Malays were still deep in traditional health practices and preferred to visit the *pawang* (traditional doctor) instead of a Western hospital to obtain health advice and remedies. In a report, it was said that many of the Malays held to the “Spirit theory of disease” and

... care little for the medical art of Europe. The Government of Perak, by a free distribution of quinine and explanatory leaflets at hospitals, and through the *penghulus* [village headmen] and the dispensary boat on the river, does its best to reduce malaria; but to provide quinine is one thing and to get it swallowed is quite another. Malays are no fonder of nasty tastes, to say the least of it, than other people, and apart from that quinine has strong prejudices to overcome. Besides conservatism and distrust of foreign things, the belief still survives in places that the drug is prepared from dogs' bones and alcoholic powders, through fear of which the *hantu* (ghost) of fever leaves its victim. Thus though its efficacy is admitted, it is outrageously *haram* – unlawful for Mohammadans. The native medicine-men, too, are said to be bitterly hostile to it – no doubt from professional jealousy – and make no use of it (*Times of Malaya*, July 18, 1911, p. 7).

This puzzled a District Officer, who found it difficult to understand why

... the Malay has such faith in his “Pawang” for the results must be disappointing, and moreover their practices, as those of witchcrafts and sorcery, are forbidden by Mahomedan teachings. His Highness the Sultan informs me it is because it has now obtained so long in Perak and has become an “Adat” (custom) in the country, and that it would not be possible to enforce

a check against these practices. His Highness considers, however, that in time the Malay will become a believer in western methods of treatment and in the power of the White Man's medicine. (*Times of Malaya*, Dec 7, 1909, p. 5).

The Sultan was to be proven correct in his prediction about the change of attitude among the Malays in the long run. Over a period of several decades, modern medicine was to slowly replace traditional medicine and become the main remedy for sickness and diseases in Malaya and later Malaysia. The initial reservation over modern medicine was eased as modern scientific knowledge began to be taught in schools and traditional medicine started to be perceived as outdated and rooted in superstition. However, as the analysis in the following sections will indicate, although traditional medicine was marginalized, it persisted both as a cultural practice and a supplement to modern medicine.

6.3. Traditional Medicine as Cultural Practice

The adoption and implementation of modern medicine and medical practices often diminished if not eliminated the perennial cultural practices of native society. According to Banerji (1979), in the case of India, the introduction of Western medicine did more harm than merely hampering the development of indigenous medicine. It actually destroyed certain cultures and traditions of Indian society. As traditional medical practice was tightly knitted with cultural beliefs and practices, the marginalization of traditional medicine also meant the erosion of traditional culture. Malayan society underwent a similar process of cultural shift that saw the increasing adoption and practice of modern scientific value, standards, and judgment.

However, the process of cultural erosion was never abrupt and often incomplete. In Malaya, the Malays continued to visit both the modern clinic and the traditional *bomoh* (shaman) (Hamid, 1983). In a call to study and make use of traditional Malay medicine, Professor Hashim Awang of the University of Malaya said that

In the Malay traditional healing literature there are various diseases and remedies. If we return to the content of the *tib* literature than we can appreciate the many ailments recorded by the Malay traditional healers since the early days (*Malaysiakini*, March 8, 2006, <http://www.malaysiakini.com/news/48022>).

He argued that although traditional medicine was no longer popular, and was looked upon with suspicion, it was deeply embedded in the Malay culture and psyche and “whether we like it or not we can't run away from the fact it's our heritage” (ibid.).

The decline of traditional culture was part of the outcome of the process of societal modernization and rationalization. Societal rationalization was an ongoing process of social change with ebbs and flows, although in general, it charted a path that led increasingly to the disenchantment of the world. The disenchantment, however, was never complete but interspersed with processes of re-enchantment.

6.4. Traditional Malay Medicine

Traditional Malay medicine was a product of diverse sources of knowledge and practices. Since Malays are Muslims, Islamic doctrines and teachings informed many of the traditional beliefs that underpinned traditional Malay medical practices. For instance, the humoural theory of disease, which suggested that disease was a result of imbalances between the elements of earth, water, wind, and fire, had its origin in European

civilization. The theory was introduced to the Malays through Islam. The latter had had contact in Europe with the idea of Galenism which was the source of the humoral theory of disease (Harun, 1990).

The practice of traditional medicine in Malaya was well recorded by Gimlette, who was a Residency Surgeon in Kelantan (Gimlette, 1915). As with traditional medicine elsewhere, the Malays, for instance, sought the help of shamans for curing of illnesses. In traditional Malay culture, disease was believed to be an infliction by supernatural forces, and could only be healed by certain artefacts, of animal and plant origins, that were brought together in a particular arrangement. Forces of spirits, such as “hantu raya” (Gimlette, 1913: 30), were also invoked to repel disease-causing spirits. As a case in point, a bamboo cylinder containing a rotten egg, porcupine quills and other things were buried along the path to a river from a Malay headman’s house in order to cure the sickness of his son, which Gimlette understood as malarial fever (ibid.: 29).

Apart from supernatural infliction, sickness was also related to the level of *semangat*, or soul-substance, in a person. A person with high *semangat* was better able to resist both physical and supernatural attack, and was thus less susceptible to disease than a person with low *semangat* (Chen 1975).

Traditional medical practice was both speculative and experiential. The speculation on disease causing agents and mechanisms in traditional medicine often had some validity. At the turn of the 20th century, the Chinese in Singapore believed, accurately, that phthisis was an infectious disease caused by “living germs” that left the body of the diseased to seek a new habitat in the living. The people, again rightly, dreaded nearing persons dying from phthisis. However, they thought these germs had a

liking for omelette, and would be repulsed by exposure to direct sunlight. As a result, an omelette would be placed on the face of the diseased and an opening would be made on the roof to bring sunlight in (Lim, 1904: 16).

6.5. British Attitudes towards the Practice of Traditional Medicine in Malaya

The British had little worry about the practice of traditional medicine among the natives. It was neither subversive nor inconvenient. In general, the British regarded the practice of traditional medicine as common to a less developed society, similar to the earlier era of British society, which was a stage that would come and be surpassed. As judged by the Resident of Selangor W. E. Maxwell:

Some acquaintance with the black art is essential to every Malay medical practitioner. Simple remedies for wounds and bruises are generally well understood, and some of the more common diseases – such as fever, small-pox – are often successfully, if not skilfully, treated with native remedies ...But, if the cause of a disease is not apparent ... it is usually presumed that evil spirits are at the bottom of the mischief, and sorcery, not medicine, has to be resorted to. Arabic works on medicine have been translated into Malay, and there may be read learned disquisitions on the parts and functions of the human body, which, in point of scientific accuracy, are of the age of Galen and Aristotle (Maxwell, 1883: 222).

Consequently, the British in general regarded traditional medical practice as superstitious belief, as indicated in the title of an article by Gimlette (1913) – *Some Superstitious Beliefs Occurring in the Theory and Practice of Malay Medicine* – which examined the practice of the *bomoh* (Malay medicine-man) in matters of sorcery, charms, etc.

The attitude of modern doctors was rooted in the modern medical knowledge in which they were trained. In a society that was rapidly undergoing societal modernization, the tendency to juxtapose the modern and the traditional and judge in favour of the

former was common among modern medical doctors, regardless of their ethnicity. The classification of diseases into “cold” and “hot” types by the Chinese was considered to be a “curious” practice, while the perception of diseases being a result of disturbance by evil spirits was seen as superstitious. In fact, Avetoon took the trouble to inspect a Chinese devil-driver and concluded that he did not cut his tongue with a knife while performing his deed. Both “curious” and “superstitious” practices were considered a result of ignorance, and modern medical doctors often took it upon themselves to try to convince the native “how wrong and destructive to life is his method of treatment and his ignorance of ordinary sanitary laws” (Avetoom, 1905: 9). Modern medical doctors, soaked in the culture of modern medicine, were thus often at the forefront of the civilizing mission of colonialism.

However, not all traditional medical knowledge was dismissed as superstition. In fact, especially when such knowledge had shown empirical efficacy, it often became a preoccupation of colonial explorers and administrators (Cook, 2007). This was particularly true of knowledge of fauna and flora. In the article *A Plea for the Scientific Study of Native Drugs and Poisons*, Daniels (1905) put forward suggestions that still ring true today. He asked the medical community to pay attention to native drugs and poisons, such as “Tuba root,” or in scientific terminology, *Derris elliptica*, which was used by natives to stupefy and even kill fish. Daniels observed,

The flora and fauna of Malaya present so many peculiarities that they are deserving of most careful study. Amongst the products of economies and scientific value are many poisonous products of vegetable life, and though notices of these are scattered through the literature dealing with Malaya, the notices are brief and rarely the results of a scientific study of the effects of the substance dealt with (*Malay Mail*, Feb 28, 1906, p. 3).

He further endeavoured to speculate that this was mainly due to the fact that

... in the more populous parts of the Colony and Native States, the inhabitants are such recent importations and of such mixed races, that they know comparatively little, whilst in the districts such as Pahang where the natives are familiar with medical and poisonous uses of various native plants, the few Europeans, resident or travelling through the country, have neither the time, inclination, nor knowledge to thoroughly study the effects of such treatment, and have in the main confined themselves to a repetition of the statements made by the natives, accompanied sometimes by the scientific names of the plants used (*Malay Mail*, Feb 28, 1906, p. 3).

He was also acutely aware of the unavailability of analytical laboratories for medical officers working with the natives and the lack of native knowledge on the part of those who had access to modern scientific laboratories. He hence urged the cooperation between these two groups of medical scientists (Daniels, 1905: 5).

Superstition aside, Shamanism was not without credibility. The various taboos that went along with shamanism had similar functions, and even similar structures of control to modern medical practice. For instance, “pupuh rumah” and “pupuh kampong” were both quarantines in a modern sense at household and village levels, and were used to contain the spread of contagious diseases. Those who infringed on these taboos were fined accordingly by the shaman (Gimlette 1913: 30).

While British medical doctors had faith in herbal medicine, they had little trust in the often elaborate ritual practiced by the *pawang* that served to drive out disease-causing evils. Both Swettenham (1913) and Dr. Daniels (*Malay Mail*, Feb 28, 1906, p. 3) attended sessions of this ritual and dismissed its usefulness.

The attitude of British colonial administrators in Malaya was a far cry from other European travellers to Malaya two centuries ago. Explorers such as William Dampier and

Alexander Hamilton who visited the Malay Archipelagos at the turn of the eighteenth century approached traditional Malay medicine as similar to their own beliefs and practices (Winzeler, 1985). It was the advent of the modern scientific age that changed the perception of traditional medicine in various parts of the world, including Europe, as relics of the past.

6.6. Acceptance of Modern Medicine and the Persistence of Traditional Medicine

As discussed in Section 6.2, the initial reception of the Malays to modern medicine was recorded as being cautious. As a result, any success at convincing the Malay to receive outpatient treatment was conceived to be an improvement in the attitude of the Malay. The lack of interest among the Malays was later addressed with travelling dispensaries and the building of a hospital which catered only to the Malays. And by the 1920s, Malay acceptance of modern medicine had vastly improved. In his talk on Malaya at the Royal Colonial Institute, George Maxwell, former Chief Secretary of the Federated Malay States (previously known as Resident General), reported that Malays came from long distances – hundred of miles in some cases – to bring their children for treatment of yaws at Kuala Kangsar (Maxwell, 1927, in Kratoska 1983: 413).

With the increasing acceptance of modern medicine, traditional medicine declined. However, the decline was not total. Traditional medical practitioners continued to receive visitors, although on a much smaller scale compared to modern medical doctors. The persistence of traditional medicine in the face of modernization was well recorded (Chen, 1979; Heggenhougen, 1980a). In fact, a survey in 1970 by the government shows that

there were equal numbers (2000) of full time *bomohs* and modern doctors in Peninsula Malaysia (Chen, 1975).

Press (1978: 75) argues that the persistence of traditional or folk medicine provided cultural continuity to urban residents who had recently migrated from rural areas, thus reducing the “trauma of acculturation.” In this view, traditional medicine was perceived to be serving an important role in mitigating the impact of cultural dislocation which arose from the encounter with a new social setting. According to Press, traditional medicine was able to serve as a cultural entity chiefly because, unlike modern medicine, it was an open system. Its boundary was not well-defined. Unlike modern science, it did not have a broadly recognized methodological standard. Traditional medical practices thus allowed flexibility for inclusion and exclusion of diverse elements to ensure compatibility and continuity of traditional medical practices.

Also, being a cultural entity, traditional medicine at times was used as a cultural representation, i.e. as part of Malay culture, parallel to if not as a counter force to the dominant Western culture (Heggenhougen, 1980b: 237). That was why the formation of the Malay Traditional Medicine Association (*Persatuan Perubatan Traditional Melayu Malaysia*) was given endorsement by UMNO, the dominant political party in Malaysia, and in one instance, was headed by an UMNO member who himself was not a *bomoh* (ibid.). A visit to a traditional medical practitioner was also more fulfilling because the relationship between patient and healer was more affective and genial compared to the more professional and distanced relationship between a patient and a cosmopolitan doctor.

It was also important to consider the effectiveness of modern medical treatments. It was found that the longer an illness failed to be cured by modern medicine, the more

likely patients would seek advice from traditional healers, and for minor illnesses for which modern medicine showed proven efficacy, such as colds, coughs, cuts, worms and diarrhoea, patients usually consulted only modern medicine (Heggenhougen, 1980c: 239-240).

More often than not, traditional medicine was practiced side by side with modern medicine. Most patients practiced medical pluralism. There was little indication that patients were adverse towards one particular kind of treatment. Most patients were happy to try both modern and traditional medicine. There was pragmatism in the approach of patients amid the increasing pace of modernization.

6.7. The Limits of Rationalization and Disenchantment

That science was not able to provide answers to all questions of disease made room for non-scientific interpretations of disease causation and cure. The continuous visits to *bomoh* and traditional healers suggest the limits of societal rationalization and disenchantment. While science provided somatic explanations of diseases, it fell short in giving a complete account of the health condition of patient. Science was able to tell “how” a patient fell sick, but it was not able to tell “why” this particular person came to be the victim. Even in cases of successful curing of disease, there was always room for patients or their relatives to ask questions about “why this child; is there not an underlying supernatural or predisposing cause; has not some *antu* (ghost) acted” (quoted in Chen, 1975: 178). Science explained, but only partially. The remainder of the answer had to be sought from other sources, and tradition was often by default a place to fall back upon.

The limit of science had long been recognized by Weber, as shown by his assertion that science can only provides answer to the working of nature but never the moral behind it. The disenchantment with nature, as a result, will never be complete. There will always be room for further interpretation. This opens the gate for the process of re-enchantment while science continually disenchant. Disenchantment and re-enchantment as a result are in a dialectical relationship.

Weber argues that modern science, while denying the supernatural a place in the explanation of the world, nevertheless is not able to provide a justification for value choices that often come with, or tie to, supernatural existence. In other words, science can only advise us on “what is,” and not “what ought to be.” As he muses,

Even such simple questions as the extent to which an end should sanction unavoidable means, or the extent to which undesired repercussions should be taken into consideration, or how conflicts between several concretely conflicting ends are to be arbitrated, are entirely matters of choice or compromise. There is no (rational or empirical) scientific procedure of any kind whatsoever which can provide us with a decision here (Weber, 1949: 18-19)

One of the consequences of this inconclusive domination of science is the return of a relatively polytheistic worldview in societies such as Europe, that have undergone uniformization as a result of rationalization. Religion and beliefs of different hues, as a result of incomplete disenchantment, are put on equal footing *vis-à-vis* their validity claims. When it comes to value judgements, no one source is more valid than the other. It is thus paradoxical that the process of rationalization, while effacing differences and forging homogeneity and uniformity through instrumental rationality, nevertheless inaugurates a process of differentiation whereby values of diverse sources thrive.

The inability of science to determine the right or wrong of value principles contributes to multi-polar world values. Less critical, but equally important, is the fact that science is not able to answer every question about the working of nature. The continuing debate on the theory of evolution is a case in point (Witham, 2002). In places where science falls short of providing a conclusive explanation, room is made to allow for metaphysical interpretation by resorting to supernatural explanation.

All these factors result in the perpetuation of tradition and religious beliefs and the differentiation of practices. As a result, the continuity of traditional medicine hinges on the persistence of the gaps in medical knowledge. Although such gaps are being sealed on a daily basis, new gaps emerge, and at times sealed gaps reopen as a result of new research findings. One outcome of uncertainty of knowledge is the diversification of medical practices where traditional medicine continues to play a role, although often supplementary in nature, in the modern medical system.

This means the process of rationalization encourages differentiation on two fronts. On one hand, the process brings about differentiation in the form of minute specialization. In this respect, medical knowledge, or more generally, the production of modern knowledge, tends to branch out. The knowledge tree is getting bigger and more complex instead of homogeneous. On the other hand, societal rationalization contributes to the demystification of nature, and the existence of knowledge gaps potentially allow for metaphysical interpretation by, for instance, religious leaders. Where scientific explanation is incomplete or inconclusive, it becomes only one of the explanations available. Scientific knowledge thus becomes an addition to the knowledge pool,

although undeniably often in a dominant position with respect to other kinds of knowledge.

6.8. Modernity in Tradition

The process of rationalization is not a process by which a society develops from an irrational state of existence to a more rational state of being. In fact, traditional medicine is no less rational than modern medicine in its logic and procedures. For instance, in the curing of disease in Malaya, witch doctors would first seek to appease the spirit. If appeasement was not successful, then only procedures to expel the spirit would be taken. What set modern medicine and shamanism apart were the assumptions and theories behind the two practices. In this regard, one conspicuous difference lies with the lack of reference to supernatural entities in modern medicine. Compared to traditional Malay medicine which explained diseases in terms of both physical and supernatural anomalies (Chen, 1979), modern medicine based its treatment solely on the assumption of physical disorder.

Natives who practiced traditional medicine were acutely aware of the difference in worldviews between themselves and the Europeans. In one incident, as a European watched his friend, an old chief, who was being treated by a *manang* (witch doctor of Ibans, a main native group in Sarawak), the old chief lightheartedly told him, “Ah! You don’t believe in this [the treatment]; but she [the *manang*] is doing me a great deal of good” (Roth, 1864, quoted in Tate, 2005: 5).

The need to address the unseen world of spirits was clearly reflected in the position of Malay witch doctors. Many of them served the role of court physicians and

were exempt from various taboos and rituals connected with the royal family (Tate, 2005: 14). At a time when modern medicine had not set foot in Malaya, traditional medicine of different hues and colors was the only kind of medical relief available to the people of Malaya, be they of the elites or of the populace. This was the scenario until the end of the 19th century when the British began to become actively involved in the Peninsula Malaya.

The pragmatism displayed by modern Malays, who would not shun traditional medicine when modern medicine failed to cure, was equally true of Malays in the late 19th century. While consulting of witch doctors was tantamount to dealing with evil spirits, which was prohibited by Islam, traditional Malays would not confine themselves to Islamic teaching when sicknesses persisted. As Wilkinson noted:

... the sick man is not likely to stand upon such ceremony; believing as he does that all sickness comes from the Evil One he will not be deterred by any rules of propriety from entering into negotiations with his tormentor. He sends for the *pawang*. The *pawang* realizes the delicacy of the situation and begins with mild measures (Wilkinson, 1957 [1906]: 67).

Traditional medicine is today called alternative or complementary medicine (Ismail and Chan, 2003). However, complementary medicine is not traditional medicine *per se*. Complementary medicine is traditional medicine without the latter's spiritual content. In modern Malaysian society, the promotion of traditional medicine today is largely confined to herbal medicine, and efforts of bio-conservation in developing countries also focus on the medicinal values of plants (WHO, 2001) without making reference to the cultural context of traditional medicine. The demystification of traditional medicine allows for an *ex-situ* conservation of traditional medicine.

6.9. Between Modern Science and Traditional Culture: Pragmatism and a Dual Approach to Disease and Illness

In the 1996 National Health & Morbidity Survey II of the World Health Organization, it was found that only 2.3% of those surveyed in Malaysia consulted traditional or complementary/alternative medical practitioners (WHO, 2001: 161). This low figure indicates almost a full displacement of traditional medicine by modern medicine in a century. Still, there remains a lingering enthusiasm for traditional practices, including traditional medicine, as exemplified by modern midwifery (Bourgeault, Benoit, and Davis-Floyd, 2004).

The lingering practice of traditional medicine indicates the resilience of traditional culture in the face of the overwhelming presence of modern science. While modern medical practice often combines physiological and psychological therapies, the psychological treatment in modern medicine is individualistic in its approach, and often de-contextualized from the larger cultural milieu and psyche of a patient. Traditional medicine, conversely, uses the language of culture and addresses the anxiety of a patient in congruence with the daily routines of that patient. This is especially relevant to rural people who are the main users of traditional medicine. Importantly, in Malaysia, the persistence of traditional midwifery is attributed to the “importance that rural Malays attach to *adat* (custom) as a binding factor that governs their behavior” (Hamid, 1983: 9).

As a cultural practice, traditional medicine was tightly knitted to religious beliefs. Where modern science left a gap, traditional medicine tended to fill in. As studies show, traditional medicine was often the second choice, consulted only when modern medicine failed to find a cure. What modern science could not explain provided room for religious

and traditional interpretations. Often, this meant the employment of supernatural theorizing of diseases. For instance, traditional Malay midwifery was a practice that was closely knitted to traditional beliefs in supernatural forces. In the case of the Malay Muslims, the practice of midwifery was also a religious practice. Smooth delivery of babies often meant repelling, by persuasion or force, supernatural beings that tried to inflict injuries and harms. The practice of traditional midwifery, unlike modern obstetric practice, called for deep religiosity on the part of its practitioner (Karim, 1984).

The reign of modern science put traditional and cultural practice, including traditional medicine, on the defensive. In general, traditional midwifery was frowned upon in Malaysia. Traditional midwifery practices were considered to be unhygienic and at times dangerous. Over the years, concerted efforts had been carried out to replace traditional midwives with modern government midwives (Hamid, 1983: 11-12). There was a general consensus that traditional midwifery was a remnant of the past and eventually would and should be done away with as the nation progressed toward a scientific and modern medical system. In fact, in urban areas, modern gynecology has more or less completely replaced traditional midwifery. The latter mainly finds adherents in rural areas (Ali, 1978: 56).

Even in rural areas, the persistence of traditional medical practice often went hand in hand with the adoption of modern medicine. In a Malay community studied, Hamid (1983: 64-72) identified three disease theories held by the Malays. The first was called “personalistic,” which hinged on the belief in supernatural causes of illness. In this belief, a person’s illness could be a result of possession by a spirit, or *kena rasuk*, or a work of a witch, *kena buatan orang* (ibid.: 78). For supernatural sickness, remedies from the *bomoh*

and *pawang* were sought. The second theory was “naturalistic,” similar to a modern understanding of disease as caused by physiological disorders. Illness in this context was understood as an outcome of physiological dysfunction that was not related to supernatural forces but attributed to other natural entities such as germs. The last theory that underpinned Malay medical knowledge was a combination of both the personalistic and naturalistic theories. Although diseases had roots in nature, they nevertheless were ordained in accordance to God’s will. The tendency to attribute the cause of disease to supernatural factors was especially strong when a disease persisted despite repeated modern medical interventions.

From the perspectives of the Malays, the division of ailments was along the “usual” (*biasa*) and “unusual” (*luar biasa*) lines (Laderman, 2001: 48). Illness could be a result of humoral imbalance or possession by a spirit. The former was treated with herbal remedies, dietary adjustments and thermal treatments while the latter was attended by shamans who exorcised the spirit. An overemphasis on the supernatural cause of disease at times drew criticism from other shamans who held that illness was mainly a result of disharmonies within the self (Laderman, 2001: 52-53).

Research repeatedly shows that the dual approach of healing – visiting traditional medical practitioners and accepting modern medical treatment at one’s convenience – was most popular among rural communities. This was mainly due to pragmatic consideration – they visited traditional medicine when modern medicine failed, but cultural attachment to traditional medicine was still important. As a result, modern science and medical knowledge was only one among other branches of knowledge that could be tapped into for treatment of diseases. Viewed in this light, the understanding of

modern science was based on its utility value, and epistemological issues figured only vaguely in relation to issues of efficacy.

In fact there was an element of faith, *rasa percaya*, among the village mothers who opted for the service of a traditional midwife. Often, the traditional midwife was both a “general medical practitioner” (Hamid, 1983: 111) and a “ritualist” (ibid.: 113).

Because of trust, mothers at the very least become emotionally or psychologically satisfied by the services of the BKG [traditional midwife] even though the traditional medicines that are prescribed by the BKG or the massage performed on the mothers may not necessarily be “medically” effective or safe from the scientific point of view (Hamid, 1983: 202).

The persistence, or revival, of segmented traditional practices and beliefs is very much a part of modern societies. The New Religious Movements, such as Christian Science, Mormonism, and Watchtower, in the United States in the second half of the 20th century are cases in point (Robbins, 1988). In Canada, among certain segments of the population, midwifery remains a practice that continues to be cherished (Bourgeault, Benoit, and Davis-Floyd, 2004).

6.10. Summary and Conclusion

The practice of traditional medicine sheds lights on Weber’s theory of societal rationalization. According to Weber, the advent of modern science brings along with it the process of disenchantment, which gives rise to two possible and contradictory modern conditions. One is the uniformity of modern culture, or “a world of stable calculations” as defined by Holton and Turner (1989: 88). Under this condition, the demise of traditional and religious values paves the way for the domination of the instrumental rationality of

science. The development of modern society thus gravitated toward homogenization of all cultural forms. However, disenchantment may also contribute to the diversification of cultural practices and value forms. This comes as a result of the demystification of nature and diversification of the meanings of the world. The moral issues of right and wrong, as a result, lose their central authority, thus opening up spaces for a plethora of thoughts and beliefs to flourish.

The practice of midwifery in Malaysia speaks to a condition that encompasses both conditions of modernity. On one hand, the concerted efforts to introduce modern midwifery by the government, including the regulation of traditional midwives, continued to see an encroachment of modern midwifery into the realm of traditional culture, which in this case, was defined by traditional midwifery. On the other hand, the persistence of traditional midwifery in the service of cultural continuity gave rise to conditions of diversity in which a dual approach to midwifery – both traditional and modern – was being practiced in the community. Medicine and medical care, in this context, was as much a type of technical knowledge as it was a cultural practice. This is in contradiction to positivist and modernist views of science, which consider culture, other than the scientific quest for objectivity, as an element that does not sit well with modern scientific knowledge.

This process of differentiation continues under the dictate of scientific knowledge. Today, the differentiation is along the lines of prenatal and postnatal care. Obstetrics, a modern branch of the medical knowledge of childbirth, is concerned mainly with the prenatal aspect, while traditional midwifery continues to provide postnatal services during the mother's confinement (*New Straits Times*, July 11, 2003). While

acknowledging the value of traditional knowledge, the Health Ministry nevertheless cautions that certain procedures of traditional midwifery need to be modified “to make sure they are safe to those who opt for the treatment” and have to be scientifically researched and evidence-based (ibid.).

The disenchantment of the world as reflected in the field of traditional medicine can be viewed from the definition and understanding of “traditional medicine” by the World Health Organization. Traditional medicine according to the World Health Organization concerns mainly herbal medicines (WHO, 2003). And the issues that concern the organization are mainly the safety and the preservation of biodiversity. In this modern framework of preservation, biomedicine is scientific and technical but not cultural. Traditional medicine, in this case, is not bio-culture as understood by the Malays. The preservation of traditional medicine, in the eyes of WHO, can, as a result, be conducted *ex-situ*, without regard to the cultural context and other cultural practices that are part of the practice of traditional medicine and indigenous knowledge.

Chapter 7: Modern Science, Disenchantment, and Re-enchantment

So you teach *Shariah* on one side, and modern science, modern sociology and modern economics on the other side. And then this is called an Islamic University, but this is not an Islamic university. An Islamic university is a university in which all subjects are viewed in the perspective of Islam.

Nasr, *Islam and Science*, 2003: 12.

7.1. Introduction

The preceding chapter assessed the process of societal rationalization as modern medicine made inroads into traditional society. While modern medicine by and large displaced traditional medicine, the process was never complete. Traditional medicine survived, especially in rural areas, partly as a cultural practice. The persistence of traditional medicine at the margin of Malaysian society served as an alternative service in situations where modern medicine failed to deliver.

It is important to note that apart from being a cultural tradition that continued to be practiced in rural areas, traditional medicine was consulted where modern medicine failed to deliver. In other words, traditional practices and beliefs found room for survival among the knowledge gaps of science. The disenchantment was incomplete so far as knowledge of science was lacking.

As there remain countless gaps in modern scientific knowledge, there will always be room for non-scientific explanations of natural phenomena, although one may also stay an agnostic. Moreover, since modern science can only adjudicate true and false knowledge, but not right and wrong conduct, there will continue to be areas where

scientific authority ceases to function, and alternative authorities, such as religious authority, prevails.

The lack of ultimate closure in modern science, both in terms of knowledge claim and moral judgment, provides room for the re-enchantment of modern society despite the fact that inconclusiveness of knowledge is expected of, and is not necessarily an issue in, science. More importantly, the compatibility between tradition and modernity often means tradition and modernity mesh easily without necessarily causing the displacement of tradition (Rudolph and Rudolph, 1967).

In Malaysia, the persistence of tradition in modernity can be found both in the cultural realm (Karim, 1992) and in the religious sphere (Peletz, 2002). Living in modern society, one often finds that remnants of the past, such as patriarchal values, continue to manifest in modern ways. In Malaysia, feudalism continues to dominate the mentality of Malaysian society despite the fact that the nation is now formed on the basis of a modern political structure that was introduced during British rule (Alatas, 1968).

7.2. Early Reaction to Modernity: the Kaum Muda (younger generation, reformist) and Kaum Tua (older generation) Debate

One of the key indigenous intellectual reactions to Western influence happened in the early 20th century when there were significant divisions between the traditional elite and a group of younger generation Malays. This younger generation of Malays, the *Kaum Muda* as they were called, were mainly trained in Egypt, and influenced by religious teachings in Egypt. In one of their earliest periodicals, *Al-Imam*, they proposed a revamping of the education system to include the teaching of English and modern science, but at the same time stressed the return to the true teaching of Islam. They encouraged

ijtihad (informed independent investigation) and rejected *taklid buta* (blind acceptance of intermediate authority). Inadvertently, their ideas challenged the traditional aristocrats and village religious leaders and their activities were not well-received by the authorities. Their critical role, however was later overshadowed by the emerging categories of locally and overseas trained Malays who were less sympathetic to religious ideas compared to their enthusiasm for ethnically based Malay nationalism (Roff, 1962).

The intensification of Islamization in the late 20th century was meant to define a modernity that was distinct from the West and rooted in Islamic values. This was a far cry from the Islamization movement in the early 20th century that exhorted the active engagement with modernity through the learning of modern (perceived to be Western) science and through serious participation in the economic entrepreneurship. The Kaum Muda was acutely aware that the domination by European colonialists was based upon their superior knowledge of science (Khoo, 1993), and the path to Malay and Muslim success was through the adoption of modernity, which according to their interpretation, was what Islam would demand its followers to do.

Ironically, after a century of pursuit, while the call to return to the path of Islam remains, the content of the call from the early 20th century contradicted that of the end of the century. The earlier call extolled the values of the modern West while the late-century call disapproved of Western secularism. The change was a result of the realization that modernity in the West would eventually lead to the denial of Islamic religion. In addition, the current quest for Islamization can be understood as a reaction against the inadequacies of the project of modernity in Western societies (Fuller, 2006: 153). It does

not denounce modernity but instead seeks to reap the fruit of modernity without repeating the weaknesses of Western secularization and falling into the abyss of nihilism.

7.3. Crises of Modernity, Decolonization of the Lifeworld, and Re-enchantment of the World

After gaining independence from the British, Malaysia continues to undergo intense modernization and social change. This is reflected not only in the mushrooming of modern physical structures and rising living standards, but also in social and cultural dislocations similar to what Durkheim characterized as social anomie. The emergence of child abuse, youth crime, drug addiction, and a display of “aimlessness” among the youth (Ariffin, 1995), though it reflects very much our new conception of knowledge, deviance and illness (Foucault, 1971), nevertheless points to a changing social reality that needs to be addressed in order to maintain social stability.

Social ills aside, one cannot forget the specter of the iron cage envisaged by Weber as a society modernizes. The decline of meaning and substantive values, as postulated by Weber, provoked a response from religious institutions, since it is in religion that many of our social values are seated. In fact, one of the key issues in contemporary Malaysian society is the Islamic revivalism of the 1980s (Nagata, 1984; Anwar, 1987; Muzaffar, 1987; Mutalib, 1993). Today Islam has become an indispensable source of political legitimacy in Malaysia, and both ruling and opposition parties try to out-Islamize each other (Bakar, 2003).

While the Islamic resurgence is partly inspired and encouraged by the Iranian revolution, its manifestation in Malaysia is often perceived as a disguise of class struggle, where religion is said to be used as a rallying point by disadvantaged social groups to

express their discontent over their condition of marginalization (Kessler, 1978). Amid the tide of globalization, Islamic resurgence in Malaysia is also understood as a response to a crisis of identity in the face of inter-ethnic competition and the homogenization effect of the process of globalization (Nagata, 1984, Muzaffar, 1987).

Apart from Islamic resurgence, there is also a call for a revival of Malay tradition. Interestingly, this call comes mostly from the middle class Malay who, while experiencing and enjoying the fruits of modernity, nevertheless are apprehensive of their waning cultural identity. The quest to preserve traditional culture in turn is tightly enmeshed with the need of the New Economic Policy to define who the Malay are (Kessler, 1992: 144-7). As a result, the yearning for tradition is said to be closely tied to economic considerations. In fact, the regeneration of tradition, such as the construction and display of elegant traditional Malay houses at tourist spots, often overshadows the disturbing reality of lower income citizens who continue to dwell in dilapidated traditional Malay houses as the pace of modernization quickens (Goh, 2001). As a result, tradition in this context is understood to be more an “invention” (Hobsbawm and Ranger, 1983) than a representation of a social and historical reality and ethnic identity.

The above analyses provide insightful views into the socio-economic interests that promote social unity or ethnic solidarity in the name of tradition. However, these views do not take into account the importance of religion and tradition as perennial sources of meaning. The fact that religious interests cut across diverse social classes, among the rich and the poor, points to a different dimension that religion and tradition may offer.

According to Weber, modernization goes hand in hand with secularization. The disenchantment of the world and the decline of substantive rationality will eventually

give rise to the domination of instrumental rationality. The disenchantment of the world causes the loss of purpose and meaning, or the “eclipse of the sacred” in industrial society (Acquaviva, 1979). Can we then conceive the resurgence or revivalism of religious interests in Malaysia as a search for meaning in the face of rapid modernization and erosion of tradition as Malaysian society undergoes the process of modernization and industrialization?

7.4. Scientific Knowledge as a Site of Re-enchantment

The anxiety about loss of meaning is vividly demonstrated in Harun’s *Malay Cosmology in the Era of Information Technology* (2001). It is an attempt by the author to discern the epistemological basis behind such a technology and its possible impact on the mental makeup of the Malays. The main concern lies with the demise of transcendental and religious belief such as the denial of spiritual existence in the modern conception of man.

In line with social constructivism, the book suggests that the design of information technology is closely shaped by human values and beliefs. Technology as a human creation is said to reflect more human mind than technical necessity. The advent of information technology, as such, is only another manifestation of rationalist Western culture. The creation of computer technology that is able to mimic the human mind and interact with human beings hence suggests a cosmology that perceives human beings as machines without spirits. They are merely mechanistic entities. It is clear that the author seeks to remind his readers that technological progress interferes not just with our physical existence but also our spiritual well-being. The arrival of the much celebrated

information age may as well announce the end of spiritual man and the ascent of the “Turing man.”

As a nation where religion plays an important role in everyday life, it is only natural that any hint of obsolescence of religion is disquieting. The apprehensiveness about information technology, as demonstrated by Harun, likely lies with the possible loss of meaning, which in the case of Malays is still very much rooted in Islamic religion.

The same may be said about the “Islamization of Knowledge” effort which was initiated in the Middle East before being introduced to Malaysia. Again, one way of looking at it is through the lens of political economy (Abaza, 2002). The expansion of the project in Malaysia, in this case, can be conceived as an exchange of relationship between politicians who seek Islamic legitimacy and scholars who for various reasons, have to align their interests to those of state.

While the proximity between scholars and political patronage is certainly a legitimate concern, there is also room to interpret this Islamization effort as a response to modernity, or more specifically, the crisis of modernity (Taylor, 1991). One major concern of Islamizers is the alleged lack of spirituality in modern scientific knowledge (Daud and Zain, 1999). While the discourse in the Islamization of knowledge is partly contributed by the rise of the sociology of knowledge, as evidenced by the constant reference to the “Kuhnian revolution” (ibid.), the sociology of knowledge probably provides only a channel to reflect upon a concern that has long been seated in the psyche of modern man.

Another response to the disenchantment of modern society can be seen in re-mystification. If we are to subject ourselves to Weber’s thesis of societal rationalization,

mystical practices should subside and eventually vanish. This, however, is not the case. In the case of Malaysia, amid euphoric economic success, the practice of the occult remains prevalent, even among those who are at the upper echelon of the political structure (Malaysiakini, May 2, 2006, <http://www.malaysiakini.com/news/50470>). Harun accords this phenomenon to a search for spiritual meaning amid an increasingly rationalized society. It is a quest for a more “holistic” existence that fulfills both material and spiritual needs.

The continuity of mysticism is certainly not unique to Malaysia. Earlier study in Bali reveals the same phenomenon (Boon, 1979) where the author comes to the same conclusion that the process of societal rationalization and modernization had prompted efforts to re-enchant or re-mystify the world instead of demystification. In fact, this did not happen only in Islamic societies like Malaysia, it occurred also in Western societies. As argued by Tiryakian (1992), exoticism in the West is a form of “re-enchantment” and the quest for a collective consciousness, whether in the French Revolution or more recent social movements, are different forms of “dedifferentiation.” Both forces of re-enchantment and dedifferentiation are directed at the disenchanting tendency of modernity.

It is in this light that Islamic banking in Malaysia is said to be an effort to “re-embed” religious values into the instrumentalized modern system of capitalism (Schrader, 2000). There is no doubt that Islamic principles are more closely observed in Islamic banking; in fact they are said to have helped to mitigate the impact of the currency crisis in 1997 due to their lesser involvement in high risk investment (Shamsul, 1999). However, doubts remain regarding whether the Islamic Bank is not the same as other

commercial banks in terms of the practice of usury, which is prohibited by Islam (Yaakob, 2004). Although no interest giving is involved, the Islamic Bank nevertheless shares its profits at a competitive rate that closely matches other commercial banks. As such, it is said to practice quasi-interest. Still, it attracts a substantial number of customers, Muslims and non-Muslims included, and becomes a credible alternative to a conventional commercial banking system. As a symbol of Islamic practice, it has certainly served the purpose of bestowing religious meaning to the otherwise mechanistic system of capitalist economy.

7.5. An Answer to Western Hegemony?

In an era where Islam as a religion is suspected of promoting religious fundamentalism, the discourse on Islamic knowledge is often viewed in the same light as part of the effort of Muslim communities to challenge Western hegemony. The Islamization of knowledge is also a rejection of Western domination which is deemed to be closely associated with Western knowledge. Rooted in this perception is the understanding that knowledge is contextual and not neutral. In the 19th and early 20th centuries, dominant Western knowledge is perceived to be engaging in “epistemological imperialism” (Sardar, 1985: 85) and suppressed if not eliminated non-Western knowledge, which led to the oppression of non-Western societies. In order to regain an Islamic “way of life” in accordance with Islamic teaching, it is essential to Islamize Western knowledge, which is regarded as secular knowledge devoid of divine quality. As a result, “de-westernization” of knowledge means the reintroduction of the divine into the

corpus of modern knowledge, and achieves the Islamic dream of semi-modernity (Tibi, 1995; 1993).

While the struggle to make Islamic identity distinct from Western tradition is an overt objective of the Islamization of knowledge, the discourse has a greater relevance than merely being a reaction to Western hegemony. As argued by Zaidi (2006), the project of the Islamization of knowledge should be conceived as an effort to engage in a dialogue with Western civilization. One aspect of the malaises of modernity (Taylor, 1991) is the loss of meaning due to the disenchantment of nature. The Islamization of knowledge is said to be an effort to address this dilemma of modernity and re-enchant the modern knowledge of science.

In other words, Islamic resurgence in different parts of the developing world, Malaysia included, is a response to the encroachment of Western secular values on religious sensibilities. The quest for Islamic identity amid global domination by Western culture happens under the condition of globalization that brings Western culture to every corner of the world. Much of the Islamization quest occurs, ironically, through the global movement of intellectuals and political alliances that are made possible by the process of globalization. In Malaysia, the main proponent of Islamization, Syed Naquib Al-Attas, was strongly supported by Anwar Ibrahim when the latter was the former Deputy Prime Minister of Malaysia. Osman Bakar, who was a former student of Syed Hussein Nasr, also played a key role in articulating the idea of Islamic science, and was a close associate of Anwar Ibrahim. The common sharing of misgivings over Western cultural domination, at the price of devaluing Islamic tradition and Muslim identity, was given a new lease of life in social action under the condition of globalization (Lotfalian, 2004)

In another view, Shamsul (1983) argues that the Islamic revivalism, especially the *dakwah* movement in the 1970s, was an attempt to reconnect to tradition and seek reassurance especially among educated young urban Malays who were “confused” and “disoriented” by the urban milieu which is one of the main symbols of modernity.

One of the important legacies of British colonialism is the separation of religion from politics. Prior to the process of European colonialism, Islamic religion was tightly intertwined with political structure whereas after the British colonialism, Islam was separated from the state through the bureaucratization of the state. Islam was thus “traditionalized” and “marginalized” (Shamsul, 2005).

7.6. Summary and Conclusion

The process of societal rationalization is accompanied by the decline of substantive rationality. The loss of purpose and meaning destabilizes the moral foundation of modern society, at times giving rise to nihilism. This, coupled with the continued presence of old and new scientific knowledge gaps, provides room for the re-introduction of traditional interpretations of modern science, and a resulting re-enchantment of modern society.

In Malaysia, one of the sites of re-enchantment is located in modern scientific knowledge. Capitalizing on the constructivist notion of scientific knowledge production, some scholars (Nasr, 1993) argue for the re-interpretation of modern science in an Islamic framework, calling for the “Islamization of Scientific Knowledge.” The initiative had its roots in a global network of scholars inspired by Ismail Al-Faruqi (Abaza, 2002). In this respect, the question for Islamization, including Islamization of Knowledge, can

be understood as a quest to re-enchant the world that has been secularized. However, given the relatively objective and universal nature of scientific knowledge, the relativist concept of Islamic science is built on a shaky foundation and may not be tenable (Huff, 1996).

In Malaysia, the initiative of Islamization of Knowledge has received little attention and has achieved little over the years. The Islamization of social institutions such as the Islamic Bank on the surface attained greater success although great doubt remains as to whether it truly functions according to major Islamic principles (Yaakop, 2004).

Chapter 8: Summary and Conclusion

But science is encroaching on more issues of core human values ... and that is causing discomfort in the public and tension in the relationship It's depressing that many Americans don't believe in evolution.”

Alan Leshner, executive publisher of *Science Magazine*, quoted in *University Affairs*, January 2007: 39

8.1. Introduction

Before the introduction of the modern clock to Malaya, the time of day was expressed in terms of rooster calls – the first call is at approximately 2 a.m., and the sign of the sky; for instance *bongkar cherah* referred to the first sign of dawn, etc. (Brown, 1921:1). The introduction of modern technology, such as the clock, was to intensify the process of rationalization in which the determination of the time of day, and for that matter most other affairs, were made more exact and precise. In general, this trend was applicable to both Western and non-Western societies that underwent the process of societal modernization. However, at what point the similarity ended and differences began is a subject of contention.

Weber's theory of societal rationalization was formulated in response to the changing social conditions in Europe as it underwent the process of industrialization and modernization. Although they varied from one European country to another in details, the European models of societal modernization nevertheless shared similar traits in terms of societal rationalization. With European expansion and globalization, these models were

being exported to other parts of the world, including Malaysia. Despite the in-depth and continuous studies of the process of societal modernization and rationalization in Europe and Western societies – more recently Habermas’ response to the critique of modernity – little research has been conducted to analyze the process of societal rationalization in non-Western societies. In the context of Southeast Asian societies, Wertheim (1995) and Alatas (1972) voice their concerns about the lack of enthusiasm in applying Weber’s theory of societal rationalization to the study of modernization in Southeast Asia. In other parts of Asia, the studies by Takayama (1998) and Bellah (2003) on Japanese society are a few exceptions.

Being a former British colony, modern Malaysia is made mainly in the image of Britain. In other words, British intervention in Malaya set the tone and foundation for the kind of modernity that Malaysians live today. British colonialism introduced to Malaya major modern systems and institutions that make Malaysia look similar to Western societies in many aspects. Equally significant is the introduction, on a substantial scale, of modern science to Malaya. Some of the scientific institutions established during the British colonial period, such as the Institute for Medical Research, remain active and productive to this day.

After nearly 50 years of independence, Malaysia today is defined both in terms of its modernity and its Islamic credentials. In general, Malaysia is perceived to be an Islamic country that is able to blend Islam and modernity harmoniously (Hamayotsu, 2002). At a time when successful modern Islamic nations are few and far between, the relatively peaceful co-existence of religious conviction and modernity in Malaysia conjures an image of Malaysia that is keenly praised as a “model Islamic State,” which is

to be emulated by other seemingly failing Islamic states (*New Straits Times*, Nov 18, 2003).

From the European experience of modernization, the major challenge presented to religion came from modern science. The latter posed a major threat since it destabilized the metaphysical foundation of religion. On the surface, Malaysia's success in building a modern Islamic state may indicate a different model of modernization. However, whether this is the case remains to be answered. This research is guided by this line of inquiry. By studying the interaction between modern science and traditional Malayan society using the sociological framework of societal rationalization, the analyses of this study point to a similar path of societal rationalization, and the notion and meaning of the "Modern Islamic State" remains contentious and problematic.

8.2. Modern Science and Societal Rationalization

The introduction of modern science to Malaysia was an offshoot of the process of British colonization. The value of science in the making of colonies laid with its efficacy in resolving difficulties encountered in the process of colonization. This was achieved by identifying, controlling, and transforming colonial disorders, which were often themselves consequences of colonization, into a regime that was economically productive and socially conforming. In this process, colonial societies were subjected to the calculative measures implemented by the British colonial administration and informed by knowledge of science (Cohn, 1996).

The production and deployment of scientific knowledge in colonial societies signalled the intensification of an enduring process of societal modernization and

rationalization. According to Weber (1930), the process of societal rationalization is a two-prong process of disenchantment and the rise and domination of instrumental rationality. The disenchantment of the world happened as a result of a scientific exposition of nature which excluded metaphysical content and was self-sufficient in its explanation through the employment of mechanical principles. Consequently, nature was seen as an autonomous operating system devoid of meaning and destiny. The modern scientific worldview was often at odds with traditional and religious worldviews, and the demystification of nature led to the marginalization of religious authority in modern society. This occurred in tandem with a shift of leadership style from that of traditional and charismatic to legalistic-bureaucratic.

The decline of value rationality in turn paved the way for the dominance of instrumental rationality. Modern science contributed to the widespread use of refined and detail-oriented techniques of efficiency in modern societies. These techniques of efficiency permeated diverse life spheres, including child rearing, which conventionally did not hold efficiency, but love and happiness, as the criteria of success. In this process the life sphere of cultural reproduction was said to have been colonized by the life sphere of material reproduction (Habermas, 1984).

Associated with the accumulation of scientific knowledge was the increasing sophistication of societal management, from one that relied on the power of sovereign and brute force to one that drew increasingly on knowledge of human and social behaviours. The management of modern society, according to Foucault, deviated from one that exerted control over the body to one that sought to encourage docility of the soul. Foucault's exposition is an extension of Weber's legal-rational discipline to personal and

psychological discipline (O'Neil, 1986). Increasingly, modern society stresses efficiency and in the process, enforces conformity. The purported ethos of enlightenment – freedom and emancipation – thus remains unreachable by individuals. In fact, the spectre of an “iron cage” in which the individual becomes merely a cog in a gigantic and self-perpetuating system looms large. All in all, modernization brings two malaises of modernity – one, the loss of meaning; the other the loss of freedom.

8.3. Colonial Medicine and Colonial Economy

In colonial society, issues of health and illness were some of the most pertinent in the process of colonization, because they threatened not only the efficiency of economic extraction but also the survival of expatriates and their families. Naturally, the institutionalization of modern medical services in Malaya came early in the process of colonization. Modern medicine, as a result, was quick to be incorporated into the system of governance in colonial society. Together with other sciences such as geography, medical science informed and structured colonial policies towards maintaining the stability and continuity of the project of colonialism.

This study continues the predominant tradition of the political economy approach in the study of colonial science and medicine in British Malaya. It however goes beyond this approach and analyses the role of science and scientific knowledge not only in directing and setting social agendas, but also in influencing social values and worldviews. In this connection, it acknowledges the importance of social economic interests, especially those of British colonialists, in the introduction and implementation of modern medicine, and medical and public health policy to British Malaya. However, it goes

beyond the political economy perspective to investigate the semi-autonomous existence of science, and how science and scientific values infiltrated social realities in Malaysia.

The strength of the political economy approach lies with its ability to discern the often obscured human interests behind the seemingly disinterested and authoritative claims of science. The singular focus on human desire and needs, however, often overlooks the autonomy of science, and makes science a passive instrument subservient to human manipulation rather than recognizing its function in directing the process of societal rationalization in modern societies. By incorporating science as an autonomous agent, one risks being apologetic for the colonial enterprise and does injustice to the suffering of colonial subjects in different parts of the world. However, by ignoring the fact that science possesses some degree of autonomy that at times acts against the aspirations of individuals, one may underestimate the role of science in shaping its own path and the path of social development.

In general, the approach of this thesis is one that stresses the co-construction of modern science and society (Jasanoff, 2004). Although science enjoys a certain autonomy, this autonomy is valid only to the extent that it commands the trust and respect of not only the major scientific community but also the social community. In this regard, scientific authority is tied to social authority. Scientific authority, while based largely on virtuosity, or methodological scrupulousness, and not human sanction, nevertheless needs to find expression through the medium of human expression, language or otherwise. In the process, scientific authority is constructed, but the construction needs to be done with respect to the authority of science. Science and society are thus engaged in a dialectic relationship of co-production.

8.4. Science as an Agent of Social Change

The social constructivist school of thought tended to stress the social influence of society on the construction of modern scientific knowledge both at the social and cognitive levels. Viewed from this perspective, the agency or proactive status of science was often obscured. In the case of Malaya, the coming of age of the germ theory of disease stimulated laboratory research both at the colonial metropolis and the periphery, and contributed to the establishment of the Institute for Medical Research in Malaya.

The germ theory in fact further dictated the enactment of various measures for the social and physical control of infectious diseases, including the formation of Sanitary Boards in major cities. New sanitary regulations were enacted and provided justification for greater surveillance and intervention in private life such as housing conditions and individual behaviours.

Despite what it accomplished in terms of public health policy, the over-emphasis on the germ theory of disease in fact distracted the medical search for the etiology of beri-beri disease from the deficiency theory which was the correct theory. However, the deficiency theory eventually prevailed and one of the major puzzles of illness during the late 19th and early 20th century was solved. In the case of beri-beri research, despite the social influence of the germ theory of disease, modern scientific research had allowed for the filtration of social influence and made a successful identification of the etiology of the disease based on laboratory evidence.

8.5. Science, Modern Medicine, and the Regimentation of Society

One of the earliest branches of modern science introduced to Malaya was that of modern medical knowledge. Initial modern medical services in Malaya catered to expatriate and military personnel. However, as tropical diseases quickly took a toll on immigrant labours, modern medical services, such as hospitals, were extended to the labourers. While modern medical knowledge helped to alleviate illness and provided protection against various deadly diseases, it also dictated the expansion of medical surveillance and the encroachment on individual privacy. The coming of age of the germ theory of disease at the turn of the 20th century dictated an expansion of sanitary programs that supervised sanitation at the household level. From the disposal of night soil to the design of a residence, the colonial administration intervened deeper and deeper into citizens' private lives. Various regulations were enacted to instruct and shape social behaviours in line with the latest understanding of disease infection and spread.

At the turn of the century, the focus of disease control also shifted from curative to preventive measures. While the construction of modern hospitals continued to grow, more and more effort was put into the development and practice of preventive measures. The establishment of Sanitary Boards and later the introduction of the concept of social medicine were examples of changing techniques of disease control. The latter focused on the incorporation of social factors into disease diagnosis, signalling a change of strategy from the healing of illness to the promotion of health and healthy habits.

Concurrent with the changing concept of health and health remedy, the control of patients also increasingly moved away from coercive means to persuasive means. The control of leprosy patients was a case in point. In order to promote leper settlements as

health institutes and to avoid their degeneration into prison institutes, rehabilitation of leprosy patients was conducted with fuller attention to their civil rights and social and psychological needs, signalling a change in the strategy of control that eventually saw a substantial increase in the voluntary confinement of leprosy patients to leper settlements. Modern science, or more specifically modern medical knowledge, while providing greater relief from illness, also demanded greater surrender of individual rights to a state that was increasingly adept in the deployment of persuasive means of control.

8.6. Disenchantment and Re-enchantment of the World

One of the biggest cultural impacts of modern science on traditional societies is the demystification of nature, or the disenchantment of the world. With the introduction of modern medicine, the role of the shaman and traditional medicine man was in decline. Shamanism was increasingly seen as a superstitious practice rooted in ignorance. However, the elimination of traditional medicine was never complete. Modern patients visited traditional medicine men for various reasons. Some visited as part of their cultural practices; others found traditional medical practice emotionally more fulfilling compared to the more detached modern hospital approach. Still many sought traditional medical help as an alternative after prolonged and unsuccessful modern medical treatment. This provided additional room for the survival of traditional medicine. As modern medical knowledge was always in progress and incomplete, there would always be knowledge gaps in which traditional medicine could thrive. Despite the continued marginalization of traditional medicine, today in Malaysia there are more than 5,000 registered traditional medical doctors complementing modern medical service (*The Star*, April 29, 2007).

Even in situations where modern medical knowledge was able to furnish the etiology of a disease, it was not always possible to fully answer why a particular patient contracted a disease while someone else did not. This often left room for shamanism and metaphysical exposition, although the demystification of nature meant that one could choose to leave the question unanswered while believing that a scientific explanation could be found.

More significantly, as Weber contended, modern science was only able to tell “what is” and not “what ought to be.” In other words, when it came to moral questions of right and wrong, one might have to resort to cultural and religious resources to find a solution. On top of that, the disenchantment of the world by modern science also caused the loss of meaning about the existence of the human race. This again provided room for metaphysical exposition. The process of Islamization in Malaysia, such as the establishment of the Islamic Bank, apart being investigated from political economy perspective, could also be understood as a process of re-enchantment where modern institutions were brought in line with religious teaching (Schrader, 2000).

8.7. The Place of Modern Science in Modern Malaysian Society

Malaysia sent an astronaut to the International Space Station in October 2007. One of the major concerns of the trip was the determination of prayer times and the direction of Qiblah in order for the astronaut, who was a Muslim, to perform his religious duty. It was reported that the Malaysian Islamic Development Department (Jakim) had been requested by the Science, Technology and Innovation Ministry to come up with a guideline on this issue (*The Star*, April 27, 2007). This was a difficult religious duty to

fulfill given the fact that the International Space Station orbits the earth sixteen times a day, and if the astronaut were to follow the usual five-times-a-day worship, then he would have to perform 80 worships at the international station. The direction of Qiblah (Mecca) was also another issue that needs to be resolved.

Many modern scientists have a personal religious conviction (Collins, 2006). However, unlike European societies, the relationship between science and religion in Malaysia is accepted as mutually inclusive by the state and among the majority of the Muslims. As a result, the concurrent practice of science and religion is never an issue. A Malaysian scholar of Islamic science, Osman Bakar, argues that “there is hardly any difference between the traditional Muslim account of the structure of science and its modern version of science” (Bakar, 2003: 37). What this means is subject to further debate but there is an entire corpus of intellectual efforts that provide grounds for the assertion of the congruity between modern science and Islamic religion. The need to argue for congruity between Islam and science points to the persistence of the tension between modern science and religion. How the country is able to hold this tension in check is a subject that remains to be investigated.

8.8. Science, Society, and Modernity

The compatibility between modern science and Islamic religion in Malaysia, as compared to the strict separation of the two in other industrialized countries, speaks to the flexibility in the interpretation of the meaning of modern science. In the case of Malaysia, modern science is defined in a way that is in congruent with religion. However, this occurs only at an abstract level, and in the concrete day to day laboratory research and

classroom teaching, including the teaching of the theory of evolution, the same methodologies and syllabi of modern science that are used in other industrialized nations are imported wholesale and are being used in Malaysia. In other words, epistemologically, modern science currently practiced in Malaysia is the same as modern science in other industrialized nations. The difference that is sought to be formed is only at the ontological level, which does not have an immediate impact on the everyday working of science.

In this regard, one can understand modernity as being comprised of two dimensions - institutional and cultural (Tibi, 1995: 3). Viewed in this framework, Malaysia has adopted the institutional dimension of modernity wholeheartedly, but is still in the process of negotiating the cultural dimension. While playing catch-up to the West in the institutional dimension of science, Malaysia is also actively pursuing the cultural dimension of modernity in the mould of Islam, despite the fact that the latter is itself subject to varied interpretations. Where this will lead Malaysia in the future remains to be seen.

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