Polity and Petroleum

Making of an Oil Industry in Assam, 1825–1980

By

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STATEMENT

I hereby declare that this thesis, entitled *Polity and Petroleum: Making of an Oil Industry in Assam, 1825-1980*, is the outcome of my own research work in the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati, India, which has been carried out under the supervision of Arupjyoti Saikia in the Department of Humanities and Social Sciences.

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Certificate

It is certified that the matter embodied in the thesis entitled *Polity and Petroleum: Making of an Oil Industry in Assam, 1825-1980,* submitted for the award of the degree of Doctor of Philosophy by Ditee Moni Baruah, student of the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati, India, has been carried out under my supervision. It is also certified that this work has not been submitted anywhere else for the award of a research degree.

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Abbreviations

AC	Assam Company
AAORAC	All Assam Oil Refinery Action Committee
AASU	All Assam Student Union
AAGSP	All Assam Gana Sangram Parishad
AICC	All India Congress Committee
ALA	Assam Legislative Assembly
ALAD	Assam Legislative Assembly Debate
AMOC	Assam Mineral Oil Company
AOC	Assam Oil Company
AOS	Assam Oil Syndicate
APOC	Anglo Persian Oil Company
ARTC	Assam Railway and Trading Company Ltd
ASA	Assam State Archive
ASB	Asiatic Society of Bengal
BOC	Burmah Oil Company
EIC	East India Company
GOI	Government of India
GSI	Geological Survey of India
NAI	National Archives of India
NMML	Nehru Memorial Museum and Library
OIL	Oil India Ltd.
ONGC	Oil and Natural Gas Commission

OUP	Oxford University Press
SRCB	Saligram Rai Chunnilal Bahadur
ULFA	The United Liberation Front of Assam
US	United States of America
WWI	First World War
WWII	Second World War

Glossary

Aeromagnetic Survey	A survey that uses magnetometer and an airplane to record variations in magnetic field of the earth. It is useful to find out the depth to basement and to locate structures.
anna	a monetary unit, equivalent to one sixth of a rupee.
Barrel	A unit of volume in the petroleum industry. A barrel is equivalent to 42 U.S. gallons, which is about 159 litres
bigha	a traditional unit of measurement of land, equivalent to 0.33 acres
Boiler	A pressure vessel, used to generate steam power from water with help of heat.
Boring	The act of drilling a hole in the earth through the surface rocks.
dharna	sit-in protest.
diya	oil lamp
eksoniya	annual proprietary right over land.
fasal	agrarian production.
Gallons	A unit of volume, equivalent to 3.7 litres.
gola	marwari shop
Gravity Survey	An exploration method in which gravity meter is used to measure the strength of the gravity of the

	earth on the surface at different locations. It helps in detecting the densities of surface rocks.
hartal	strike.
khadi	hand spun and hand woven cloth
kothi	bungalow
lathi	stick
maund	a variable unit of weight, generally equivalent to 36 kilogram in Bengal.
mali	gardener
muga	mulberry silk
naamghar	place for congregational worship
paniwala	water carrier
pung	well
satyagraha	non – violent strike
Seismic Survey	Method of investigating subterranean structure. It has replaced the technique of exploding dynamite underground.
tel	oil, in Assam the term is used for both edible and fuel oil.
Wildcatter	A person or an organisation willing to conduct exploratory drilling in an unproven area.

Acknowledgements

In the popular discourse, the name Assam has always been associated with tea. However, with the introduction of tea plantations during the colonial rule, the region also experienced geological mapping and exploitation of other natural resources. The thesis is an attempt to study the development of an oil industry in eastern Assam under western capital that had to accommodate local specificities.

At the very beginning I would like to acknowledge my supervisor, Arupjyoti Saikia for his valuable guidance and critical appraisal. I owe a special debt to the members of my Doctoral Committee, Debarshi Das, Saundarjya Borbora and Chandan Mahanta for their critical observations and advice.

I offer my sincere gratitude to the staff of the Assam State Archive in Guwahati. I specially acknowledge Haren Baishya for responding to my demands under numerous constraints. I also thank Director, Assam State Archives and Arnab Kashyap and other officials for helping me out in various occasions in the archive. I would also like to recognise the support of the staff at the Secretariat Library, Dispur; Department of Historical and Antiquarian Studies, Guwahati; Nehru Memorial Museum and Library, New Delhi; the library of Geologiacl Survey of India, Shillong; the Centenary Museum of the Assam Oil Division, Digboi; the National Archives, New Delhi; District

Library, Guwahati; Central Library of the Indian Institute of Technology, Guwahati.

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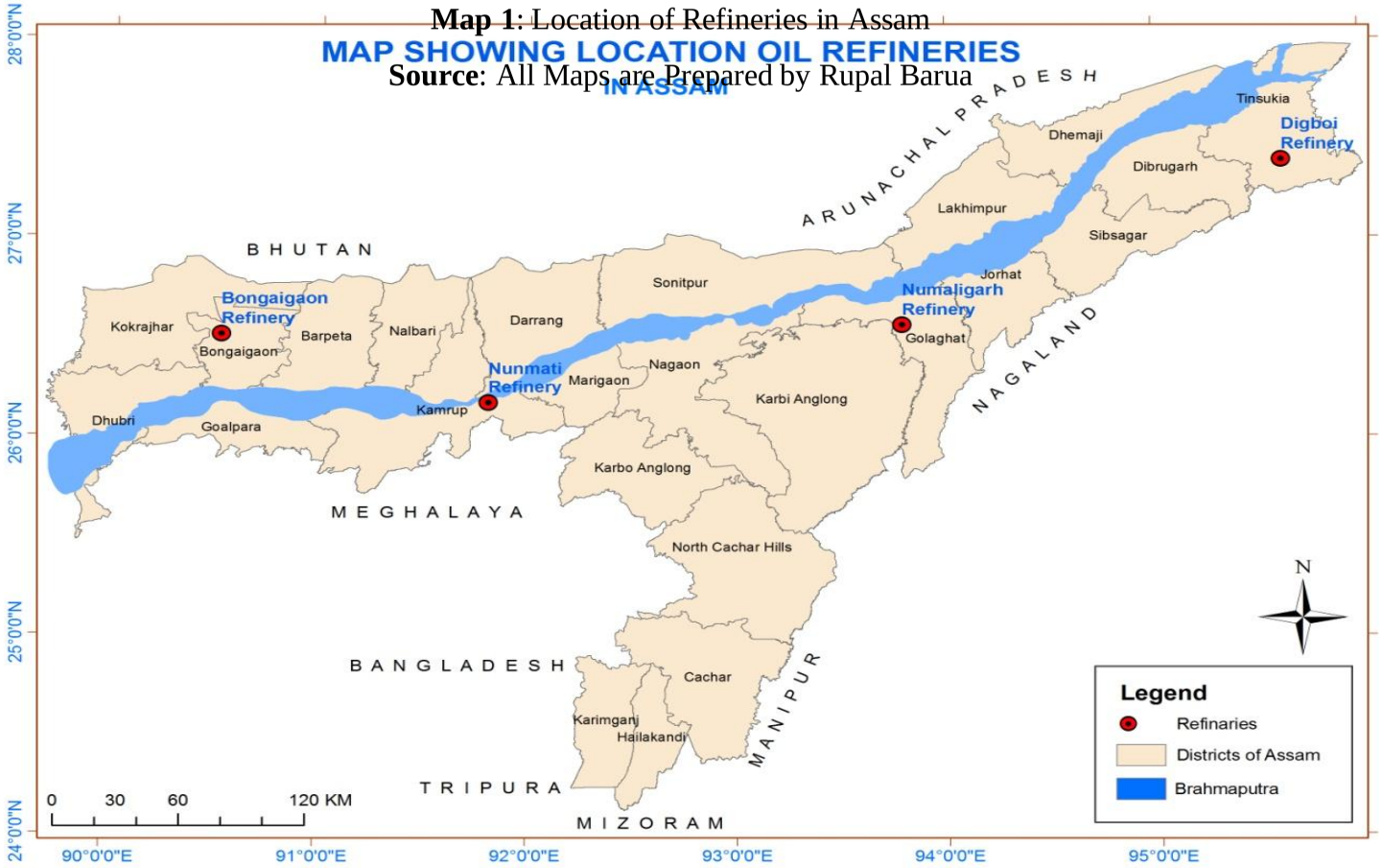
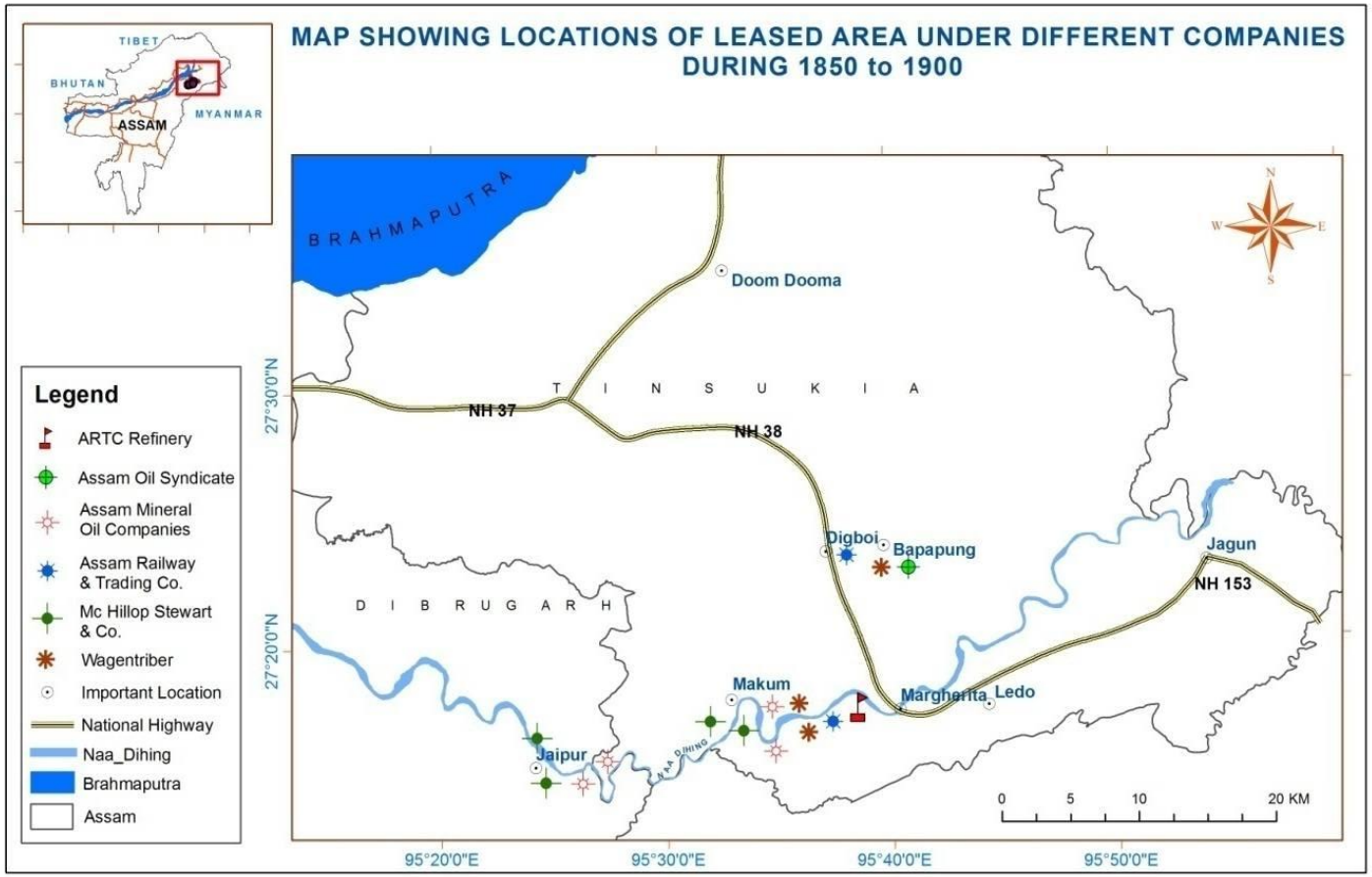


Map 1: Location of Refineries in Assam

Source: All Maps are Prepared by Rupal Barua

Map 2: Area Leased out to Different Companies (1850s – 1900)



Chapter 1

Introduction

In 1825 Lieutenant R. Wilcox, an army man and geologist of the British East India Company wrote about the possible presence of crude petroleum in Assam, yet to be added to the eastern most province of British India.[1] Wilcox found oil in the bed of the river Burhidihing at Supkong near a coal bed in the eastern Assam. Several others from the EIC also subsequently reported about the presence of oil. Years later, C.A. Bruce, the man largely credited for his discovery of tea-plant reported about several oil seepages at Makum in eastern Assam. In 1837, Major Adam White, Political Agent, Upper Assam, too found oil near a river in Namrup below coal bed. Close to a coal field near Borhat in eastern Assam, Francis Jenkins in 1838 noticed several oil springs. In 1845, Captain S.F. Hannay reported oil seepages at Naharpung near a bed of fine coking coal. However, it was only after the GSI took over the systematic exploration of oil in Assam, the government considered to develop the oil industry in Assam.

After the formation of the GSI in 1856 the exploration of Indian mineral resources became more scientific and institutionalised. The case of petroleum in Assam and its neighbourhood like Lower Burma was no different either. H.B. Medlicott, Deputy Superintendent of the GSI, in his survey of the coal tracts mentioned the presence of good oil springs at Makum. Medlicott

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[1] Lieutenant R Wilcox, "Memoir of a Survey of Assam and the Neighbouring Countries, executed in 1825," *Asiatic Researches*, Vol.17 (1832), p.415.

suggested that 'experimental borings should be made to test the value of oil accumulated'.[2] By then the importance of petroleum as fuel was known to people due to the exploitation of oil in US. The advice of Medlicott was followed when Goodenough of Calcutta based company; the Mckillop Stewart and Company obtained permission to strike an oil spring near Makum. But nothing much was achieved till the 1880s and very slow development occurred.

India in 1900 was producing less than one per cent of world's crude oil production and practically none of this oil came from India.[3] Though throughout the nineteenth century oil fields in India attracted the attention of geologists, it was only by the turn of the century that systematic effort was put to produce oil in British India. The main areas producing oil then were Digboi in Assam and Punjab, apart from Burmese fields. In 1900 the Assam oil fields produced around 750,000 gallons of petroleum per year and those of the Punjab just around 2,000.[4]

However, all of the oil produced in India in 1900 came from Burma. Centred on Yenangyaung, the oil industry in Burma existed for several centuries.[5] The hereditary right to dig for oil was entrusted upon 24 heads of families, known as Twinzayos (well eaters). After the annexation of Burma by the British in 1886, the well sites belonging to the former Burmese king, Mindon Min, became the property of the Crown. The GOI in 1891 leased these

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[2] H.K., Barpujari, *The Comprehensive History of Assam*, Vol V, 2nd Edition (Guwahati: Publication Board Assam, 2004), p. 86.

[3] G.G. Jones, "The State and Economic Development in India 1890-1947: The Case of Oil," *Modern Asian Studies*, Vol.13, No.3 (1979), p.356.

[4] *Ibid*.

[5] *Ibid*.

wells to the BOC. The British government recognised the property rights of the Twinzayos and the BOC also had leased some of their land. Modern drilling was initiated by the BOC and with the help of geologists new oil fields were discovered at Yenangyaung.[6]

In the early 1888, a successful boring was done at Digboi by the ARTC, but for further exploration and to establish a refinery, it needed an increased capital. To meet that end a subsidiary company was formed in London, the AOC that took over the rights of the ARTC and a refinery at Digboi was established. Till 1921, the ARTC was closely associated with the AOC when the BOC took over the AOC and the BOC provided AOC with technical and commercial supports.

The petroleum industry in the world, by the turn of the nineteenth and the beginning of the twentieth century, was at a nascent stage and was modest in its size with rudimentary technology, products and organisation. Energy supply in the early twentieth century was still predominantly dependent on coal. The most important product of the oil industry was kerosene, which was used mainly for lighting purpose. The industry was neither technologically sound nor the crude oil exploration and production was efficient. The 'wildcatter' remained the basis for exploration. The oligopolistic[7] structure of

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[6] The crude oil production in Burma increased from 6 ½ million gallons in 1891 to more than 222 million gallons by 1911.

[7] An oligopoly is a market form in which a market or industry is dominated by a small number of sellers (oligopolies). Because there are few participants in this type of market, each oligopolistic is aware of the actions of the others. The decisions of one firm influence, and are influenced by, the decisions of other firms. In an oligopolistic market the degree of market concentration is very high.

the oil industry was yet to emerge in 1900. However, the evolution towards the growth of massive multinational oil companies had started to unfold by the early twentieth century. In USA John D. Rockefeller's [8](1839 –1937) Standard Oil Company rose to dominance. The Nobels[9] and the Rothschilds[10] had developed large scale interests in Russia while the Royal Dutch Company was formed in 1890 to exploit the discovery of oil in Sumatra.

By the 1920s, the oil industry made significant advances. Crude oil production rose from 20 million tonnes in 1900 to more than 140 million tonnes in 1925 recording a sevenfold increase. New oil producing areas were discovered, particularly in the Middle East and the South America. At the same time, with the help of geological and geophysical methods exploration techniques were becoming more efficient and scientific. Fuel oil had also able to capture a large share of coal's traditional markets.

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[8]John Davison Rockefeller was an American industrialist. In 1870, he founded the Standard Oil Company and aggressively ran it until he officially retired in 1897.

[9] The Nobel family was a successful entrepreneur family of Russia. Alfred Nobel is only one member of the Noble Family. The other significant members were his father Immanuel, brothers Robert and Ludwig and nephew Emanuel. The family was involved in the industries of armaments, petroleum, chemical and transportation. *The Petroleum Production Company Nobel Brothers, Limited, or Branobe* was established in 1876, as a distillery and by the late nineteenth century it was one of the largest oil industries. With the rise of Bolsheviks the power and affluence of the family declined.

[10] The Rothschilds family was a Jewish banking family spread over France, England, Austria and Naples. The Rothschilds due to their huge investments in Caucaseu by late nineteenth century emerged as one of the world's leading producer and distributor of oil. With their company Standard Russe, they exploited the rich oilfields of Baku and with a huge refinery they could control their own oil production. In 1902 the family entered into partnership with the Royal Dutch and Shell to form the Asiatic Petroleum Company to exploit the oil fields of Russia.

In 1900, the oil industry was dominated by the Standard, the US based company.[11] By 1914, along with the rapid growth, the oil industry experienced the emergence of a few firms, collectively known as 'majors' or 'seven sisters' which came to dominate the international oil industry and created an integrated business in oil.[12] The majors include five American oil companies – the Gulf Oil Corporation, the Texas Company (Texaco), the Standard Oil Company of New Jersy (Exxon), the Standard Oil Company of New York (Mobil) and the Standard Oil Company of California (Chevron); an Anglo Dutch company, the Royal Dutch Company and a British enterprise, the British Petroleum Company. The majors were actively involved in research, exploration and production of oil. They also refined, transported and marketed various petroleum products. The majors were influential in fixing prices of petroleum products and played the role of intermediaries between the countries selling and buying oil. Biplab Das Gupta argues that the majors 'knew everything there was to know about the oil industry, and tried their best to keep this knowledge to themselves'.[13] The massive size and capital along with the multinational character of the majors enabled them to invest enormously and

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[11] The Standard Oil by the late nineteenth century could monopolise oil refining in the United States and became vertically integrated. It was a major influence in the world. For details, see M. S. Vassiliou, *Historical Dictionary of the Petroleum Industry* (USA: Scarecrow Press, 2009), p 13.

[12] The majors along with Compagnie Francaise des Petroles (CFP) dominated the world petroleum industry through a series of consortia. BP, Shell, Exxon, Mobil, and CFP were part of the Iraq Petroleum Company consortium that dominated the oil industry in Iraq in the twentieth century. For details, see *ibid.*, p 14.

[13] Biplab Dasgupta, "World Oil, Development and India," *Social Scientist*, Vol.5, No.6/7(1977), p. 49

take risk which resulted in the discovery of oil at Alaska and North Sea. The majors would aggressively follow the policy of maximising their aggregate profit from all the operating countries whereas the oil producing countries would look for maximisation of revenue. As a result the global objectives of the majors conflicted with the national objectives of the producing countries. The monopoly of the majors was challenged by the nationalisation of oil production in the East Asia and elsewhere and with the establishment of Organisation of the Petroleum Exporting Countries (OPEC) in 1960. The OPEC was formed to regulate the supply of oil and to control the fluctuation of prices of oil in the world market.

The influence of the majors was also limited by the growth of Soviet Union as exporter of oil and technology. From 1955–59, Soviet exports increased from 3.6 million tons to 25.4 million tonnes.[14] The Soviet growth of export was mainly because 'it was cheaper, available on good credit terms, payable in local currency or with non-oil commodities like cotton (Egypt), sugar (Cuba), tobacco (Greece), citrus fruit (Israel) and steel pipes (Italy)'[15]. Besides, Soviet was ready to help other countries in the construction of oil refineries and technologies for oil exploration without demanding for equity participation.

It was in the last decades of the nineteenth century the British government in India became interested in commercial aspects of petroleum resources of India. The growing interest of the government reflects from the fact that there was an increase in the number of land leases to explore oil in

[14] *Ibid*., p.53.

[15] *Ibid*.

both Brahmaputra and Surma Valley.[16] The two reasons provided by Jones for this growing interest were that the Crown possessed the mining rights over the territories of the Indian Empire and the extensive use of kerosene by Indian consumers. The period coincided with the British Admiralty's serious experiments of use of oil instead of coal in its warships. The Indian market was dominated by American and Russian oil, but by 1904–05 the BOC captured 35 per cent of the Indian market. The expansion of the BOC in the Indian market was safeguarded by the government exemption of tariff on the import of oil. The government emphasised on the rapid development of the BOC, but at the same time it put restrain on the BOC from having monopolistic control over all the oil fields in Burmah. To develop the BOC the British government excluded foreign companies like the Standard Oil form Burmah.[17] The government was anxious about any monopolistic control over any natural resources by private enterprises. However, as the British navy (Admiralty) was determined to have its required supply of oil from only British territories and British companies, the bargaining power of the BOC increased and through the navy it could influence the government decisions of excluding foreign companies, even the Shell.

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[16] *Ibid*.

[17] The British oil policy excluded the foreign companies from its territories to exploit oil fields at least till 1920s. Thus, when in 1902 the two subsidiaries of the Standard Oil Trust – the Colonial Oil Company of New Jersey and the Anglo- American Company applied for prospecting license in Burma, it was rejected by the Government of India. The Shell was also mot allowed to venture in Burma.

That the oil exploration in India was not satisfactory had been pointed out by the GSI itself.[18] It was also noted by the power sub-committee of the National Planning Commission which was initiated by the Congress in 1938.[19] The one reason for the slow growth in the oil exploration might be the colonial government's exclusivist policy. The British followed its exclusive policy at the international level as well. The exclusive policy slowed down the development of oilfields in India outside the established Burmah oilfields, as the large international companies had the capital resource to undertake large scale exploration and development work.[20] In post- independence India, the government was also apprehensive of the big oil companies and it put emphasis on the increased involvement of the GOI in the oil industry. In the late 1950s and early 1960s, K.D. Malaviya, Union Minister for Mines and Oil worked hard in developing a national oil policy of India which would be independent of the foreign multinational oil companies. Malaviya, with the help from Soviet worked hard to develop an independent petroleum industry for the

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[18] Hriday N. Kaul, *K.D.Malaviya and the Evolution of India's Oil Policy* (New Delhi: Allied Publishers, 1991), p.19.

[19] *Ibid.*

[20] In 1930 the British Government withdrew the restriction on non British nationality and shifted to open door policy in the Cabinet. There emerged an agreement that opening to foreign companies, particularly the American ones would be helpful to the rapid development of the oil resource of the British Empire. The condition remained that the navy's interests and the British right over oil in times of emergency should be protected. However, till WWII, the development of oil fields in the British colonies remained insignificant even after the change in the British oil policy. For details, see James H. Bamberg, *The History of the British Petroleum Company: Volume II The Anglo-Iranian Years, 1928-1954* (UK: Cambridge University Press, 1994), pp. 176 – 177.

country by disassociating the multinationals from the refining and marketing and also from the field of exploration and production. As a result, in 1956, the GOI placed oil in the public sector and created the Ministry of Petroleum and Natural Gas. The other concerns of the government were to have a hold over the management of the British and American oil companies functioning in the country, and to have a control over the distribution and fixation of prices of oil products.

Oil despite being one of the most important natural resources has received little attention amongst the Indian historical writing. Yet some of the existing literature, including both Indian and from other parts of the world will be helpful to place the present study into a proper perspective. In the following sections the thesis has attempted to contextualise the history of petroleum in Assam through studying secondary literature.

Science, Technology and the Age of Colonialism

Any study of the development of petroleum industry in the nineteenth and the twentieth century in India is crucially connected to an understanding of the combined impact of science, technology and the colonial state in growth of the commercial exploitation of the British India. The emergence of modern science and technology and its commercial applicability coincides with colonial explorations and exploitation. The pioneering role of science and technology in the making of modern state can be traced back to the seminal essay of Basalla, *The Spread of Western Science*.[21] In the essay Basalla suggests a three stage

[21] George Basalla, "The Spread of Western Science," *Science*, New Series, Vol.156, NO.3775 (1967), pp.611–622.

model to describe the introduction of modern science in non-European nations. In the first phase the non-scientific colonies provide European scientists with raw scientific data, generated by Europeans. The collection of data became possible because of the utilisation of sciences like botany, zoology, geology, and geography in mapping, surveying and exploring the virgin lands. In the second phase locally born or the resident scientist (Europeans presumably) starts taking part participating in the scientific activities. Though there are local scientific institutions but the scientists of the colonies still remains dependent on European expertise, institutions and training. The third phase ends up with the completion of the process of transplantation with desire to establish an independent scientific tradition and a national science. Thus, to Basalla scientific knowledge in the colonies is derivative in nature without any intervention by the indigenous knowledge. The Eurocentric approach of Basalla hardly gives any space for participation of indigenous practices and the people. The passive east experiences social change because of the dynamism of the homogenous West.

During the 1980s historians started to raise question the universal model of colonial science. The critiques argue that such a model could not take into account the different trajectories of colonial science in different parts of the empire. In the recent years scholars have reviewed the role of science as a 'tool' of imperial ideology and enterprise and not simply a product of diffusion. The role of science and technology in the commercial exploitation and political development of an individual country has attracted scholarly attention. The history of science in British India as studied by scholars like Deepak Kumar,

Roy M. MacLeod, Daniel Headrick, David Arnold, Gyan Prakash reveals a close relationship between science, technology, imperialism and emerging nationalism.[22] The colonial government put continuous effort to tape India's wealth through the use of various scientific knowledge and techniques. Science facilitated the colonial state in fulfilling imperial interest of maximising its commercial benefits in cultivated plantations and natural resources. In fact scientific technology became the 'tools of empire' as pointed out by Headrick.[23] Headrick puts forward that 'the breechloader, the machine gun, the steamboat and steamship, and quinine and other innovations lowered the cost, in both financial and human terms, of penetrating, conquering, and exploiting new territories'.[24] As the colonial state derived its power from the 'rule of colonial difference', the staging of science also became a part of representing the difference between the colonisers and the colonised. Science

[22] See Daniel Headrick, *The Tools of Empire: Technology and European Imperialism in the Nineteenth Century* (USA: Oxford University Press, 1998); Gyan Prakash, *Another Reason: Science and the Imagination in Modern India* (Princeton: Princeton University Press, 1999); Roy Macleod and Deepak Kumar (ed.), *Technology and the Raj: Western Technology and Technical Transfers to India, 1700–1947* (Delhi*:* Sage Publications, 1995).

[23] Headrick, *The Tools of Empire*. Hedrick divides his work mainly into three sections. Each section studies a particular phase of imperialism and its associated technologies. In the first phase, Europeans penetrated and explored Africa and Asia with the help of the shallow draft, quinine and steam powered gunboat. The second phase was marked by the establishment of European rule after conquesting indigenous people. This development was aided by developments in firearm like breech loading, smokeless powder and repeating mechanisms. Third phase of imperialism was characterized by the technologies like the steamship lines, railways, submarine telegraph cables, the Suez Canal – technologies that developed communication and transportation networks between Europe and the colonies.

[24] *Ibid*., p.206.

became an instrument by which economic and cultural hegemony were secured by the colonial state. As Prakash argues that the collections of artifacts and human specimen in museums and exhibitions by the end of nineteenth century became a dominant mode of representing the Western dominance.[25]

East India Company and Science

If the science and technology played an instrumental role in the expansion of the colonial rule and its consolidation, during the rule of the EIC, as Arnold has shown, scientific pursuits remained largely outside the support and encouragement of the early days of the EIC rule. With few exceptions the scientific activities were result of personal interests of company officials and army officers. Francis Buchanan and Colonel Colin Mekenzie were sponsored by the Company to provide it 'with the much needed knowledge of the extent, properties and resources of the newly acquired territories'.[26] To the Company, science remained a secondary concern till science could prove its service to the empire. The science in India was not simply transferring from the metro pole. Arnold shows that the officials who practiced sciences in India suffered a sense of isolation from the scientific world of England.[27] The colonial science was considered as peripheral practice which would provide raw materials for analysis in England to be incorporated into wider systems of scientific knowledge. However, the colonial science had to distance itself from the

[25]Prakash, *Another Reason*.

[26] David Arnold, *The Cambridge History of India: Science, Technology and Medicine in Colonial India* (Cambridge: Cambridge University Press, 2000), pp. 23–24.

[27] *Ibid*., pp.26-28.

metropolitan science as it encountered a different environment and tropical diseases and a culture where the state needed to stage science to prove its authority. The specific problems in India like epidemic diseases, insect pests, poor sanitation and poor agricultural yields provides the immediate impulse to the government to take the support of research and scientific methods in the administration.[28] The British officials encountered periodical famines in India (famines were familiar to India and were accepted as unassailable part of the natural order), which the British administration attempted to resolve through the use of scientific knowledge and technology.[29] The colonial government soon recognised the utility of science. On the one hand, it helped the state in pacifying the country internally by using it as a part of good governance and on the other hand, it helped in exploiting resources for commercial purpose. Science became a tool for legitimising colonial rule and a language of 'improvement'. The science of the colonies also influenced the metropolitan science and therefore it was not always a peripheral science. Grove has shown that colonial planters, botanists and foresters had contributed to the initiation and maturation of conservation debates in the metro pole.[30]

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[28]R.M. Macleod, "Scientific Advice for British India: Imperial Perceptions and Administrative Goals, 1898-1923,"*Modern Asian Studies*, Vol.9, No.3 (1975), p.350.

[29] Sir Richard Stratchey, the famine commissioner in 1878 reported that science and technology, 'manifested in the forecasting of weather and the use of railways to transport grain to the devastated areas had bugun to allay the most severe distress.' He further argues that more expertise needed to increase agricultural yield. He recommended creating a class of officials in India with more scientific knowledge for improvement of agriculture and industries. For details, see *Ibid*.

[30] Richard Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism 1600–1860* (Cambridge: Cambridge University

Kumar suggests that colonial science represented an advance science over pre-colonial science, it was far more systematic, methodical and persuasive, but argues that colonial power utilised various branches of natural science particularly in the nineteenth century for spreading its economic interests and the institutions like the GSI and other scientific societies brought the government, science and economic exploitation into a close relationship and these were not simply romances with science.[31] For instance, the period between 1856 and 1901, the geologists were obsessed with 'black gold', i.e., coal and manganese ores and the government funded many projects. The establishment of GSI in1856 led to a systematic exploration and exploitation of mineral resources by the colonial state. In the nineteenth century, the colonial government gave prominence to the natural sciences like medical science, botany, zoology and geology so that it could explore and exploit the natural resources of the country to meet the needs of the Indian and British demands. Kumar points out that during the Victorian times the colonial scientists had to perform dual task – to serve the state and to serve science.[32] As a result there

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Press, 1995). Grove has suggested that the imperialist destructiveness had produced one of the earliest theories regarding environment in the west. The effect of European settlement in the colonies led to extensive and rapid deforestation. The concern over the environment was reflected when a group of scientist in India reported to the British Association for the Advancement of Science in 1851 that if government did not regulate the use of forests, it would not only lead to the land be denuded, but also wider climatic changes. The vulnerability of tropical ecologies due to human intervention first emerged in the colonial world by the mid nineteenth century.

[31] Deepak Kumar, "Economic Compulsions and Geological Survey of India," *Indian Journal of History of Science*, Vol.17, No.2 (1982), pp.289–300.

[32] Deepak Kumar, "Science and Society in Colonial India: Exploring an Agenda," *Social Scientist*, Vol.28, No.5/6(2000), p.28.

was institutionalisation of geological, botanical and medical works which had tremendous effect both on history of science and history of imperialism.

Science as a Colonising Ideology

In the path of imperial expansion, settlement and development, science had a broader meaning. It was associated with mission of unifying the world. Science was considered as the only means of material improvement. The colonisers burdened science and technology with an important role in their 'civilising mission'. Traditionally, the concept of civilising mission had produced an ideology that provided the Europeans with a legitimate tool in the late nineteenth century to rationalise and justify their colonial domination over the rest of the world. The ideology had many attributes that focused on creating difference between the rulers and the ruled. In most of the cases, the colonial rule was represented as saviour of 'barbaric' and 'savage' peoples suffering from incessant warfare and despotic rule. Even the role of the missionaries and reformers in religious conversion and education was to facilitate the Europeans in their efforts to uplift the ignorant /backward peoples in the colonies. All the different attributes of the civilising mission theme had a common propaganda, i.e. to provide the Europeans and the colonial officials with intellectual and ideological means to endeavour into some identified area of the colonies in which the Europeans could first represent and then establish their superiority unquestionably. However, the apparent material difference between Western Europe and that of the non European countries seemed to confirm the discourse on the civilising mission in front of the colonisers. Late Victorians were convinced that the principles by which they measured their material superiority

and justified their dominance were both empirically demonstrable and increasingly evident, as pointed out by Michael Adas.[33]

Western science was portrayed as objective, culturally neutral, and universally true. Adas argues that the Western Europe from Industrial age onwards considered science and technology to be the most consistent indicator of their superior material culture and rationality. Adas while tracing the history of the 'ideologies of dominance' of the Europeans argues that by the mid nineteenth century technology and scientific prowess emerged as principal means of measuring human achievements. The material achievements in the field of science and technology during the industrial era could be empirically demonstrated and that shaped the Europeans perception about the rest of the world and influenced their interaction with the 'other'. Their belief in the material achievements justified the colonialist discourse that the non-western societies were inferior, childlike and needed the guidance of the materially and scientifically advanced west. The religious criteria gave way to technological criteria as measure of development. The colonial state classified and quantified both people and natural resources in India with the use of various scientific methods and thereby gathered information and knowledge to consolidate their rule in an alien country. In the creation of this knowledge-power structure the authority of science played a universal reason, which the British considered to be free from prejudice and passion.

Western technologies aided the British in acquiring territories and making them safe for British interests. In the field of technology during the

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[33]Michael Adas, *Machines as the Measure of Man: Science, Technologies and Ideologies of Western Dominance* (New York: Cornell University Press, 1989).

Victorian era the steamships, exotic seeds, the telegraph and the railways were the significant of moments of arrival into the country. However, by the early twentieth century there was a shift from natural sciences to industrial technology in India. In the nineteenth century the British introduced technologies like telegraphs and railways, but as argued by Ian Inkster, these could not develop into a 'technology system'.[34] These technologies received Government patronage as imperial consolidations involved massive construction work and the Public Works Department (PWD) fulfilled the colonial needs. The importance of construction works in this period gave birth to civil engineering while the other branches of engineering like mechanical, electrical and metallurgical engineering had to wait till 1930s. The objective of the engineering colleges as pointed out by Arun Kumar was to meet the requirements of the PWD and the department was also the country's major employer of the trained civil engineers.[35]

However, there was a shift by the first quarter of the twentieth century due to the post war circumstances and the growing national demands. This phase of colonial science was characterised by Macleod as 'Empire/Commonwealth' phase.[36] Macleod argues that this phase marked the juxtaposition of the metropolitan trusteeship and the increased delegation of

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[34]Ian Inkster, "Colonial and Neo Colonial Transfers of Technology: Perspectives on India before 1914," in *Technology and the Raj: Western Technology and Technical Transfers to India 1700–1947,* ed. Roy Macleod and Deepak Kumar (New Delhi*:* Sage Publications, 1995).

[35]Arun Kumar, "Colonial Requirements and Engineering Education: The Public Works Department, 1847–*1947*,"in *Technology and the Raj,* ed. Macleod and Kumar.

[36] Roy Macleod, "Passages in Imperial Science: From Empire to Commonwealth," *Journal of World History*, Vol.4, No.1 (1983), pp.117–150.

power to the periphery. The colonies demanded the right to raise their voice at the Versailles and in the imperial affairs as a return for their service during the War. Before the WWI the important large scale industries were cotton and jute industries and the capital came from foreign investments and internal accumulation that occurred due to the commercialisation.[37] The war, however, convinced the government that India needed industrialisation to meet the war related necessities. Indian nationalist leaders too started demanding for industrial development so that India could move towards progress. As a result the period after the WWI witnessed the growth and expansion of industries like sugar, iron and steel, cement and paper. Along with the demands for industrialisation, the issue of 'technical education' also became a strong strand in India. Nationalists blamed the British government for the inadequate promotion of industrial research and technical training and thus keeping the country backward.

The important factor in science, as pointed out by Prakash in colonial India was translation and not imposition.[38] Prakash argues that the translation meant a realignment of power, renegotiation of unequal relationship between western and indigenous languages and between tradition and modernity; it is a translation of western science in indigenous idiom. Since the colonial state had limited knowledge about India and its people, it set up modern institutions to develop a scientific knowledge of India and enlisted Indians in it with the ideology of 'improvement'. The staging of science in museums and exhibitions

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[37] Tirthankar Roy, *The Economic History of India 1857–1947,* Second Edition (Delhi: Oxford University Press, 2006), p.227.

[38] Gyan Prakash, *Another Reason*, pp.49–50.

was an attempt to get recognition from the colonized of the authority of sciences thereby creating modern subjects for the colonisers. The Western educated Indians while appropriating science for the making of the nation was conscious of creating a distinct identity for them and for the nation. Therefore, they directed their attention towards rediscovering a scientific past for India, particularly in Hinduism. Prakash has termed it as translation through which a new form of scientific knowledge was created which was 'modern' but Indian.[39]

The debate on development was run by experts, professionals, politicians and bureaucrats. Defeating the dissent of Gandhi, the Indian nationalist leaders and scientists accepted the role of science and technology in the development of the country. Finally, the resolution of 'development' discourse was on the lines of planned development on Soviet pattern which assigned a far greater authority to the state.

Colonial Assam: Towards a History of Imperial Rule

By middle of the nineteenth century the British Empire made substantial progress in the mapping and exploiting the natural resources of Assam. The British colonial government had created enough knowledge about Assam's forest resources which resulted in the control over the collection and production of forest products like lac and rubber and exported for the market in Calcutta. The control over timber production and trade became a growing colonial interest with the development of tea industry and the railways. There was an increasing demand of timber for tea chests, railway sleepers, bridges

[39] *Ibid.*

and buildings.[40] Therefore, the exploration, classification and the exploitation of existing forests of Assam became an urgent necessity. Handique claims that the British forest policy was one of their 'most subtle and ingenious imperial creations'.[41] By the 1850s the Company worked towards the conservation of the forests and towards an exclusive right over the forests. After the formation of Assam as a separate province in 1874, a separate forest department was established to supervise the forest resources of the province.[42]

Along with the successful plantation of tea, the British Government invested in the exploration of other mineral resources. With the formation of the GSI in 1856 the nature of mineral exploration in the state acquired a more professional nature. The GSI undertook elaborate exploration of coal and oil in Assam. Captain Jenkins made earnest recommendation to the committee formed for investigating the coal and mineral resources of India in1836 to depute some scientific surveyor to examine the existence of coal along the southern hills of the Assam Valley.[43] The British obsession with coal in India resulted in the exploration of 27 coal fields by 1867.[44] The amount of coal raised in Bengal in 1859 was 99, 61,928 *maunds* (35, 86, 29,408 kilograms)

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[40] For details, see Arupjyoti Saikia, *Forests and Ecological History of Assam, 1826 – 2000* (New Delhi: Oxford University Press, 2011).

[41]Rajib Handique, *British Forest Policy in Assam* (New Delhi: Concept Publishing Company, 2004), p.3.

[42] Saikia, *Forests and Ecological History of Assam*, pp.271–276.

[43] John McClelland, *Reports of A Committee for the Investigation of Coal and Mineral Resources of India* (Calcutta: G.H.Huttman:1836), p.5.

[44]Deepak Kumar, "Patterns of Colonial Science in India," *Indian Journal of History of Science*, Vol.15, No.1 (1980), pp.105–113.

which rose up to 1, 08, 34,551 *maunds* in 1861.[45] In this context and with the growth of tea plantations by 1860 the exploitation of coal became extremely significant. The rise may be explained by expansion of railways. Besides coal, the British government in India kept on looking for other minerals like lime, manganese, and iron. In the fourth quarter of the nineteenth century coal was produced commercially in eastern Assam. This period of colonial rule is marked by the utilisation of natural sciences like botany, zoology and geology to exploit the country's resources while neglecting the industrial and technological side. In comparison to coal, the petroleum experienced slow development and it was only in the late nineteenth century the oil industry made inroads in Assam.

Oil as a natural resource of Assam continued to play an important role in the post-colonial polity. Yet, historical works on colonial economy of Assam have confined themselves primarily to study of the discovery of oil and its commercialisation under the AOC. The oil industry has not attracted separate attention and it has been studied as part of the understanding of the overall economic growth of Assam under the British rule. Historians like, H.K. Barpujari and Priyam Goswami who studied the political economy of colonial Assam have dealt with oil along with other natural resources.[46] Like the economic nationalists, Goswami argues that Assam like any other parts of

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[45] *Ibid*.

[46] H.K. Barpujari, *The Comprehensive History of Assam*, Vol V, Second Edition (Guwahati: Publication Board Assam, 2004); Priyam Goswami, *Assam in the Nineteenth Century: Industrialisation and Colonial Penetration* (Guwahati: Spectrum, 1999); Priyam Goswami, *Indigenous Industries of Assam: Retrospect and Prospect* (Kolkata: Anshah Publishing House, 2005).

British India experienced economic backwardness under the colonial rule.[47] Rajen Saikia recognised that towards the end of the nineteenth century several crafts like the gold washing, dying, iron making, ivory carving declined while the handloom sector managed to survive. Saikia does not put the blame on the EIC's imperialistic interests as the Company was not the sole buyer, it did not put any restrictions on the producers and it did not oust local capital from its own area of operation.[48] The decline according to Saikia was due to the absence of local trading capital.[49] Saikia further argues that the incidence of 'deindustrialisation' in the nineteenth century Assam is a misnomer as there was no exclusively industrial population in Assam and therefore there is hardly any statistical information available regarding the workforce, output and the market related to a particular craft and there was no division of labour and separation of craft from agriculture.[50] Barpujari, while recognising the fact that the increasing surplus or profit from trade and industries went out of the province, did not put the entire blame on the colonial rule for the backwardness and poverty in Assam. He argues that it would be an over expectation from a colonial rule to be guided by philanthropic motives and he contextualises the colonial rule's limitations. He argues that the economic development was a two way process where the regional specificities played its role.[51] On the other hand, the economic development of colonial Assam has been termed by

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[47] Goswami, *Assam in the Nineteenth Century*.

[48] Rajen Saikia, *Social and Economic History of Assam* (Delhi: Manohar, 2000).

[49] *Ibid*. p.76.

[50] *Ibid*, pp.75–76.

[51] Barpujari, *The Comprehensive History of Assam.*

Amalendu Guha as 'a big push without take off'.[52] Guha points out that there was a push in the investment in Assam's economy between the period 1881 and 1901, which was 15–20 per cent of the region's existing national income, yet it did not lead to any 'commensurate growth' in the indigenous sector of the economy as the benefits could not be widely absorbed in the agrarian society.[53]

By the second half of the nineteenth century Assam experienced a tremendous growth of the tea industry. The acreage under the tea cultivation increased from over 56 thousand acres in 1872 to 338 thousand acres in 1901 with the support from the British government in India.[54] The tea gardens were considered as the state led agrarian development of the region that transformed the wild non productive land into an 'Empire's Garden'.[55] The tea plantation developed a labour intensive export oriented enterprise using migrant indentured labour.[56] The imperial construction of local indolence justified the migration of coolies to 'serve as docile workforce' in the gardens. To the colonial officials and native intelligentsia the indolence was due to the easy access to opium.[57] However, the British government instead of banning opium consumption in the region introduced the policy of selling opium under

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[52]Amalendu Guha., *Medieval and Early Colonial Assam: Society, Polity, Economy* (Calcutta: KP Bagchi& Co., 1990).

[53] Guha, *Medieval and Early Colonial Assam*, p.189.

[54] Amalendu Guha, *Planter Raj to Swaraj: Freedom Struggle to Electoral Politics in Assam 1826 – 1947* (Calcutta: People's Publishing House, 1977), pp.12–15.

[55] Jayeeta Sharma, *Empire's Garden: Assam and the Making of India* (New Delhi: Permanent Black, 2012).

[56]*Ibid.*, p.17.

[57] The British officials, planters and missionaries considered opium as the cause of moral and physical degeneration of the Assamese peasantry without considering the material necessity of the homegrown drug. *Ibid.*, p.64.

government monopoly. It is worth mentioning that the revenue collected from the sale of opium was next to the land revenue.[58] With the growth of a plantation economy, Assam needed an improved infrastructure, particularly communications; consequently the construction of railways became important. The mileage under railways increased upto 114 miles by 1891 and 715 miles by 1903.[59] The increased mileage under the railways demanded a regular fuel supply and the respite came from the coal industry. The imperialistic concern of the British Government in India reflects from the fact that the alignment of the railways was done through the thinly populated tea belt areas while the old trading centres like Goalpara and Barpeta and towns like Sibsagar were bypassed.[60] The colonial state in the nineteenth century thrived on plantation economy while neglecting the industrial sector. Even in the plantation economy it was the British capital that dominated and the native capital faced discrimination from the government. Even in the local municipal boards the European planter members dominated. Guha points out that in 1885–86 , out of 125 municipal commissioners only 59 and out of 144 in 1901 only 53 were elected members and in both the years Europeans constituted one fifth of the total strength.[61] Hence, Guha calls the British raj as 'Planters Raj'.

The investment in the tea industry reached to 18.6 million by 1870. Between 1881 and 1901, the total investment in the organised sectors (tea, coal,

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[58] For details, see Saikia, *Social and Economic History of Assam,* pp. 213-221 and Guha, *Planter Raj to Swaraj*, p.55.

[59] *Ibid*., p.35.

[60] *Ibid*., p.36.

[61] *Ibid*., p. 32.

petroleum, railways, roads, etc.) was around 200 million.[62] In the petroleum industry the investment by 1901 was around 4.6 million Assam witnessed one of the highest investments in a region in British India. However, such huge capital investment did not result in the growth of domestic capital of the Assamese. The tea planters made huge profit at the cost of the peasants who suffered from high revenue demand and low savings. By the end of the nineteenth century Assam became known to the colonial state through various surveys (both amateur and professional) for the vastly laid out tea-plantations, petroleum and coal mining and Reserved Forests that wielded timbers. The land revenue earned by the colonial state between 1868 and 1898 increased four times while the expansion of land under cultivation was only 7 per cent. Thus, the colonial period witnessed transformation of the existing resource use regime. The rationality provided for such changes in the resource use had hardly any connection with the local resource sector. The appropriation of land and exploitation of other natural resources in the colonies enabled the global expansion of industries based on natural resources. New legal framework and property rule developed to exploit resources of the colonies undermining the pre-existing rights of gatherer and peasant societies over resources.[63]

A History of Underdevelopment: Politics of Regionalism in Assam

After independence the petroleum industry along with other natural resources got entangled with the developmental discourse and with the growing forces of

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[62] Guha, *Medieval and Early Colonial Assam*, p. 189

[63] M. Gadgil and R. Guha, *Ecology and Equity: The Use and Abuse of Nature in Contemporary India* (New Delhi: Penguin India, 1995), pp.39 – 53.

regionalism in Assam. The idea of development in the newly independent third world countries after the WWII meant the economic growth through industrialisation. Consequently, it would lead to capital accumulation and disintegration of pre-modern economic organisation and social institutions.[64]

Sanjib Baruah argues that sub-nationalism in India had originated and sustained by the civil societies with organisational capacities, for example, in case of Assam, *Assam Sahitya Sabha* and AASU played a significant role in sustaining the Assamese sub-nationalism.[65] The sub-nationalist mobilisations in Assam had been around the cultural demands like the use of Assamese language as the state language and as the language of education and the economic demands for large scale projects which would lead the province towards progress. It is the collective memories and aspirations that have produced the sub-national 'imagined communities' within a pan-Indian 'imagined community'. The evolution of sub-national 'imagined communities' in India was already evolving under the colonial rule, the pre-colonial conception of community as 'fuzzy', as it was characterised by fuzzy conceptions of time and space, undergone transformation to a bounded and enumerated community.[66] Language is a good illustration of this principle organisation of difference. In pre colonial Assam, the flexibility in the political frontiers allowed trade and economic control to move beyond the territorial

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[64] Kalyan Sanyal, *Rethinking Capitalist Development: Primitive accumulation and Governmentality and Post Colonial Capitalism*, New Delhi, Routledge,2007

[65] Sanjib Baruah, *India against Itself: Assam and the Politics of Nationalism* (New Delhi: OUP, 1999).

[66] Kaviraj Sudipta, "The Imaginary Institution of India," in *Subaltern Studies*, Vol VII ed. Partha Chatterjee and Gyan Pandey (Delhi: OUP, 1992).

limits and provided a space for 'circulatory regime' that 'included local ideas of state making and accompanying notions of sacred topography and overlapping sovereignties'.[67] British government in India in its attempt to create unified economic space fragmented the region into 'unambiguous, compact political unit'.[68] As a result the new spatial ordering of the area broke the earlier historical connections and the inability of the post colonial state to escape the colonial spatial ordering has led to the identity politics around the issues of ethnicity and territorial rights.[69]

The claims to nationhood in Assam have often used the language of native belonging and elusive sovereignty. Besides, the expression of regional pride and cultural affiliations in the sub-national politics, the question of rights over natural resources has been a recurrent theme. The question of a regional or an ethnic identity is not only about self-essentialsing cultural politics, but also about claims to a territory, resources and to livelihood.[70] The mainstream Assamese nationalist discourse along with the insurgent group continuously making references to the availability of natural resources in Assam and Assam's contribution to the central exchequer at the cost of its own development. The Assamese nationalist leaders argued that Assam is not poor in resources, but was always remain as poor as her financial returns were low. It would not be wrong to claim that the mainstream Assamese discourse holds

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[67] Sanghamitra Misra, *Becoming a Boarderland : The Politics of Space and Identity in Colonial Northeastern India* (New Delhi: Routledge,2001),p.12.

[68] *Ibid*., p.13.

[69] Baruah, *India Against Itself.*

[70] Cederlof Gunnel and Sivaramakrishnan , K., ed.,*Ecological Nationalism :Nations, Livelihood and Identities in South Asia* (Delhi :Permanent Black,2005).

that the poverty in Assam has been a result of the neglect by the central government.[71] An instance of such rhetoric was that of the leading Assamese Congress ideologue Omeo Kumar Das who thus argued:

> My province, Assam, has been the source of contribution to the Central exchequer to the extent of nearly rupees eight corers annually in the shape of excise and export duty on tea and petrol. But the subvention that was given to Assam was only rupees thirty lakhs. I do not find any change in the outlook today. [72]

The political rebel groups of Assam like the ULFA too speak the same language to justify their political demands. ULFA argues that India has been engaged in large scale exploitation of Assam's rich resources thereby reducing Assam to one of the most backward states. There have been changes and continuities in the discourse on development with the changing generations.

Writing Economic History of India

Industrialisation and deindustrialisation has been a major area of research within the economic history of modern India. The theory of deindustrialisation of the nineteenth century Indian regions was the main thrust of the nationalist critique of the British rule.[73] Arguing on the similar lines Amiya Bagchi with the help of available statistical data from Bihar argues that the percentage of

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[71] Sanjib Baruah, "Politics of Subnationalism: Society versus State in Assam," in *State and Politics in India*, ed. Partha Chatterjee (Delhi: OUP, 1998), pp.498-499.

[72] Speech of Omeo Kumar Das, Assam Legislative Assembly Proceeding, 9 (1946), pp.785–795.

[73] For details, see Sekhar Bandyopadhyay, *From Plassey to Partition: A History of Modern India*, (New Delhi: Orient Longman, 2004), pp. 122-134.

weavers and spinners to the total industrial population declined from 62.3 to 15.1 during the period between 1809 and 1913.[74] Bagchi's work renewed the debate over industrialisation in colonial India. Though the employment declined, it has been argued that the real income per worker increased from 1900–47. Roy points out that the rise in the industrial income was not due to the modern industry but because of the increase in productivity of workers in the crafts, which was possible due to the technological specialisation and industrial reorganisation, for instance substituting family labour with wage labour particularly in the case of handloom sector.[75] Roy refutes the standard argument that craft industries were devitalised by the colonial economy. There was growth in artisanal industry which was achieved through producing for non local markets, shifting to long distance trade, adoption of modern methods and other infrastructural evolution. However, it did not lead to industrialisation in India. Roy argues that the true root of stagnation was the rapid growth of population and an absence of government involvement in the provision of education and credit.[76] Morris D. Morris projects the colonial government as a

[74] For details, see Amiya Bagchi, "De-industrialisation in India in the nineteenth century: Some Theoretical Implications," *Journal of Development Studies,* Vol.12, No.2 (1976), pp.135–64; Amiya Bagchi, Deindustrialisation in Gangetic Bihar,1809-1901, in *Essays in Honour of S.C. Sarkar* edited by B. De (New Delhi: Peoples Publishing House,1976).

[75] Tirthankar Roy, *Artisans and industrialisation: Indian Weaving in the twentieth century* (Delhi: OUP, 1993).

[76] Tirthankar Roy, *Traditional Industry in the Economy of Colonial India* (Cambridge: Cambridge University Press, 2000).

benevolent night watchman.[77] The lack of industrial development as pointed out by Morris resulted from the fact that there was not enough demand for machine goods, the average per capita income was low, human capital was scarce with availability of cheap labour that hindered mechanisation and scarcity of capital.[78] He points out the growth of jute and textile industry in pre 1914 India without tariff protection. There have been studies on large scale industries like the cotton textile industry, the jute industry, iron and steel industry, the coal industry and the pulp and paper industry but we hardly find significant work on the oil industry of colonial India. On the other hand, Bagchi while addressing the issue of private investment argues that 'before the First World War it was the governmental policy of free trade, and after the war it was the general depression in the capitalist system combined with the halting and piecemeal policy of tariff protection adopted by the GOI, that limited the rate of investment in modern industry'.[79] Without denying the role of managing agencies[80] and expatriate capital in the industrialisation of eastern India, recent studies have also brought insight to the growth of native entrepreneurs and their

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[77] Morris D. Morris, "Towards a Reinterpretation of Nineteenth Century Indian Economic History," *Journal of Economic History*, Vol.23, No.4 (1963).

[78] Morris D. Morris, "The growth of large Scale Industry to 1947," in *The Cambridge Economic History of India,1757-1970*, Vol II, edited by Dharma Kumar (New Delhi: Orient Longman, 1983).

[79]Amiya Kumar Bagchi, *Private Investment in India 1900-1939* (Cambridge: Cambridge University Press 1972), p. 19.

[80] For the role of Managing Agency House, see S.D. Chapman, "The Agency Houses: British Mercantile Enterprise in the Far East 1780-1920," *Textile History*, Vol.19, No.2 (1988), pp.239–254; B.B. Kling, "The Origin of the Managing Agency System in India," *Journal of Asian Studies*, Vol.26, No.1 (1966), pp.37–47.

role in Indian economy like the Marwari traders, Parsis, Gujaratis and Sindhis.[81]

Writing Institutional History

There are few company histories of the big integrated oil companies, though the small and medium sized oil companies still await attention. One of the significant works on the company history is on the Standard Oil Company of California (SOC).[82] White while studying about the growth of SOC gives us a detailed history of oil in California. During the 1850s geologists were looking for petroleum for the purpose of illuminating and lubricating. A number of small oil companies came up and small refineries were set up. In 1876 the California Star Oil Works and in the following three years the Pacific Oil Coast Company (1879) were established to become important leaders in developing oil industry in California. In the field of marketing various firms within the

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[81] For the history of the native entrepreneurs, see Claude Markovits, *Merchants, Traders, Entrepreneurs: Indian Business in the Colonial Era*(New Delhi: Permanent Black, 2008); Claude Markovits, *The Global World of Indian Merchants: Traders of Sind from Bukhara to Panama, 1750–1947* (Cambridge; Cambridge University Press,2000); Omkar Goswami, "Sahibs, Babus, and Banias: Changes in Industrial Control in Eastern India, 1918-50,"*The Journal of Asian Studies*, Vol.48, No.2 (1989); B.B. Kling, *Partner in Empire: Dwarkanath Tagore and Age of Enterprise in Eastern India* (Los Angeles: California University Press, 1976); Amalendu Guha, "Parsi Seth as Entrepreneurs,1750-1850," Amalendu Guha, "Parsi Seths as Entreprenuers,1750-1850,"*Economic and Political Weekly*,Vol.5,No.35(1970), pp.107–115 and B.R. Tomlinson, *The Economy of Modern India 1860-1970* (Cambridge: Cambridge University Press,1993).

[82] Gerald T. White, *Formative Years in the Far East: A History of Standard Oil Company of California and Predecessors through 1919* (New York: Appleton-Century-Crofts, 1962).

Standard combination, viz. Standard of Ohio and Standard of Iowa were actively engaging themselves. White's work reveals the process through which the Standard combination by the early twentieth century became dominant in all the fields of oil industry in California. The huge capital and efficient management resources provided the Standard with all the means to acquire the production, pipe lines, refineries, tankers and other properties of the Pacific Oil Coast Company and the California Star Oil Works. The Standard between 1900 and 1911 was able to establish a large business in oil by integrating all the sectors such as refining, production and transportation facilities, setting a department of production and exporting kerosene to the Orient. In 1906 the Standard decided to consolidate its administration by amalgamating the Standard of Iowa and the Pacific Coast Oil Company and it became Standard Oil Company of California. After the dissolution of Standard in 1911, the Standard Oil Company of California became independent. White has shown how the Standard Oil Company of California after 1911 put effort for an integrated expansion by securing new capital, employing geologists, conserving oil and gas, meeting gasoline shortage caused by the increasing automobile, competing with Shell and other companies, developing better relations with the public and turning out more production in WWI.

There are two significant works on two British owned oil companies, the BOC [83] and the British Petroleum Company[84]. Both the works have been

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[83] T.A.B. Corley, *History of the Burmah Oil Company, 1886-1924* (London: Heinemann, 1983).

[84] R.W. Ferrier, *History of the British Petroleum Company: The Developing Years, 1901-1932*(Cambridge: Cambridge University Press, 1982).

funded by the respective companies. The authors reflect on the British oil polity during the early twentieth century and argue that the main objective of the British's oil policy particularly after 1918 was to minimise its dependence on foreign owned oil companies and to secure the supply of oil from British territories and British owned companies. Between 1916 and 1924 the British government attempted to amalgamate a number of smaller British owned companies with the large Shell Group (40 per cent British owned and 60 per cent Dutch owned) to form a giant all British oil Company. The Government also purchased a majority of the shareholding of the APOC in 1914. Jones in his article studies the evolution of the British Oil policy in the early twentieth century. He argues that there was a shift in the policy after WWI. There was now a general consensus among all the departments along with the admiralty that the 'oil' is an important issue and a coherent policy is needed.

Corley's work provides valuable insight into company history of the BOC. The work is a case study of the growth of a British owned industry within the empire. The BOC competing with major American and Anglo Dutch oil companies could able to emerge as a medium sized integrated oil enterprise. Corley's work puts light into the structure of the management of the Company, while not diminishing the importance of the ability of particular individuals. He has studied the impact of individuals on the company policies, particularly of Sir John Cargill, BOC's Chairman from 1904–43. The recruitment of British staff, salaries and living conditions of the employees have been treated in his work.

The history of the British Petroleum Company's early years by Ferrier is a comprehensive work studied, particularly from the perspective of

management. The policies of the government directly affected the decisions of the management. Ferrier has shown how the company in its early years was exposed to the demands of the Persian Government and to the scrutiny of the officials in the British Government. The British Government acquired a majority of the stock in the company after the WWI. The decision was motivated by the British navy's decision to shift its fleet from coal to oil which required a secure source of oil. The relation between the government and the company reflects from the fact that the company's board included government representatives with limited veto over issues that might affect naval or foreign policy. The company in its early years had to deal with a number of pressures as it developed its financial, technical and administrative capacities to survive with the other large and expensive international oil companies.

Biographical studies on the leaders of oil industry like Thomas Bard, a nineteenth century leader of the oil industry in California, E.L.Dohney, one of the pioneers of the oil industry on the Pacific Coast, Rockfellers the founder of Standard, that facilitates us to understand the entrepreneurial skills. The other areas that await valuable research as pointed out by Gerald D. Nash are the relationship between the technical improvements in the oil industry and the movement for oil conservation, constitutional or legal history of oil conservation movement, the strains in the Anglo-American alliance over the Middle Eastern oil concessions during the WWII.[85]

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[85] Gerald D. Nash, "Oil in the West: Reflections on the Historiography of an Unexplored Field," *The Pacific Historical Review*, Vol.39, No.2 (1970), pp.193-204.

Survey of the Sources:

This thesis is based on various primary and secondary sources. I have worked primarily in the archival repositories like the National Archives of India, New Delhi; Assam State Archives, Guwahati; Department of Historical and Antiquarian Studies (DHAS), Assam; Assam Secretariat Library, Assam; Nehru Memorial Museum and Library, New Delhi for this thesis.

Keeping in mind the conception that colonial archives mostly contains records with 'colonial bias', I have used extensively the colonial records for the writing a history of petroleum in Assam. The study of archival records reveals the fact that the policies of the colonial state evolved over a long period of time after having conducted various surveys and investigations of the region. Even officers and different departments had conflicting interests and ideas while formulating different policies. The archival records of the Assam State Archives, Guwahati has been useful for reconstructing the history of the early enterprises which were involved in the region for the development of an oil industry. The proceedings of home, revenue and agricultural departments of the Assam government, particularly for the late nineteenth and early twentieth centuries, contain important insights about various official policies adopted by the government on matters related to leases of land, terms of concessions and the question of royalty arising out of the oil industry. I have extensively used publications like the *Annual Report on the Administration of Assam*. These reports contain statistical data on the output of various mines and minerals and the revenue earned in Assam from those mines. For the post-independence period the statistical data collected from the *Economic Survey of Assam*,

published annually by Government of Assam has helped in giving a broad idea of the industry's larger economic picture.

A number of reports of official commissions and enquiries conducted by the colonial government has been useful for the reconstruction of the history of the working class during this period. I have used the *Royal Commission on Labour, 1930* and the *Report of the Digboi Court of Enquiry* to understand the nature of the relationship between the Assam Oil Company and its workers and about the labour strike that challenged the authority of the Company in the late 1930s. The *Annual Police Administrative Reports* for the state of Assam available at the state archives helped in writing about the politics of labour union of the AOC.

The GSI established in 1851, with Thomas Oldham (1816–1878)[86] as its first director, emerged as a premier scientific institution in India. The GSI has published volumes of *Memoirs, Annual Reports,* and *Records*. The GSI perhaps can be one of the best illustrations of the use of science for colonial purpose. Like other parts of India, there have been reports, records and memoirs of the Survey for the province of Assam as well.[87] These literatures

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[86]Thomas Oldham was an Irish Geologist and the first Superintendent of the Geological Survey of India.

[87] To name few of the GSI literature on Assam:

T.H.D.Touche, "Notes on Traverse through Khasi, Jaintia and North Cachar Hills," *Record GSI,* Vol.16 (1883), pp. 198–203.

T.H.D.Touche, "Coal and Limestone in Doigrung river ,near Golaghat," *Record GSI,* Vol.17(1885), pp.31– 32.

H.B.Medlicott, "The Coal of Assam etc, with Geological notes of Assam and Hills South of it," *Memoir GSI,* Vol.4, No.3 (1865).

H.H.Hayden, "Northeast Assam Coalfields," Record *GSI,* Vol.30 (1910), pp.283–319.

have been helpful in studying the mapping and exploitation of mineral resources of Assam under the colonial state. Even before the formation of GSI, in the first half of the nineteenth century, the survey of the province was carried out by Major John Butler[88], Lieutenant R.Wilcox[89], Major James Rennel.[90] Those surveys provided the state with the knowledge of the extent, properties, resources of the province needed for the foundation of the British rule in Assam. The surveys reported on the topography, natural resources, the inhabitants of the region, agriculture, soil as the state needed the knowledge for its foundation in the newly acquired province. The sporadic nature of early surveys took up definite shape under the GSI. The GSI literature was specifically concerned with the scientific study of the mineral resources. Such literature proved to be influential in studying the need and the desire to have knowledge over an unknown territory and the service of the natural science to the state. The GSI literature along with the archives formed an important source to study the transformation of the management of mineral resources and the production history of Assam in the nineteenth century.

The official accounts have been collaborated with sources like the newspapers published from Assam. These include leading newspapers viz. *Natun Asamiya, Dainik Asom,* and the *Assam Tribune*. The debates in the

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Pascoe,E.H.Pascoe, "Coal in the Namchik Valley, Upper Assam*," Record GSI*, Vol.14, No. 3 (1911).

[88]Butler, J., *A Sketch of Assam with Some Account of the Hill Tribes,* London, Smith Elder &Co.,1847.

[89] Richard Wilcox," Memoir of a Survey of Assam and the Neighboring Countries," *Asiatic Researches,* XVII (1825).

[90] Rennel James, "An Account of the Ganges and Burrampooter Rivers," *Philosophical Transactions of the Royal Society of London,* 1781.

Assam Legislative Assembly spell out the popular sentiments of the Assamese nationalists on issues like royalty, Indianisation of the AOC. These debates are also window to an understanding of the ideas of development or Assam's right over natural resources vis-à-vis the centre. The debate in the public sphere has helped me in placing petroleum in a larger political context, particularly after 1947. Besides, *Digboi Batori* the in-house newspaper of the AOC was of help in the reconstruction of the history of the AOC and in the study of the growth of Digboi as an oil town. The digital version of *The Economist*, launched in 1843 and *The Times*, launched in 1788 have detailed official information on the economic performance of both the AOC and the BOC.

Indian official archives helped little in the understanding of petroleum question in post-independence Assam. For the post-independence India the official and personal letters of the leaders like Keshava Deva Malaviya, Jawaharlal Nehru available at the Nehru Memorial Museum and Library have facilitated me in dealing with the issues of growing regionalism in Assam over the concern for economic development of the region. Malaviya, who was the Union Minister for Mines and Oil in the Cabinet of Jawaharlal Nehru, played a significant role in the formulation of India's oil policy immediately after independence. With the support of Nehru and Soviet Union, Malaviya attempted to develop India's national oil industry independent of the foreign multinational oil companies.[91] The official and personal conversation of Malaviya and Nehru has reflected upon the different layers of negotiations with the multinational oil companies to develop an independent oil industry. To

[91] H.N. Kaul, *K.D.Malaviya and the Evolution of India's Oil Policy, (Delhi:*Allied Publisher,1991).

study the question of the relationship between the centre and the state over the issues of the control of natural resources and development of the region, the private papers like some leading political leaders of mid-twentieth century Assam including that Bishnuram Medhi (1888-1981)[92], Hem Baruah[93], Omeo Kumar Das[94] and also the papers of the Assam Pradesh Congress Committee have been explored.

Organisation of the thesis:

The main findings of this thesis have been arranged in the following order. The Chapter 2 titled *Mapping of a Frontier Landscape: Science and Geological Imperialism*, examines science as 'tools of empire' facilitating the colonial state in establishing its 'civilising mission' at ideological level and also fulfilling the political economy of imperialism. The core of the British Empire lay in its obsession of collecting data as knowledge about the colonies was essential for sustaining colonial structure. The Empire depended on various knowledge producing institutions like the army, universities, science, surveys and the museums.

In 1824, the British had to face the Burmese aggression at the Northeast frontier of British Bengal. Though the British won all the three battles against Burma, the British felt the dearth of knowledge about Burma and the north eastern region resulting in a number of unavoidable mistakes made by the

[92] Bishnu Ram Medhi, was the Chief Minister of Assam (1950–58) and Governor of Madras (1959–64).

[93] Hem Baruah was an MP from the Praja Socialist Party.

[94] Omeo Kumar Das, was a leading Assamese Congress ideologue.

British. In such a context of 'information famine', the imperial surveys in the region started unfolding.

This chapter is a study of the complex relationship between science and mineral exploitation in Assam in the nineteenth century. The period witnessed extensive work on exploration and exploitation of mineral and natural resources along with huge investment on tea plantation in the region by the colonial state. By the mid nineteenth century, the British State had created enough knowledge about Assam's forest resources and mineral resources which resulted in the control over the collection and production of those resources. The chapter deals with the relation between science and the colonial state in transforming Assam into a productive land. The focus of the chapter is to study the early exploration of petroleum and its subsequent commercial production in colonial Assam. I have intended to study the transformation in the exploration of oil from incidental discovery in the early nineteenth century to systematic exploration in late nineteenth century with the growing knowledge of Geology.

The Chapter 3 titled *Setting a Petroleum Industry: The Early Enterprises (1850s-1890s)*, tells how there was a significant increase in the investment in non-renewable resources in mining and petroleum by the late nineteenth century. Coal along with tea and jute became the nucleus of investment by the British merchant houses in Calcutta. The discovery of petroleum in Assam in the early nineteenth century did not receive much attention till the second half of the nineteenth century. The commercial production and marketing of Assam petroleum became a reality only in the first decade of the twentieth century. It was a gradual process which involved attempts made by various syndicates and

companies. The successful borings in the 1880s eventually resulted in the establishment of a small petroleum industry with a refinery at Digboi in Eastern Assam. In this chapter, I have reconstructed the history of the early endeavours in establishing a successful petroleum industry in Assam to the formation of the AOC in 1899.

There was an increasing global demand for petroleum products from the twentieth century. Even after the formation of the AOC, a number of syndicates and individuals and speculators came forward to make fortune in the petroleum industry with hardly any success. The chapter is an attempt to study the role of various managing agencies in the development of the oil industry in Assam, their negotiation with the government regarding leases of land in favourable terms and the royalty to be paid to the state as it was the Crown that possessed the mining rights over the territories in the Empire

The economic history of Assam has mostly centred on the tea economy and the global networks of commerce that the crop had generated. However, my study has showed how ideas along with people came to Assam to intervene in the nascent oil industry. Assam witnessed the flow of Canadian experts, drillers and machineries in the late 1880s.

The Chapter 4 titled *The Assam Oil Company: Economic and Social Challenges (1900-1950)*, reconstructs the history of the AOC during the first half of the twentieth century. The company was formed to develop the petroleum properties situated at Digboi and Makum in eastern Assam. As by the turn of the century the home market for kerosene was growing incredibly the AOC was placed at an advantageous position, so far as the Indian market was concerned. I have attempted to find out the initial marketing strategies of

the company and the participation of the indigenous entrepreneur in retailing of the petroleum products of the company. The study of the AOC also reveals the fact that the company after WWI had to be merged with the BOC for financial, technical and managerial aids.

With the establishment of the refinery, Digboi hosted European capitalist, native employees and migrant labourers; all came for a job and contributed to the growth of a settled township in the eastern most corner of Assam. The study reveals that the company being a corporate enterprise followed the politics of exclusion if not in the workplace then in the neighbourhood. The European management practiced racial differences with the Indians. The overview of the structure of Digboi under the colonial rule demonstrates the fact that the town was segregated along community lines.

I have found remarkable class solidarity when the labourers stood up against the management in 1939. The strike took place in an atmosphere of growing politics of nationalism and retreating imperialism. The worker's expectation rose high with Indians taking control of the provincial governments after the election of 1937. The workers expected that the provincial governments would support the long standing demands of workers concerning their choice of leaders, better wage and remuneration, increase participation in the management and security against arbitrary dismissals. There were quite a number of labour strikes and unrest in India during this period. However, in the wake of the world war and the failure of the provincial congress government the strike failed, yet it had a profound influence on the labourers working on surrounding tea gardens.

The Chapter 5 titled *Whose Oil is it? Natural Resource, Contest over Petroleum and Crisis of Indian Federalism* attempts to study the role of petroleum in the political economy of Assam after independence. The focus has been on the forces of regionalism, state's right over natural resources and federalism. To study the conflicts over the ownership of natural resources, the chapter has drawn attention to the movements over the establishment of petroleum refinery in Assam. The discovery of Naharkatiya oil field in eastern Assam immediately after independence led to conflicts not only between the Assam and the central government, but also between the GOI and the AOC and its equity holder the BOC as the GOI was moving towards nationalisation of the minerals. Though the conflict between Assam and the GOI started over the location of the refinery, the debates in the public sphere and in the ALA raised larger issues like the rights over natural resources, the question of Assam's development and centre's role in it and the relation between the centre and the state.

The tussle between the central government and the provincial government over the question of controlling resources had already started before independence. The amount of the state's share over the profit earned by the petroleum industry remained a contentious issue between the centre and the state government. The AASU during the Assam agitation of 1979-85 demanded a raise in the state's oil royalty so that more revenue could be generated for the development purpose. The chapter explores the changes and continuities in the discourse on development by the Assamese educated middle class and the insurgent groups with reference to the refinery movements and the issue of royalty and its role in the growth of Assam's identity.

The Chapter 6, is the concluding chapter that summaries the main findings of the thesis. The thesis argues that oil is not merely an economic commodity but also has political value. Though the total volume of petroleum production in Assam has been far below the world standards, yet oil as a natural resource has played an important role in Assam's polity. However, most of the works on Assam have centred on tea and its impact on economy, demography and culture of the region. Except mere reference to the discovery and exploration of petroleum in the colonial period, there has been hardly any work on petroleum and its impact on Assam in the both colonial and post colonial period.

In the nineteenth century, the imperial relation between science and technology and the exploitation and development of mineral resources of the region was an important aspect of political economy of Assam. Once the possibilities of development of an oil industry was growing by the second half of the nineteenth century, we see the entrants of managing agency houses coming forward to set up companies to earn profit in the new venture. However, the initial enthusiasm did not result in success and Assam had to wait till the end of the nineteenth century to have a modest oil industry with the success of the ARTC. The flow of oil required a refinery and the ARTC soon realised that to raise capital a new company had to be launched and the AOC was set up and a refinery of a modest size came to function from 1901. Like the coal and the jute industry, the Marwari merchants made their presence distinct in the retailing of the products of the refinery.

With the growth of nationalism the demand for industrial development became strong and continued to be a major issue in the post-independence

Assam. However, Assam being the frontier province had to struggle for the access to the large scale industries as the Indian Central Government was apprehensive of providing the frontier states with heavy industries for security concern. As a result, oil along with other natural resources has become a point of reference both in the negotiations between the state and the centre and among the various pressure groups. Besides the issues of culture and demography, the Assamese nationalists had based their arguments on the economic backwardness of Assam even after having the natural resources.

Chapter 2

Mapping of a Frontier Landscape: Science and Geological Imperialism

Introduction of western science in India and its subsequent growth has been divided into three broad phases by scholars like Shiv Visvanathan and Zaheer Baber.[1] The first phase coincides the period after the British conquest in the mid eighteenth century. This period was marked by the extensive topographical, statistical, trigonometrical, cartographic, and other surveys which helped not only in the establishment of scientific basis in India but also created much needed scientific knowledge to sustain colonial rule in India. The meticulous scientific surveys of the second half of the eighteenth century played a determinant role in the transition of the EIC into a colonial state. The EIC attempted at creating an empire of knowledge through its various scientific surveys, collection of botanical and geological specimens and mapping of the landscape and studying the inhabitants.[2] The amateur scientists were active in producing knowledge of the newly acquired territories by the colonial state. In the second phase, scientific and technical education was introduced in colonial India. The third phase was marked by colonial state's attempts to 'forge institutional links among science, technology, and the Indian economy'.[3] In this chapter we deal with the first phase taking Assam as the case study.

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[1] Zaheer Baber, *The Science of Empire: Scientific Knowledge, Civilization and Colonial rule in India* (USA: State University of New York: 1996), p.138.

[2] A mention must be made of the earlier contributors in the field of colonial knowledge such as James Rennel, Benjamin Hyne. Rennel is of particular interest as his work not

Certain branches of science under the colonial rule developed more rapidly than the others reflecting the relationship between science and the colonial state. In the field of zoology, there had been pioneering contribution made by surveyors like Buchanan, Hodgson and Blyth, yet it was geology with the support from the state that developed more rapidly. Initially, geology too lacked state support as influential pressure groups in London did not want India to compete with Britain's own production of copper and other minerals and because of the presumption that India should remain primarily an area of agricultural production.[4] Once the economic value of geology was proved, it was placed immediately at the service of the colonial state. The economic utility of geology became an immediate concern to the EIC as the possibility of commercially viable production of coal emerged in eastern India. The EIC's concern for mineral resources of the country, particularly coal reflects from the fact that it appointed a committee to investigate coal and other mineral

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only contributed to the development of the colonial administrative apparatus, but also contributed to the emergent scientific discourse of geography and geology in nineteenth century Europe. His work on sea currents credited him with the title of the Father of Oceanography.

[3] In the first phase, the *Asiatic Society of Bengal* (1784) played a significant role in popularising and institutionalising western science in colonial India. In the second phase, there was an intense debate regarding the direction that scientific and technical education should take in India, resulting in the Anglicist–Orientalist controversy of 1835. The issue was resolved in favour of scientific and technical education in English while withdrawing support for indigenous educational institutions. Finally, the colonial state in the third phase moved towards the setting up of scientific institutions in colonial India that had an impact on the evolution of science in India. Baber, *Science of Empire*, p.138.

[4] David Arnold, *The Cambridge History of India: Science, Technology and Medicine in Colonial India* (Cambridge: Cambridge University Press, 2000), p.44.

resources of India in 1836.[5] The objective of the committee was to investigate 'the existence, extent and relative accessibility of the beds of mineral coal in different parts of India and their immediate applicability to the increasing demands of the steam navigation of the Ganges and its tributaries'.[6] The information on coal gathered through such surveys was expected to help private enterprise to commercially produce coal in order to introduce steamers on the Ganges at reasonable cost, whereby substituting costly imports by local supplies.[7] By the end of the nineteenth century railways became major consumer of coal.

Geology and Imperial Ideology

By 1830 quantification and measurement came to play an increasingly significant role in the workings of the Geological Survey of Britain.[8] There arose a demand for professional geologists who were well trained in preparing

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[5] John McClelland, *Reports of a Committee for Investigating the Coal and Mineral Resources of India* (Calcutta: G.H. Huttman, 1838).

[6] *Ibid*., p.1.Even before the formation of the committee, noted mineralogists and surveyors, namely Voysey, Dangerfield, and Herbert had explored sporadically the nature of Kumaon, Malwa and the Himalayan regions. The committee has been termed by Deepak Kumar as a 'milestone in the evolution of colonial science in India', as the committee was formed by the government for systematically tapping coal in India.

[7] Robert A. Stafford, *Scientist of Empire: Sir Roderick Murchison, Scientific exploration and Victorian Imperialism* (Cambridge: Cambridge University Press, 1989), p.113. The major collieries in the nineteenth century were located at Raniganj, Barakar, Giridh and Jharia. The period between 1890 and 1919, has been termed as the 'coal rush' in eastern India. For details, see Tirthankar Roy, *The Economic History of India, 1857–1947* (New Delhi: OUP, 2006), pp. 272–274.

[8] Crosbie Smith,"William Hopkins and the Shaping of Dynamical Geology:1830-1860," *The British Society for the History of Science*, Vol. 22, No. 1 (1989), p.28.

maps. As a result, geology was distancing itself from the amateur and provincial geologists.[9] The importance of quantification in geology was a part of a larger development in Britain.[10] By then, quantitative experimentation was increasingly becoming more forceful in Britain, instead of qualitative experiments. John Herschel in *Preliminary Discourse on the Study of Natural Philosophy* (1830) wrote:

> In all cases which admit of numeration or measurement, it is of the utmost consequence to obtain precise numerical statements, whether in the measure of time, space or quantity of any kind. To omit this, is, in the first instance, to expose ourselves to illusions of sense, which may lead to the grossest errors.[11]

For the extension of quantitative experiments the much needed institutional support was provided by the establishment of the British Association for the Advancement of Science (BAAS) in 1831.[12] The initial researches of the BASS

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[9] *Ibid.*

[10] *Ibid.*

[11] Quoted from Smith, "William Hopkins and the Shaping of Dynamical Geology," p.28. The researches in physical science during 1800–1860 in France was increasingly marked by accurate quantitative investigations of the electrical, thermal and other chemical properties of matter. Such scientific practice of numerical investigations influenced the practitioners of the British. As a result of growing emphasis on the quantitative research, maps and charts became an important part of research programmes. Besides geology, maps were becoming essential part of tidology and meteorology. The imperial concerns over power in the nineteenth century used accurate mapping of the earth to safeguard their interests. The increasing mathematisation of geology was aggressively initiated by William Hopkins (1793–1866) and his associates of the BASS. For almost all the nineteenth century British geologists except Charles Darwin and Charles Leyll, geology was stratigraphic.

[12] *Ibid*., p. 29.

reflect the point that the study of the earth sciences involved accurate measurements as the basis of quantitative relations often displayed through charts. Geology also came into the influence of applied research. Thus, accurate, comprehensive maps became one of the most indispensible tools for the discipline of geology. Secord argues that geology throughout the nineteenth century was a territorial science, as its essence was embodied in maps.[13] Accurate mapping became both politically and commercially important. Maps played a much wider role than simply signifying land, sea and political boundaries. The Geological Survey Act of 1845 confirmed that the 'survey as a service of national importance for an expanding industrial and commercial empire whose railways depended on coal at home and whose steamships needed coal overseas'.[14]

Though professionalisation of geology as a discipline developed much earlier, in Britain it was only around 1800, it was emerging as a professional discipline. During the late eighteenth and early nineteenth centuries, geology in order to establish itself as a discrete science had to differentiate itself not only from mineralogy, but also from the composite disciplines of natural science and philosophy. Thus, geology started focusing on the developmental aspects of earth history. The gentlemanly and amateur tradition continued to dominate. The early British geologists mostly belonged to the landowning and

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[13] James Secord, "King of Siluria: Roderick Murchison and the Imperial Theme in Nineteenth – Century British Geology," *Victorian Studies*, Vol.25, No.4 (1982), p.414. Maps are not passive reflector of the world, but like the imperial maps are always socially constructed. Maps are influenced by the structure of power and discourse.

[14] Smith, "William Hopkins and the Shaping of Dynamical Geology," p.33.

commercial elites whose economic interests ensured that geological research would focus mainly on material applicability. Stafford has shown that the economic utility of geology both in home and colonies became clearer to the elites in the context of the increasing demand for raw materials for industries and the scope for raising estate revenue.[15] That profit could be generated through systematic exploitation of resources by studying soil types, drainage system and the occurrence of coal ores and other minerals drew state support to geology. Societies like Geological Society, Geological Survey of England and Wales provided geology with the institutional support in its march towards professionalisation.[16] Geology with a systematic programme of exploration and mapping travelled beyond its home to domesticate the wilderness overseas.[17] From 1840s many British colonies followed the pattern of the Geological Society of London (1807) and the Geological Survey of Great Britain (1835) by forming colonial surveys.[18] The geological surveys in the colonies were initially modelled like that of the Survey in Britain, but local demands and variations did bring methodological divergences in various geological surveys in the colonies.

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[15] Robert A. Stafford, "Annexing the landscapes of the Past: British Imperial Geology in the Nineteenth Century," in *Imperialism and the Natural World*, ed. John Mackenzie (New York: Manchester University Press, 1990), p. 68.

[16] *Ibid*.

[17] *Ibid*.

[18] Suzanne Zeller and David Branagan, "Australian-Canadian Links in an Imperial Geological Chain: Sir William Logan, Dr. Alfred Selwyn and Henry Y.L, Brown," *Canadian Journal of the History of Science, Technology and Medicine*, Vol. 17, No.1-2 (1993), p.72.

The evolution of geology in the British India was divided into three distinct phases by Sangwan.[19] The phase one starts from 1770s to the formation of the Coal committee in 1836, which was dominated by "'gentlemanly' reconnaissance devoid of a direct 'pecuniary' purpose".[20] In the second phase, from 1836 onward to the formation of the GSI, the purpose of exploitation was added and the third phase witnessed a decisive institutional reform departing from 'gentlemanly' tradition to a more professionalised occupation. The professional scientific institutions that started operating in India around mid-nineteenth century had to struggle to establish themselves independent of the Asiatic Society of Bengal.

Martin Rudwick comparing geological travel with the experience of pilgrimage argues that geological expeditions involved a double movement, from familiar (home area) to unfamiliar (foreign area) and then back again.[21] The argument is that geologists who were spatially and temporarily separated from familiar world, in terms of personal and intellectual environment, and exposed to the world of unfamiliar, i.e., unknown land and surroundings could induce a 'deeper and cognitive' understanding of both the unfamiliar and familiar worlds.[22] The argument of Rudwick can be well placed in the context of the colonies where individuals worked in an unfamiliar atmosphere

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[19] Satpal Sangwan, "Reordering the Earth: The Emergence of Geology as a Scientific Discipline in Colonial India," *The Indian Economic and Social History Review*, Vol.31, No. 3(1994), p.294.

[20] *Ibid*.

[21] For details, see Martin Rudwick, "Geological Travel and Theoretical Innovation: The Role of "Liminal Experience"," *Social Studies of Science*, Vol.26 (1996), pp.143–59.

[22] *Ibid*. p.152.

(colonies) detached from the scientific community at home. This gave the geologists enough space and scope to develop new insights without the fear of being criticised pre maturely by the dominant group at home. During the company rule, many such individual geological surveys were mainly conducted under the patronage of the Asiatic Society of Bengal (1784). The surveyors were mainly amateur geologists drawn from the Company's surgeon–naturalists, officials of the Trigonometrical Survey of India, various Engineering Department and other government departments. Though William Jones was mainly interested in Asian history, language, religion and art, he also showed interest in botany and published several papers in the *Asiatick Researches* on botany.[23]

The Asiatic Society patronised scientific research in India and elsewhere in Asia. The amateur scientists, mostly colonial officials found the Society as the symbol of acknowledgement of their work. Those scientists worked on their own, studied soil, plants and animals in different parts of the country reflecting their passion for science. By 1830s, geological research was gaining popularity under the Society. The amateur scientists had a wide variety

[23] The Asiatic Society endeavoured into the grand projects, both cultural and geographical so that it could redefine the Orient. Its faith on empiricism was also reflected through graphic representation of the natural world. The Society was influenced by the European post-Enlightenment disciplines such as linguistics, anthropology, botany, and geology, which provided the society with instruments of knowing the 'other'. This in turn helped the colonial government in incorporating unknown areas within a centralist discourse. For details, see Pratik Chakrabarti, "The Asiatic Society and its Vision of Science: Metropolitan Knowledge in a Colonial World," *The Calcutta Historical Journal*, No.21–22 (1999–2000); O.P. Kejariwal, *The Asiatic Society of Bengal and the Discovery of India's past, 1784–1838* (Delhi: OUP, 1988).

of interest with the devotion towards 'search for knowledge' and often their research was outside the state support.[24] However, by the second half of the nineteenth century, with the establishment of scientific institutions the 'gentlemanly' tradition transformed into a more professionalised tradition.

Besides the economic compulsion, and the utilitarian influences behind the growth of scientific institutions, there was an increasing pressure from the European scientists to expand the practical use of science from Europe to the peripheries. This influence could be prominently seen in the case of geology. Henry De la Beche, the first director-general of the *British Survey*, has been credited with taking the initiatives in establishing geological surveys in the colonies, recommending or supporting the appointments of geologists.[25] Roderick Murchison (1792–1871), a leading practical geologist, was more aggressively engaged in the exploration of minerals in the colonies. Murchison's mineral exploration was not only limited to the empire, it went beyond the colonial territories. Murchison 'bombarded' colonial secretaries, viceroys and governors with the advice to employ geologists in every province and dependency.[26] Murchison made his greatest contribution in spreading

[24] The response to the Asiatic Society was incredible. Within a year of the formation of the physical committee of the society that emphasised on disciplines like zoology, botany, mineralogy and meteorology, it received enough materials including maps and charts to become the first part of the eighteenth volume of the *Asiatic Researches*. For details, see Pratik Chakrabarti, *Western Science in Modern India: Metropolitan Methods, Colonial Practices* (New Delhi: Permanent Black, 2004), p.49.

[25] Zeller and Branagan, "Australian-Canadian Links in an Imperial Geological Chain," p.72.

[26] Chakrabarti, *Western Science in Modern India*, p.98.

British influence across the globe through his Silurian nomenclature.[27] Stafford, therefore argues that the metropolitan geologists played a 'sub imperialistic' role in the colonies through their 'desire for new data, careers, fresh satisfactory conquests, a more dominant voice in administrative affairs – meshing with the needs of the imperial government'. [28]

However, the increasing pressure to collect data from the colonies can be put into a context. The collection of data often consisted of long travels and isolated fieldworks. Europe by the late eighteenth century was becoming increasingly conscious of conducting empirical research internationally. It became more and more imperative to experiment the universality of the grand theories and therefore they had to travel and collect data. Collecting huge amount of data through conducting field surveys became important component of geology. For establishing or formulating any theory collection of data is an integral part. For this reason the British Geological Society in its first circular, *The Geological Enquiries* acknowledged the contribution of 'the Miner, the Quarier, the Surveyor, the Collier, the Iron master and even the Traveller'.[29]

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[27] For details, see Stafford, *Scientist of Empire*. The creation of 'Silurian system' by Murchison established British geology internationally. Murchison earned widespread popularity and support for geology. In India, the important followers of Murchison were Andrew Fleming, Richard Strachey and John McCelland.

[28] Robert, A. Stafford, "Geological Surveys, Mineral Discoveries, and British Expansion, 1835–71,"*Journal of Imperial and Commonwealth History*, Vol.12, No.3 (1984), p.23. Stafford has critically examined the metaphors of militarism and imperialism in the works of Murchison. He argues that the scientific accomplishments of Murchison in his early life had a link with him as a soldier and later with British imperial expansion.

[29] Quoted from Rachel Laudan, "Ideas and Organisations in British Geology: A Case Study in Institutional History," *Isis*, Vol. 68, No.244 (1977), p.529.

This was true not only for the mother country but also for the colonies. This resulted into a knowledge structure known as 'network research'[30], which was largely composed of Company servants in India and scholars in London. British botanists and geologist maintained networks in India and other colonies for their academic interest. Individuals like Joseph Banks, Charles Greville and William Hooker had successful networks in India. Such a structure of academic networking created a pattern of 'knowledge producing relationships' at work.[31] The company officials at various levels became part of this structure.

In Assam, Francis Jenkins was well placed in the academic network of Hooker.[32] Jenkins kept Hooker informed about the progress of tea and supplied various plants and orchids to him. Jenkins was active also in providing EIC headquarter in Calcutta with geological specimens and minerals, particularly coal of the region. Company officials in general and Captain S.F.Hannay in particular were constantly providing Jenkins with reports and information through their field works and thus became part of the larger 'network'. The officials supplied both botanical and geological specimens even when they were not directly involved in geological surveys. One such official who was appreciated for his contribution was W. Masters.

While surveying Nambor forest in Assam for the purpose to preserve the forest for its timber, Lieutenant Colonel D. Reid, an executive engineer in the public works department of the upper Assam division, instructed W.

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[30] Andrew Grout, "Geology and India, 1775–1805: An Episode in Colonial Science," *South Asia Research*, Vol.10, No.1 (1990), p.10.

[31] David Arnold, *The Tropics and the Travelling Gaze: India, Landscape and Science, 1800–1856* (New Delhi: Permanent Black, 2005), pp.147–184.

[32] *Ibid*. p.159.

Masters, the only available practical geologist other than Hannay, to conduct a geological survey of the Nambor and its surrounding area, particularly to find coal.[33] Masters found a seam of coal in the bed of the Nambor. Masters surveyed and collected geological specimens and submitted to Jenkins while convincing him about the importance of Nambor for its timber and mineral resource. He was not satisfied at his geological work as he had very 'imperfect knowledge of geology'. Masters demanded a thorough geological investigation of the area. The economic interest of such surveys cannot be disqualified, however, the service to the realm of science was also not absent. The contribution of Masters was recognised by the officiating commissioner of Assam, who wrote:

> …At a time of life when little energy remains to men, indeed that is even attained by but few in this country, and under circumstances when ordinarily speaking, the desire to please government or to attract their favourable notice ceases, he (Masters) undertook a most labourious journey at the worst season of the year purely in the interest of *science* and to enable him to *collect information for the government*…(Emphasis mine)[34]

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[33] The Public Works Department (PWD) by the mid – nineteenth century emerged as a major consumer of forest wealth of Assam. The department needed timber for fuel and for the growing construction work in the state. In eastern Assam, the forests of Nambor supplied the required timber to the department. Therefore, Reid asserted that the Nambor forest should be reserved to preserve and encourage the growth of valuable timber for the use of the governmental and also for working the coal beds and limestone quarries. For details, see Arupjyoti Saikia, *Forests and Ecological History of Assam, 1826–2000* (New Delhi: OUP, 2011), pp.37–38.

[34] Letter issued to the Secretary to the Government of Bengal from W Agnew, Officiating Commissioner of Assam, Vol.30, No.12 (1863), ASA. Reid considered

Many company officials felt that by generating data in the field they were fulfilling an imperial duty. At the same time, they were also conscious about their service to science and to India by helping her to find a place for herself in the 'wider conspectus of science and empire'.[35] As Jenkins pointed out in 1846 that his role in the knowledge producing network was 'not only as a point of duty in one of H[er] M[ajesty's] subjects having the opportunity of adding to our national stores in anyway, but specially for the pleasure of seeing the plants of this Province done justice to'.[36]

The Company initially was not enthusiastic enough to support mining in India. The non-interventionist attitude of the Company towards exploitation of Indian minerals, as Grout argues was determined by the British mining interests.[37] However, Warren Hastings's encouragement led to the first attempt by the Company to organise a mineralogical survey by appointing Adam Hotchiks, an assistant surgeon of the Bengal establishment, as Mineralogical Surveyor[38] in 1799. It was expected by the colonial state that a mineralogical survey would be advantageous for having a better knowledge of the mineral resources of the country. The Company's initial survey of mineral resources was part of the composite topographic and revenue resource surveys. Surveys were the official and systematic means of exploitation of the natural and social

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Masters as capable enough to take the charge of ranger of the Nambor forest. Reid recognised his competency in Botany as well as his devotion to the state. Thus, Masters commanded respect and admiration of senior officials.

[35] Arnold, *The Tropics and the Travelling Gaze, p.*159.

[36] *Ibid.*

[37] Grout, "Geology and India, 1775–1805," p.4–5.

[38] Hotchiks was murdered in 1780 and the post was subsequently abolished in 1784.

landscape in British India. From the non-interventionist policy of the Company to the evolution of the GSI as a professional institute, geology evolved as complex science contributing both to the pure science and to the state. With the discovery of the coal fields in eastern India the economic utilisation of geology by the colonial state proved to be even more fruitful. Kumar argues that the GSI was the best illustration of the 'juxtaposition of science and the state'.[39]

Early Explorations in Assam

Assam and the Bengal's eastern frontier in the early decades of the nineteenth century remained a terra incognita to the Company. When the Ahom king, Gaurinath (1780–94), asked the EIC for military aid against Moamariya rebels, Lord Cornwallis, Governor General remarked, 'However extraordinary appear to the people of Europe or England…we know little more of interior parts of Nepal and Assam than of the interior parts of China'.[40] Therefore, John Peter

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[39] Deepak Kumar, "Science, Resource and the Raj: A Case Study of Geological Works in Nineteenth Century India," *The Indian Historical Review,* Vol.10 (1983–84).

[40] H.K. Barpujari, preface to Francis Jenkins: *Report on the North East Frontier of India* (Guwahti: Spectrum Publications, 1995), p.V. The core of the British Empire lay in its obsession of collecting data. The Empire depended on various knowledge producing institutions such as the army, universities, science, surveys, and the museums. Richards has termed the Empire as 'paper empire' because of the data - intensive nature of the raj. In 1824, the British had to face the Burmese aggression at the north-east frontier of British Bengal. Though the British won all the three battles against Burma, the British felt the dearth of knowledge about Burma and the north eastern region resulting in a number of unavoidable mistakes made by the British. In such a context of 'information famine', the imperial surveys in the region started unfolding. For details, see C.A. Bayly, *Empire and Information: Intelligence*

Wade, who was the medical assistant of the troops under Captain Welsh deputed to Assam by Hastings, compiled *Sketch of the Geography of Assam*, furnishing an account of administrative structure, state of trade and commerce, agricultural resources, minerals and forests products.[41] One of the earliest contributors to the growth of colonial knowledge of Assam was by Lieutenant Richard Wilcox of 44 Regiment. Wilcox executed his survey of Assam and its neighbouring areas in 1825. Wilcox initially worked as assistant to Captain James Bedford. In 1826, Bedford reported back in Calcutta leaving Wilcox to carry forward the survey. The survey was patronised by the Asiatic Society as it felt that the knowledge about the province was scattered and inadequate.[42] Wilcox was already an 'interested observer' and the patronage to survey the region fulfilled both his personal interest and the interest of the Company which was in need of knowledge about the province. However, such surveys

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Gathering and Social Communication in India, 1780-1870 (Cambridge: Cambridge University Press, 1997), pp.171–173. In 1935, R.B. Pemberton in his report recalled the lack of knowledge at the eve of Anglo- Burmese war :

> When, at the commencement of the Burmese war, our ignorance of the whole frontier became manifest, and it was found that the records of Government furnished no information that could in the slightest degree direct or facilitate the advance of those armies, which it became evident were necessary to preserve the integrity of our dominions.

R.B. Pemberton, *Report on the Eastern Frontier of India* (New Delhi: Mittal Publications, 2000), p. 2.

[41] Barpujari, *preface to Francis Jenkins: Report on the North East Frontier of India*, p.V.

[42] Lieutenant R. Wilcox, "Memoir of a Survey of Assam and the Neighbouring Countries, Executed in 1825," *Asiatic Researches,* Vol.17 (1832), p.314.

were part of the larger colonial structure of knowledge generation. In his memoir, Wilcox stated the objective of the survey as

> In the following Memoir I propose to give a detailed account of the progress of our Geographical Discoveries on the N.E. Frontier from the time when our armies advancing in that direction opened to us countries of which we had till then a very imperfect knowledge.[43]

Besides the economic utility of the survey, the Asiatic Society was also interested in scientific issues like the sources of the origin of the Brahmaputra river. The interest of science, besides the issue of 'governmentality' existed in the Society's funding of the survey. Wilcox points out the verbal direction given to Captain Bedford by the Society:

> …consider the Brahmaputra as the chief object to which his (Bedford) attention should be directed. He was to endeavour to unravel the mystery in which was enveloped each notice or tradition respecting its fountainhead by proceeding up its streams as far as the influence of the neighbouring force, or the safeguard of a detached escort might permit.[44]

That the EIC was anxious and was desperately eager to have information about the region had been reflected from the growing interest to know about the Brahmaputra river. What was the source of the river Brahmaputra? Did the Tsangpo of Tibet flow into Brahmaputra or Irrawaddy? James Rennell had

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[43]*Ibid*. Wilcox started the survey from Goalpara, in 1825 and continued till 1830. Perhaps, it is important to mention that the surveys conducted by Wilcox and Bedford were not conclusive and during 1876–77, the Great Trigonometrical Survey of India covered some areas of Assam under the directions of Captain Woodthrope and Lieutenant Harman.

[44] *Ibid*.,p. 316.

already attempted answering such issues by conducting a study of the Brahmaputra river along with the Ganges and read his paper, *An Account of the Ganges and Burrampooter* at Royal Society of London in 1781.[45] Rennell provided a detailed analysis of the great deltas of the two rivers, the process of sedimentation, and the factors leading to the changes in their courses. The curiosity regarding the origin of the Brahmaputra and its connection with the Thangapo (Rennell considered the two rivers as one) was an added incentive for the Society towards patronizing the survey as this was an important subject in Europe.[46]

There were other surveys in the same line by Captain Burlton and Captain Bedford Neufville.[47] These surveys were more topographical in nature

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[45] The survey of the Brahmaputra by Rennell in 1765 was the earliest attempt to study the source of Brahmaputra, in which Rennell covered a short distance in the north of Goalpara. Valentine Blacker, Surveyor General in Calcutta and David Scott were anxious to solve the issue related to Brahmaputra's origin. In 1825, Blacker asked Wilcox to be deputed on the special duty of surveying the river to find out the source.

[46] Wilciox, "Memoir of Survey of Assam and the Neighbouring Countries," p.315. While Wilcox was busy in his survey, he was reminded by the Surveyor general, Hodgon about the objective of finding out the source of the Brahmaputra in the following words:

> A great interest is atken about the Burrampooter and much nonsense issues from the press...Mr. Klaproth, a continental coxcomb, has written that Sampoo is the Irrawady, which can hardly be...Pray make all enquiries respecting rivers flowing on the north side of the snowy chain, from west to east, or otherwise.

Quoted from David Vumlallian Zou and M. Satish Kumar, "Mapping a Colonial Borderland: Objectifying the Geo-Body of India's Northeast," *The Journal of Asian Studies*, Vol.70, No.1 (2011), p.153.

[47] For details, see S.K. Bhuyan, *Anglo-Assamese Relations, 1771–1826: A History of the Relations of Assam with the East India Company from 1771 to 1826, Based on*

and were fulfilling strategic and military interest. It is pertinent here to mention that after the annexation of the Brahmaputra valley, the colonial state was eager to revive old trade routes into Burma. The company officials took the initiative in exploring the trade routes that once connected Bengal with China.[48] In this context, the surveys up to Irrawady river became even more important for the company. From 1820 onwards the officials and military personals while surveying the region also reported about various mineral resources. In this respect, Jenkins was aided by different officials and military personals posted in different areas. Those surveys were the initial report on the existence of the mineral resources of Assam. Like other parts in India, the colonial administrators both civil and military and travellers were obsessed with the discovery of coal in Assam. Besides coal, other minerals also did not go unnoticed. Captain Henderson described the potentiality of Assam's resources as:

> A rich alluvial country, with a large navigable river, running through a valley of peculiar fertility, which contains an area of near 19,000 square miles, has only to have its own natural resources more fully developed , its population(already between 6,00,000 and 7,00,000) still farther increased – and the rich minerals, and other produce of the surrounding mountainous countries , more accurately investigated – to ensure the

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Original English and Assamese Sources (Guwahati: Lawyer's Book Stall, second edition 1974), pp.579–560.

[48] For details, see Gunnel Cederlof, *Founding an Empire on India's North-Eastern Frontiers, 1790 –1840* (New Delhi: OUP, 2014), pp.91–105. The Charter Act of 1833 abolished monopoly right of the EIC to do trade with the East which deprived the EIC from its monopoly trade with China and in tea. Under such circumstances the surveys up to Irrawaddy and finding tea leaf became significant.

> introduction of enterprising capitalists, with all the quickly ensuring advantages of improved agriculture, extended manufactures, and an increasing revenue.[49]

Henderson thus gave a very 'ordered' picture of the region which was rich in natural resources and only in want of private capital to develop the region commercially and generate revenue for the state. In the colonial context, the collection of data for scientific activities requires the cooperation of the already existing local knowledge system. The colonial 'information order' was sustained by autonomous networks of social intelligence within Indian society, which included 'native physicians, astrologers and other indigenous professionals alongside information systems of the state'.[50] In Assam, the early surveyors depended to some extent on the native informants in producing knowledge for the state and for them. Wilcox noted in his memoir of taking guidance from natives regarding the direction of the rivers, the nature of navigation and the kinds of boats required, and noted that they even drew map in their own 'incorrect' style, 'showing the situation of the notable villages or districts, and exhibiting the various *nalas* feeding the Brahmaputra within their limit'[51] and also played the role of interpreters. Wilcox also recognised that the accounts of Singfos had helped in improving 'topographical detail respecting the time of route to Burma' and also a journey by a Persian under Scott's

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[49] McClelland, *Report of A Committee for the Investigation of Coal and Mineral Resources of India*, Section VII, p.1.

[50] Savithri Preetha Nair, "Science and the Politics of Colonial Collection: The Case of Indian Meteorits, 1856-70,"*British Society for the History of Science*, Vol.39, No.1 (2006), p.102.

[51] Wilcox, "Memoir of Survey of Assam and the Neighbouring Countries," p.317.

direction to Bhutan. The most prominent indigenous agent in the case of providing knowledge to the British regarding gold washing in Assam was Maniram Dewan Dutta Barua. Bayly points out that like in the political, military and social spheres, in the realm of scientific knowledge also indigenous participation were significant, though in the long run western theories and technologies became dominant.[52] H.B. Medlicott, while exploring various coal fields in Assam in 1865, was aided by the reports provided to him from the district in which coal was known or supposes to exist. Captain Comber, Deputy Commissioner of Lakhimpur, proposed to accompany Medlicott to the spot (Makum) where coal was found so that he could engage Singphoes and Nagas in finding whereabouts of coal.[53] The *Nagas*, helped in clearing the jungle. Native guides routinely assisted geological explorers. However, Medlicott found indigenous apathy towards knowledge an important obstacle in his exploration which reflects that the emergence of trained geologists or scientists in the country, who focused more on the scientific methods. He wrote:

> The difficulties of the undertaking only then commenced, and they are not so easily accounted for. It is not familiar obstacles of miry rivers and of jungles that I would mention; everyone knows about that these are prevalent in Assam, but the more than passive obtrusiveness of the native population. Every European traveller in India must encounter

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[52] See C.A. Bayly, *Empire and Information: Intelligence Gathering and Social Communication in India.*

[53] Henry Benedict Medlicott ,"The Coal of Assam; Results of a Brief Visit to the Coal – Fields of that Province in 1865;with Geological Notes on Assam and the Hills to the South of It," *Memoirs of GSI,* Vol.4 (1865),p.388.

> more or less of indigenous apathy, but in no part of India has I found this very natural propensity as prevalent as in Assam…[54]

As mentioned earlier in this chapter, the first written record of existence of coal in Assam is found in Wilcox's memoir. At Supkong, on the Buridhing, Wilcox found 'a bed of coal in the middle of the river'.[55] Further east in the Dihing river and its affluent Daphapanee, Wilcox along with Lt Burlton observed 'thin strata of coal alternating with blue clay in the sandstone rock'.[56] The discovery was followed by the enthusiasm of David Scott, Agent to the Governor General, North East Frontier to prospect coal locally so that steam navigation could be introduced in the Brahmaputra.[57]A coal mine was opened up in Suffrai, a tributary of the Disang in eastern Assam, in 1828, by C.A.Bruce under the instruction of David Scott.[58] However, the mine was abandoned due to the 'difficulties of navigation, of the Nullah, in forming a settlement at the remote spot in which the shaft was opened and partly from the intention of forming a depot for the use of steamers in Assam having been given up.'[59] There is also an available record of a bill for expenses incurred in the

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[54] *Ibid.* p.387. It should be mentioned here that Medlicott had strongly opposed the employment of natives in the GSI. Besides, he had also opposed the introduction of the discipline of geology and its branches – mineralogy, paleontology and petrology in India on the ground of intellectual bankruptcy of the natives of India.

[55] *Ibid.,* p.415.

[56] *Ibid.,* p.420.

[57] Priyam Goswami, *Assam in the Nineteenth Century: Industrialisation and Colonial Penetration* (Guwahati: Specturm Publications, 1999), p.88.

[58] *Ibid.,* 90.

[59] Barpujari, ed., *Francis Jenkins: Report on the North East Frontier of India*, p.46.

connection of a coal mine in Upper Assam, during 1826–28.[60] Whether this mine is the same mine that Bruce worked upon cannot be ascertained.

The search for coal by the officials continued. In 1837, Lt Brodie, principal assistant to the Commissioner, found good quality coal on the bed of Nambua, a stream which joins the Dhansiri river.[61] In the same year, coal was also found by Lt Bigge and Griffith on the Namroop river, in eastern Assam. The Namroop coal was found to be an excellent fuel as it exhibited ligneous fibre and it was free from earthy and slay matter.[62] Bigge points out that the Singphos were ignorant about the nature and use of the valuable mineral.[63] However, Bigge argues that the lack of population and the disinclination of the Singphoes to labour along with high rate of wages would prevent the production of coal at a rate which could compete with that of Burdwan or Sylhet coal, but it would be profitable if steam navigation was extended to Upper Assam. [64]

In 1838, Jenkins while visiting eastern Assam (around Disang river) discovered two coal beds near Borhat. Jenkins also found coal in Jaipur and Hannay raised over thousand *maunds* to be sent to Calcutta. The search for coal in Assam by the civil and military personals can be linked to the Company's

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[60] Letters Received from Miscellaneous Quarters, Vol II, 1836, ASA.

[61] Goswami, *Assam in the Nineteenth Century*, p.91.

[62] McClelland, *Report of A Committee for the Investigation of Coal and Mineral Resources of India*, Section VII, p.5.

[63] *Ibid.* Bigge points out that the Singphoes had no admiration 'at witnessing the ignition of each successive mass of coal, and watching the lumps bursting forth immediately into brilliant flame, as the different heaps were experimented upon, in their presence.'

[64] *Ibid*.

attempt to find economically exploitable coal for its navigation. In the coal committee report, Captain Henderson provided a detailed report of the various discoveries of coal in Assam and its practical utility. Jenkins regularly corresponded with the committee convincing the applicability and potentiality of Assam coal even though there was no steam navigation introduced in Assam which had to wait till the rise of the plantation economy. Jenkins stressing the possibility of manufacturing of products wrote:

> I do not imagine that the coal is likely to be brought into use for the special purpose which, I believe, the committee has principally in view, - the supply of the government steam vessels- yet the coal from its superior quality may be made available for other public wants which cannot now be met except from foreign, or as distant sources. …the full development of our abundant resources in this invaluable mineral may lead to the establishment of local manufacturers or to its conversion to use in the eastern provinces and the production of results highly beneficial to the trade and commerce of Bengal.[65]

Jenkins forced upon the notice of the Committee to depute a well-trained geologist to conduct scientific investigation of the province as the numerous coal beds in Assam had been looked at 'only by casual visitors, or by public functionaries, otherwise engaged, and have not hitherto received the advantages of scientific and professional survey'.[66] On the other hand, the Committee while reflecting on the commercial interest also insisted on the employment of 'trained geologists in India'.[67] John McClelland strongly

[65] *Ibid.,* p.14

[66] *Ibid*., p.13.

[67] *Ibid*., p.889.

opposed the government's plan to hire a few practical miners and repeatedly asked for the employment of theoretically sound geologists arguing that 'anything short of thorough investigation of the Indian coal formations by persons of the very highest qualifications for such enquiries would be time and money thrown away'.[68] While McClelland was negotiating with metropolitan power, Jenkins' demand for a professional survey of the region reflects the changing approach of the colonial officials, i.e. from 'gentlemanly' approach to professionalism. Jenkins focused on the increase of productivity of the province and consequent benefits to the European capital through the utilisation of coal and other minerals of Assam. He wrote to the committee:

> I would like to draw the Committee's attention to the intimate connection of our coal beds with other minerals of the highest value, iron and salt, and the probable inducements of the known coexistence of these with coal in the same localities to draw European capital and skill to a province, which appears only to want these stimuli to be valuable to the state as any of the same extent.[69]

While looking for coal the explorers did find other minerals as well. The other mineral that excited S.F., Hannay was the presence of Iron in the province. Iron making was an important small scale handicraft under the Ahom rule. Clay ironstone was worked extensively by the by the people of Assam. Goswami points out two important centres of manufacture, Tirugaon and Hattigarh in Assam.[70] Echoing the colonial discourse, which describes the period of

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[68] Quoted from Sangwan, "Reordering the Earth," p.300.

[69] McClelland, *Report of A Committee for the Investigation of Coal and Mineral Resources of India*, Section VII,p.14

[70] Goswami, *Assam in the Nineteenth Century*, p.137.

Burmese invasion as the 'dark' period of Assam, Hannay argues that the iron workers who numbered around three thousand in eastern Assam during the flourishing period under the Ahom rule declined to less than hundred after the Burmese invasion.[71] Jenkins asked the Board of Revenue, Fort William, in 1856 to explore the area in and around Dhubree and Carribari hills by a mineral surveyor as Hannay discovered magnetic iron there.

However, the obsession with coal did not encourage the company to take the cause of other minerals in the region. The officials in their correspondence with the government put forward rational arguments for the exploration and exploitation of the mineral, but the encouragement was not strong enough to pursue the exploration of the mineral. The chief engineer, lower province wrote to the secretary to the Government of Bengal:

> Assam might be made capable of supplying Bengal with iron, as the ores there produced is good and water carriage is available to the spot. In fact, if the resources of the country are properly developed, have no doubt that Bengal can be made to minister her own wants in both iron and clays by producing what is required.[72]

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[71] S.F. Hannay, "Notes on the Iron Ore Statistics and Economic Geology of Upper Assam," *JASB*, Vol.25 (1856).

[72]The chief engineer further added that:

> Assuming for granted that the capabilities of this country as regards the supply of iron are undoubted is evident by the specimens which are here produced in wrought means of the simple and rude in furnaces of the natives, it cannot be difficult to foretell how much that produced can be improved and how vast would be the advantages.

Letter from Chief Engineer, Lower Province to the Secretary to the Government of Bengal, Public Works Department, dated 3 October 1856, *Bengal Government Papers*, 1856–58, File No: 278/605, ASA.

One should also keep in mind that, the iron industry never developed in Assam and the handicraft under the British rule declined. Bhattacharya argues that the imported iron replaced the indigenous iron by the early eighteenth century. According to Bhattacharya, the substitution 'threw back the industry to the primary level of tribal household organisation in Bihar, Orissa and Assam'.[73] On the other hand, Saikia argues that even during the Ahom rule the production of *Tiruwals* (people engaged by the kings to produce iron) was not sufficient, so iron and iron products were imported from the Khasi hills and with the import of pig iron and steel bars from Calcutta in the second half of the nineteenth century, smelting and digging out clay iron gradually disappeared.[74]

The other mineral that caught the imagination of the British officials in Assam was gold. The French traveller and official of the French East India Company, Jean Baptise Chevalier noted that he 'saw an opportunity there (Assam) to overstate the opulence of the gold mines existing within his (king) territory. I told him that if he started extracting it, he would get treasures that would make him the most powerful man on earth'.[75] JP Wade refers to the existence of gold dust in most of the rivers having sources in the mountains of

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[73] S. Bhattacharya, "Eastern India," in *The Cambridge Economic History of India*, Vol II, edited by Dharma Kumar (Delhi: Orient Longman, reprint 2008), p. 285.

[74] Rajen Saikia, *Social and Economic History of Assam, 1853–1921* (Delhi: Manohar, 2001), p. 64.

[75] The Adventures of Jean-Baptiste Chevalier in Eastern India (1752–65): Historical Memoir and Journal of Travels in Assam, Bengal, and Tibbet, Translated into English by Caroline Dutta Baruah and Jean Deloche (Guwahati: LBS publication, 2008), p.32. Chevalier was the French Governor of Chandernagore (1767–78). In 1755, the then Governor of Chandernagore, Renault de Saint-Germain, instructed Chevalier to visit Assam in order to acquire land for setting up a factory.

the north.[76] The auriferous deposits of Assam that attracted the attention of Europeans in the early 1830s when 40 *maunds* of Brahmaputra sand, sent by Cracroft yielded a concentrate of 396 grains of which 147.3 grains proved to be magnetic and 1.9 grains of gold.[77] The first detailed description of gold washing in Assam was, however, drawn up by a native, Maniram Dewan, at the instruction from the state in 1838.[78] At the same time Captain Hannay's report based on the research of the four rivers the Bhoroli, Subansiri, Desoi and Janglu Pani, supplemented Maniram's account. The gold of the last two rivers was so much prized for its colour 'that the jewels of the Raja's family of Assam were invariably made up from what was collected in them'.[79] After the discovery of gold in California (1849) and Australia a few years later , there emerged a renewed interest in the exploring the potentiality of gold production in Assam and Captain S.F. Hannay and E.T. Dalton were asked by the government, during 1855 to undertake further examination of auriferous deposits of eastern Assam and provided ample funds for the investigation.[80] The report submitted by Hannay and Dalton states that:

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[76] H.K. Barpujari, *The Comprehensive History of Assam*, Vol V (Guwahati: Publication Board Assam, 2004), p.76.

[77] Malcolm Maclarren, "The Auriferous Occurrences of Assam," *Records of GSI*, Vol.31, part 1 (1904), p.206.

[78] Maniram Dewan in his account has reported that during the reign of Rajeswar Singh, the sonwals used to pay 6,000–7,000 *tolas* of gold as tax and during Gaurinath Singh's time they used to pay 4,000 *tolas* of gold as tax. Dewan has also elaborately discussed the indigenous methods of gold washing. For details see, Monneram, "Native Account for Washing Gold in Assam," *JASB*, Vol.7 (1838).

[79] Maclarren, "The Auriferous Occurences,"p.208.

[80] *Ibid.*

> the mode of occurrence of gold in Assam is similar to that in California, in the Ural, and in Australia, viz., that this is derived from crystalline rocks in the first instance, but only becomes sufficiently concentrated to render worth working in the alluvium, after this alluvium has undergone repeated washings in the river current, by being successively cut away, washed, and red posited, as the river changes its course.[81]

Hannay and Delton point out that the river naturally performs on a large scale all the operations of mining and of pulverizing and concentrating the gold in the comminute matrix. The gold washers had to work the final process of the entire process. However, one of the serious drawbacks was the regular floods of the rivers. For the concentration of gold a comparatively equable current is required, which was rarely found in the rivers of Assam. Maclarren points out that the 'annual floods, varying so quickly in height, velocity, and direction, that the slight local concentration of one year has been inevitably neutralised during the floods of the succeeding season'.[82]

As already mentioned above, Wilcox while making his journey in the eastern Assam through Buri Dihing noticed seepages of petroleum in 1825. He described his findings at Sukpong in eastern Assam in the following way:

> …the jungles are full of an odor of petroleum…There were two beds, one at a little higher level than the other, but both on the plains, filled with liquid mud of various degrees of consistence. One was twenty or

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[81] E.T. Dalton and S.F. Hannay, "Note on recent investigations regarding the extent and value of the auriferous deposits of Assam," *Memoirs of GSI*, Vol.1, part 1(1856), p.92. Both Hannay and Dalton proceeded upwards of the Brahmaputra with a primary aim of locating 'the original rock containing the gold *in situ'*. As they moved further they found that the deposits became less and less rich. The survey was provided with ample funds by the government.

[82] Maclarren, " The Auriferous Occurences,"p.232

> thirty feet across, and the other larger. In the middle, where bubbles of air are seen constantly rising to the surface, the mud is nearly white, and is there in a more liquid state–on the edges green petroleum is seen floating…[83]

Unlike Burma, where there was indigenous drilling and use of petroleum, in Assam the natives had no use of petroleum. Petroleum has been found by explorers in the wake of their search for coal.[84] The most interesting feature of Assam petroleum was its close association with seams of coal. For instance, Bruce in 1828 reported that while working the coal field in Suffery in eastern Assam (in present Sibsagar district) he came across oil seepages. Lt Bigge also noticed eight or ten springs of petroleum while finding coal in Namroop. In 1845, Hannay wrote to Jenkins that besides Jaipur in eastern Assam, the other localities that could have source of oil were Borhat, Teroogong, Magawn, Nmadeng and Namtchuk Pathar in eastern Assam.[85] Hannay was convinced of the existence of 'great Salt, Coal and Petroleum' deposits in the east branch of Dekho river in Upper Assam.[86] Hannay reported that at Namtchuk Pathar, near the mouth of the Namtchuk river , in one spot 'an extensive basin or hollow is formed at some height, which contains muddy pools in a constant state of activity, throwing out, with more or less force, white mud mixed with

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[83] Wilcox, "Survey of Assam and The Neighbouring Countries," p.415

[84] Wilcox in his memoir had mentioned that the local communities had no use of petroleum. It helped the colonial state to assert its right over the mineral.

[85] P.S. Hannay, "On the Assam petroleum Beds (In a letter to Major Jenkins communicated by him)," *JASB*, Vol.14 (1845), p. 819.

[86] *Ibid.*

petroleum'.[87] These observations were in the Makum Namdang area which is today known as Margherita. The findings of petroleum seepages by the EIC officials were sporadic in nature which could not attract the attention of the government and the private entrepreneurs. The entrepreneurs during this period came forward to develop the industry along with the coal. However, those surveys were instrumental in generating knowledge about the mineral wealth of the region and encouraged more scientific surveys of the region under the GSI.

The occurrence of petroleum near the coal beds raised fundamental issues on general understanding about fossils. According to Pascoe, the rejection of the theory that petroleum has been derived from coal by destructive distillation had ignored the close relationship between the two substances.[88] As early as 1757, Mikhail Lomonosov (1711–65), Russian scientist had proposed the biogenic origin of petroleum and coal.[89] At the beginning of the nineteenth century, the famous German geologist, Alexander von Humboldt and the French Chemist, Louis Joseph Gay Lussac rejected the hypothesis of Lomonosov and argued that oil is a primordial material erupted from great depth and has no connection with any biological substance.[90] During the early

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[87] *Ibid*.

[88] E.H. Pascoe, "The Petroleum Occurrences of Assam and Bengal," *Memoirs of GSI*, Vol.40 (1912), p.319.

[89] Mikhail Lomonosov was a Russian scientist who made fundamental contributions to chemistry, physics, geology and also literature in the eighteenth century. For details, see M.S. Vassiliou, *Historical Dictionary of the Petroleum Industry* (US: Scarecrow Press, INC, 2009), p. 302.

[90] In the second half of the twentieth century, Soviet scientists attempted to revive the Abiogenic theory of the origin of petroleum. However, by the end of the century, the theory became unpopular because it could not make any useful prediction for the

nineteenth century various hypotheses emerged indicating the biogenic origin of petroleum and gained wide spread support by the mid twentieth century. To the ongoing debate regarding the biological origin of petroleum in the nineteenth and early twentieth centuries, Pascoe added that 'the serial occurrence of these three substances (petroleum, coal and fossil wood) in the same descending order generally speaking, silicified wood-coal-petroleum, in Burma, Assam and other parts of the globe, is a strong temptation to conclude that there is some link, indirect and elusive as it may be'.[91]

The sporadic nature of geological surveys in the early decades of the nineteenth century, according to Kumar was not more than 'reconnaissance with natural history'. The desire to be recognised in the metropolitan world of science had further provided incentive for such surveys. The romantic idea of being the first discoverer had also influenced the British officials to carry out such isolated surveys. The joy and excitement of being a discoverer in an individual exploration was often expressed by the geologists. Such romantic works often involved the idea of self-seeking knowledge generated by individuals conducting lonely and isolated field surveys in 'unfamiliar' worlds. Arnold has pointed out that the romantic vein of writing was established in

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discovery of oil deposits. Eventually, Geologists began to consider the abiogenic formation of petroleum scientifically not viable, and there emerged a consensus that the petroleum is formed from organic material. For Details, see Pradip Kr Das and Hrishikesh Baruah, *Petroleum and Coal* (New Delhi: MD Publications Pvt Ltd, 1997), pp.17–18. For the debate that took place in the nineteenth century regarding the origin of petroleum, also see W.S. Tower, *The Story of Oil* (New York: D. Appleton and Company,1909), pp.12–14.

[91] Pascoe, "The Petroleum Occurences,"p.324.

India after 1800 and flourished between the early 1820s and late 1840s.[92] As Assam became a part of the British India in the 1820s that coincided the period of romanticism in India, the travel literature and the surveys conducted did reflect romantic appreciation of nature. Some features of landscape like caves, grottos, mines, waterfalls, gorges and mountain peaks became prime attraction to the European surveyors, geologists, and travellers. Hannay wrote his own personal experiences with Irrawaddy river in a romantic mode while travelling from Ava up the Irrawaddy river to the frontier towns of Bhamo and Mogaung:

> (The River) from covering an extent of miles, is sometimes confined within a limit of 150 yards, without rapids or torrents, as I had expected, but almost as still as a lake. In some places its depth is very great, being upwards of 10 fathoms. It winds through beautiful jungle, in which the pipul, simul trees, and bamboos, are conspicuous… if rice is thrown into the water from the boat, a dozen fish, some of them as much as three and four feet long come to the surface, and not only eat the rice, but open their mouths for you to put it in, and they will allow you to pat them on the head, which I and some of my followers actually did.[93]

M'Cosh while describing the nature of voyage in Assam as 'tedious' and 'dreary' and the nature of Brahmaputra as an uncultivated land 'with no trace of vegetation but an endless jungle of impenetrable reeds; without the shadow of an inhabitant, or signs of animal life but water fowls and alligators,'[94] also

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[92] Arnold, *The Tropics and the Travelling Gaze*.

[93] R. Boileau Pemberton, "Abstract of the Journal of a Route Travelled by Captain S.F. Hannay, of the 40th Regiment, Native Infantry, in 1835–1836, from the capital of Ava to the Amber Mines of the Hukong Valley on the South-east Frontier of Assam," *SOAS Bulletin of Burma Research*, Vol.3, No.1 (2005), p.201.

[94] John M'Cosh, *Topography of Assam*, second reprint (Delhi: Logos Press, 2000), pp. 6–7.

found a scenic beauty in the hills of Assam which evoked memory of homeland. Mountains were among the principal objects of romantic imagination. M'Cosh wrote:

> Though this is the ordinary nature of the Brahmaputra, it is occasionally relieved by groups of beautifully wooded hills; whose shape and colour constantly changing by position gratify the eye with a pleasing panorama till other and nearer groups come into view. As the voyager advances higher up, the scenery improves; and a series of hills innumerable, retiring far away in fine perspective, till their blue conical summits are relieved by then snowy peaks of the Himalaya towering their icy pinnacles midway up to the vertex of the sky, afford one of the grandest scenes in nature. The sight of a hill in this level land is always agreeable; few things more readily summon up before the mind's eye youthful associations; and the stranger hails its appearance like a friend of his boyhood met in a foreign land. Hence the scenery of Assam is always agreeable, and the eye wanders from hill to hill as over faces once familiar and with happy invention assimilates them with those of his native home.[95]

Arnold has showed that for Buchanan and other naturalists who followed him, the pursuit of science (botany in particular) and the aesthetic enjoyment of scenery were closely connected. The romantic evocation of nature remained a subdued motif even two decades after Buchanan's writing.[96] However, such romantic appreciation of nature was often associated with a desire to 'improve' India. Like other parts of India, Assam was also described as a 'land of death' and 'land of ruin' which needed the British intervention for 'improvement'. The desolate nature of Assam was argued by the travellers and surveyors as the

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[95] *Ibid*., p.7.

[96] Arnold, *The Tropics and the Travelling Gaze*, p. 88.

result of the Burmese invasion which was restoring under the British rule. Even though the narratives reflect upon the pessimistic view of the landscape and its agriculture, the romantic description of Assam was not absent. M'Cosh gave a gloomy picture of Assam which could be 'improved' by the British rule:

> This extensive valley , though some centuries ago richly cultivated by an industrious and enterprising people, is now throughout six-eights or seven-eights of its extent covered with a jungle of gigantic reeds, traversed only by wild elephant or buffalo; where a human footstep is unknown, and the atmosphere even to the natives themselves is pregnant with febrile miasma and death. The ruins of splendid temples are discovered in wastes and forests long since forgotten…[97]

Such ambiguity in the appreciation of the nature provided scope for sciences like botany and geology to make an entry at the ideological level to transform India's landscape for 'improvement'. By the 1850s science was striving for establishing its objectivity and authority, and therefore began to distance itself from the romantic approach towards nature and literary representation of nature. Arnold argues that though 'science never ceased to travel but it felt less compulsion to consider the landscape and nature as a site of operation'.[98] For instance, the GSI in India had to struggle for an independent identity. While in the attempt to establish GSI's scientific authority in its initial days, it had to increasingly worry about the romantic strain. However, the confused state of early geological endeavours came to be settled with the appointment of Holland and GSI became an important tool for colonial exploitation and over the years GSI became one of the most premier scientific institutions of India.

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[97] M'Cosh, *Topography of Assam*, p.13.

[98] Arnold, *The Tropics and the Travelling Gaze*, p.229.

Geological Survey of India and Assam

The interest of science and industry are bound together: each advance of science is followed by new developments in industry, and, at the same time, industrial progress facilitates in endless ways the means for scientific research.

TH Holland[99]

The GSI in the early years, as Chakrabarti points out, was struggling for an identity as it was defining a role for itself, breaking the heritage of Asiatic Society, that was, the fascination for Indian nature and amateur scientific tradition.[100] Geologists continued to invest much of their time to the general geological structure and physical features of the country and preparing maps revealing the general features of the region. During 1856–1901, not less than forty out of eighty two parts of *Memoirs* of the GSI were devoted to 'the study of geological structures and physical features of several areas encompassing the length and breadth of the country'.[101] The geologists were still not convinced about the commercial use of geological research at the cost of purely scientific research. One major achievement in the field of scientific research was the study of earthquakes and preparation of a catalogue of Indian earthquakes which was initiated by Thomas Oldham in the wake of Cachar earthquake in 1869. The studies of RD Oldham on the Assam earthquake (1897) resulted in the establishing the 'layered theory of the interior of the earth, which was

[99] T.H. Holland, "Presidential Address," *Transactions of the Minerological and Geological Institutes of India*, Vol.2 (1908), p.13.

[100] Chakrabarti, *Western Science in Modern India*, p.95.

[101] Deepak Kumar, "Science, Resource and the Raj," p.85.

unknown till then.'[102] His account of the Shillong Plateau earthquake in Assam (Oldham 1899) was exemplary and according to Richter (1958) it is 'one of the most valuable source books in seismology'.[103] Even in England the Geological Society (1807) in its initial years had to struggle with the Royal Society for its autonomous existence. The Geological Society had to prove its uniqueness and prestige against the attempts made by Sir Josheph Bank, president of the Royal society, to prevent the Geological Society from functioning independently.[104] Besides, the Society also had to prove its credential within the scientific community and thus gaining 'scientific respectability' by distinguishing geology from other natural sciences. The GSI fulfilling its primary duty to locate economically valuable coal and other minerals also engaged itself in scientific activities from the very beginning.

The transition from amateur tradition of scientific practices including the geological studies was completed under Holland by the beginning of the twentieth century when he stressed on the break from the older tradition to establish the practical use of science in general and geology in particular for development of new industries and remodelling of the old ones. Holland was different from his predecessors as he developed a clear objective of the GSI, that is, to produce practical result only. As a result the scientific concerns were

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[102] *Ibid.*

[103] S.K. Jain and Navin C. Nigam, "Historical Development and Current status of Earthquake Engineering in India," *Proceedings of the 12th World Conference on Earthquake Engineering* (Aukland, New Zealand, 2000), p.2.

[104] Laudan, "Ideas and Organisations in British Geology," pp.527–538 and M.J.S. Rudwick, "The Foundation of the geological Society of London: Its Scheme for Cooperative Research and its Struggle for Independence," *The British Journal for the History of Science*, Vol. 1, No. 4 (1963), pp.325–355.

subdued. Holland transformed GSI from an organisation that conducted various surveys and then published its reports in the periodicals to a scientific body that not only advised the government on the issue of granting mineral concession but also in prospecting and exploiting minerals.

Thomas Oldham (1816–78) was the first superintendent of the GSI. Oldham was a chief geological assistant in the Geological Survey of Ireland, and was previously Professor of geology in Trinity College, Dublin. The main objective of Oldham was to find coal in particular and other minerals of economic value in general by conducting a detailed survey of the whole country. The GSI started functioning regularly only after 1856 and its operations were carried on by a small staff of officers. In 1863 the GSI had only fifteen geologists. Oldham during his tenure attempted to transform the institution into a thoroughly professional one. Thus, he tried to follow international standards in the field of geological collection and research. The geological researches were published in the *Memoirs of the Geological Survey of India* (1856), *Records of GSI* (1868) and the regular *Annual Reports of the GSI*.[105] Those publications gave scope to the regional geologists to establish their identity and to break the sense of isolation from the metropole to some extent.

The memoirs and reports were well illustrated with maps. The literature published by the GSI gave particular attention to the coal-bearing deposits. The *Memoirs* contain reports on the coalfields of Talchir, Ranigunj, Jherria, Bokaro, Ramgurh. Besides the coal-reports, the *Memoirs* also contain papers on the gold-bearing and other economic deposits. The studies of geology in general

[105] Chakrabarti, *Western Science in Modern India*, p.100.

and physical geography of particular areas were also published. By 1867 around 27 coal fields had been explored. For the study of the species of organic remains collected by the GSI, a separate branch, the *Palaeontologia Indica* was instituted. Subsequently, a large number of fossils were collected by the geologists, which increased the volume of collections and to keep them in an ordered manner a museum became a need of the hour. It is to be noted that to preserve the heterogeneous geological collections, the Asiatic Society had already proposed to establish a museum way back in 1796. In 1814, it decided to form a museum and Nathaniel Wallich, the Company's surgeon-botanist, was appointed as curator of the zoological and geological collections. By 1835, the geological collections had become so massive that the museum became overloaded and it was felt that a separate museum should be formed for geological specimen. Thus, in 1856, the Museum of Economic Geology was set up in connection with the GSI. The superintendent of the GSI headed the museum. Museums were also established at places like Madras, Bombay, and Kurrachee. The museum was not intended for the reception of specimens to illustrate points in 'theoretical geology', but to exhibit those specimens 'which are applicable to the useful purposes of life'.[106] The officers of the engineering departments and those of the Revenue Survey, 'with whose departments the physical character of the country is nearly connected', were considered to be

[106] "Letter, forwarding a paper on the formation of the Museum of Economic Geology of India, from Captain Tremenheere, Engineers, to H.Torrens, Esq., Secretary to the Asiatic Society," *Journal of the Asiatic Society of Bengal*, Vol. 9,No.106 (1840), p.976.

the best means for generating scientific intelligence and specimens.[107] Exploration of coal and other mineral resources increasingly became the major objective of geological works. By the mid 1850s the geological collection in the society's premises had become so huge in volume that the GOI decided to move the museum to a separate building.[108]

The work of the GSI suffered due to the disturbed state of the country during the Indian mutiny of 1857.[109] The climate of India necessarily restricts the work to certain portions of the year. The geologists working in the field were exposed to unhealthy climate and areas affected by malaria. The illness of the officials, and the necessity for leave of absence, were generally recorded in the *Annual Reports*. The death of few officers since the Survey had begun further hampered its operation.[110] It was almost impossible for Oldham to recruit qualified persons for the vacancies. He could not recruit from India as well, since the subject was not taught in the country then.[111] Till 1876, GSI had to constantly find new officers due to heavy causalities. Besides, an elaborate and comprehensive training was prerequisite for employment in the GSI. The geologists also suffered from the lack of maps and had to depend on the maps produced by the trigonometrical surveyors. In 1854, Greenough, completed the preparation of a map of India, on which he had depicted all that was then known about the geology of the county. But the map was considered to be

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[107] *Ibid*., pp.980-86

[108] Nair, "Science and the Politics of Colonial Collection," p.100.

[109] *Ibid.*

[110] Greoghagan died of sunstroke, Child of cholera and Loftus of a liver infection.

[111] Chakrabrti, *Western Science in Modern India*, p.100; Kumar, "Science, Natural Resource and the Raj," p. 87.

based on outdated topographical information and it was only in 1877, an extensive and authoritative geological map of India came into being. Under such difficult circumstances the realisation that the Indian coal was inferior to its English counterpart made the situation more disappointing. To ascertain the quality of Indian coal Oldham sent a few specimens of Indian coal to the International Exhibition in London in 1862. The result confirmed the inferiority of Indian coal vis-à-vis its English counterpart. The comparison of the coal from both the countries as follow:

Table 1

Comparison of quality between Indian and English coal, 1867[112]

Coal	Carbon	Volatile Matter	Ash
India	52.5%	31.9%	15.5%
England	68.10%	29.20%	2.70%

The less carbon and high ash content of Indian coal disappointed Oldham and he himself expressed, 'the hopes which have been expressed, that the coal fields of India, Burma, Australia and New Zealand will not alone yield ample supplies but will also serve to coal the ocean steamers trading and likely to trade between Europe and those far distant regions could not be fulfilled'.[113]

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[112] Thomas Oldham, *The Coal Resources and Production of India: Being Return Called for the Secretary of State for India*, Appendix V (Calcutta: 1867), pp.20 – 22.

[113] *Ibid.*

Valentine Ball also argued that 'compared with ordinary English coal, the Raniganj coals, and India generally, are very much inferior in working power'.[114]

The references to the presence of coal, mentioned by the amateur surveys in Assam conducted by the Company official in the first half of the nineteenth century, were to be confirmed by scientific proofs. Now with disappointment of Oldham regarding the quality of Raniganj coal further provided the impetus to the exploration of Assam coal and to ascertain its quality. The first geological survey conducted by the GSI in Assam was in 1864 by H.B. Medlicott, Deputy Superintendent of the GSI. Medlicott was assisted by the A.K. Comber, Deputy Commissioner of Lakhimpur and T. Lamb, Deputy Commissioner of Darrang and the Assam Tea Company. The survey was entirely devoted to coal and not to the geology of the region. Medlicott describes the objective of his mission as:

> My attention was so entirely directed to the object of my mission that I could not attempt to give a connected sketch of the geology of the regions visited; any general observations I may have to record on this subject will be considered supplementary to the principal object of this report, the coal.[115]

Medlicott reconfirmed the superior quality of the Assam coal, particularly of Jaipur and Tirap coal. Medlicott thought that coal beds in both the localities belong to same group of rocks. Jaipur coal bed was more favourably located than Tirap as 'direct and level roads can be run almost to the pit's mouth; in the

[114] Chakrabarti, *Western Science in Modern India*,p.22

[115] Medlicott, "The Coal of Assam," p.389.

rains, boats of the largest size and even the steamers can come into the immediate vicinity and the boats of moderate burden can do so throughout the greater part of the year.' [116] The Tirap field was much further from the market, yet Medlicott was of the opinion that 'the great superiority of the coal from Tirap over that extracted at Jaipur more than outweighs the geographical advantage of the latter (Jaipur) field.'[117] The analysis of coal from three different localities brought by Medlicott was as follows:

Table 2

Comparison of quality of Coal found at different parts of Assam, 1865[118]

Coal (Location)	Fixed Carbon	Volatile Matter	Ash
Tirap	61.8	36.5	1.7
Namchik	50.4	44.6	5.0
Jaipur	53.0	43.3	3.7

The result proved the value of Assam coal as fuel, as the content of ash is remarkably low, 'even compared with that of English coals'.[119] Medlicott lamented that such a valuable coal deposits in eastern Assam had been laid

[116] *Ibid*., p.397.

[117] *Ibid*.,p. 451.

[118] *Ibid*., p.405.

[119] *Ibid*., p.406.

useless and tried to find out the causes for such neglect.[120] Besides 'uncivilised' and remoteness of the country, Medlicott blamed the all absorbing nature of tea cultivation and the Government for not taking 'energetic endeavour to open out so important a field of industry' for the neglect of the coal industry in the province.[121] Medlicott suggested the terms and conditions of leasing out mining grants in the way that it could provide immediate opportunity for the opening up of the coal field with due security to the enterprise and protection to the resources of the country and the government control over the enterprise. In the meantime, Hopkinson asked the Board of Revenue not to alienate the valuable coal tract recklessly without conducting scientific survey of the geological and topographical aspects of the mining areas. Whereas, Beadon stressed the importance of opening up the mines without any delay to the private entrepreneurs.

Medlicott's report was, however, not encouraging about the other mineral resources of the province which had been brought into focus by the officials. Regarding the enthusiasm of the military-civil officials of discovering mineral resources other than coal, Medlicott remarked:

> Assam has not escaped the usual fate of newly opened region, of having the "mineral resources" spoken of in the most extravagant and unfounded manner…With the exception of coal, of which the province seems to have a fair share, its mineral resources, as far as I can judge, approximate to a minimum.[122]

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[120] *Ibid.*

[121] *Ibid.*,p.407

[122] Medlicott, "The Coal of Assam," p.412.

The romance of the early explorers regarding Assam's mineral resources as mentioned by Medlicott can be explained by the desire of the Company servants to be a creative part of the 'network research'. As Grout points out that the company officials and army men expected that their isolated fieldwork and the knowledge derived from that would provide them with a mode of 'cultural affirmation and social communication in an alien land'.[123] Medlicott's comment on the early explorers of Assam as 'extravagant' can also be put into this context of changing nature of science, which has already been discussed in the previous section and the state's obsession with coal. The firm belief that coal would bring 'improvement' to the country discouraged the exploration of other minerals. The impact that coal could have in developing India reflects in the Coal Committee report:

> The History of coal, however, is sufficient to show how much the manufacturers of a nation may be improved by its judicious application, and there is no reason why its beneficial effect should be here less salutary than elsewhere.[124]

The geological survey of Medlicott disapproved Assam having rich mineral resources other than coal and petroleum. Consequently, in the following years, the GSI focused mainly on coal and petroleum. The other mineral that brought limited interest was gold. The importance of Medlicott's report also lies in its acknowledgement of commercial value of petroleum in Assam. He found oil in

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[123] Grout, "Geology and India, 1775–1805," p.12.

[124] McClelland , *Report of A Committee for the Investigation of Coal and Mineral Resources of India*, p.16.

the springs of the Makum river and suggested two or three experimental wells or borings to test the petroleum.[125]

Medlicott's survey was followed by Mallet of GSI during 1874–76. Mallet found the Makum coal even better than that of the Raniganj coal. The comparison between the Makum coal and Raniganj coal was important as Assam had to compete with Raniganj for use in the upper Brahmaputra and in the railway. Therefore, the analysis of Makum coal was carried out by comparing it with Raniganj Coal. The result was in favour of the Makum coal. The Makum coal contained 10 per cent more carbon, about the same amounts of hydrogen, oxygen and nitrogen, and less than one eight the quantity of ash as compared to the Raniganj coal.[126] Specimen of Makum Coal was sent to the *Metallurgical Laboratory, Royal School of Mines*, London for analysing its quality.[127] The result of the analysis confirmed the use of Makum coal could be used not only for steam but, also for gas making, coking or manufacturing and household use, and that it can 'compete successfully with many British coals'.[128]

From the first discovery in 1825 and repeated call from Jenkins to carry on a scientific survey in the 1830s and then confirmation by the GSI of its superior quality led to a successful coal industry in Assam.The tea industry and the railway had a direct relation with the growth of the industry in the province

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[125] Medlicott, "The Coal of Assam," p.415.

[126] Richard Smith, "Analyses of Coal and Fire–clay from the Makum Coal–field, Upper Assam," *Record of GSI*, Vol.XV (1882), p.61.

[127] *Ibid.*

[128] *Ibid.*, p.60.

which was not considered by the Company profitable in the initial years. By the end of the century it was a well developed industry.[129]

The theoretical aspect of GSI after the appointment of Thomas Holland did not receive much attention. Chakrabarti points out that the GSI's struggle for independent identity and establishing its scientific authority was over with the appointment of Holland as the director of GSI at the age of thirty six in 1903.[130] Holland was clear about the practical and economic aspects of geology. Holland made it clear to that the objective of the GSI was to locate minerals and not fossils:

> The great end of life is not knowledge but action, and the government has not maintained a Geological Survey for the last 55 years merely to know that Jurassic fossils occur in the Central Himalayas. The objective in view is the development of the mineral resources of the country, and whatever my scientific friends may say; it is the duty of the government and the duty of their scientific officers to make this the paramount object of scientific work in India.[131]

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[129] The Editorial of *The Friends of India and Statesman*, 8 May 1895, reported:

> Assam coal is soft, but as it readily cakes when put on fire, this characteristic has not interfered with its sale. Indeed, its reputation as a first class steaming and smithy coal stands high. It is fully established in the market, and its demand is increasing due to its use in inland steamers, the railways, jute mils, tea and other factories. The output of Assam mines was 168,000 tonnes in 1894.

[130] Holland was only 21 years old when he was appointed as an Assistant Superintendent in the GSI in 1890. At the same time he also became the Curator of the Geological Museum Laboratory. He was a Lecturer in geology at Presidency College.

[131] Holland, "Presidential Address," p.32.

Holland directed the attention of the GSI staff to carry out comprehensive studies of particular minerals such as coal, manganese ore and petroleum. He emphasised that geology had to work in collaboration with mineralogist and industrialist to be able to deal with practical issues.[132] To him applied science was far more important than the theoretical or pure science. The period of organisational shift of the GSI under Holland coincided the period of Lord Curzon, who initiated the 'New Industrial Policy' during 1900–20.[133] The study of petroleum by GSI in Assam and other parts of India like Punjab became an important subject of study. Holland was interested in petroleum in India and was the president of the Burma Oil Reserve Committee and was a geological consultant to the BOC and a member of the geological advisory panel of the Anglo Iranian Oil Company.

Conclusion

Bernard Cohn points out that for the British in India the various surveys conducted had the objective of 'systematic and official investigation of the natural and social features' of India that resulted in vast official documentation of Indian territories.[134] Survey in each new territory was not only limited to the mapping of the area, rather it classified the territory's zoological, geological,

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[132] Chakrabarti, *Western Science in Modern India*, p.108.

[133] Curzon emphasised on the state's active role in encouraging enterprise. He established a new Department of Industry and Provincial Industries to cater to the needs of the entrepreneurs.

[134] Bernard S. Cohn, *Colonialism and its Forms of Knowledge: The British in India* (Princeton: Princeton University Press, 1996), p.7.

botanical features along with its economy, history and sociology.[135] In Assam too, during the nineteenth century, the British embarked upon the policy of control through classification and documentation of various economic, historical, social and natural features. By the close of the nineteenth century the colonial state had developed substantial knowledge about the natural resources of the region. Thus, the knowledge generated through various surveys proved to be an essential component of the British rule in Assam, as it provided necessary framework for transforming the frontier region into a productive land.

The transformation of the landscape of Assam was evident by the mid nineteenth century with the growing tea plantation and became one of the significant commercial ventures of colonial economy in Assam. The plantation economy subsequently demanded cheap networks of communication and fuel and this was facilitated by the production of coal. Tea planters could now use coal in place of wood as fuel at a reasonable price. When the explorers were consciously looking for coal in Assam thirty years before the first oil well was drilled at Pennsylvania in 1859, they also found oil in addition. Though the existence of petroleum in Assam was noticed in 1825 and repeatedly mentioned in the 1830s, it could not attract the attention of the state and the GSI. The mere reference of oil in the early surveys did not attract any attention and had to wait till the mid nineteenth century when European capital started developing interest in the new field though it was uncertain in nature. In the

[135] *Ibid.*

next chapter, I have discussed the early attempts in establishing commercially unsuccessful business in oil.[136]

[136] In 1855, Professor of Chemistry at Yale, Benjamin Silliman had discovered the properties of oil which could after distillation yield lubricants and a cheaper and lighter illuminant fuel than whale oil or natural gas. His voice was so authoritative that many wealthy people in the US came forward to invest in oil. See Tower, *The Story of Oil*, pp.43–44.

Chapter 3

Setting a Petroleum Industry: The Early Enterprises (1850s-1890s)

As already mentioned in the previous chapter, the discovery of petroleum in Assam in the early nineteenth century was a by product of the exploration of coal. But petroleum as a mineral for energy, did not receive much attention till the second half of the nineteenth century. From 1860s onwards a number of private enterprises came forward to invest on petroleum industry in eastern Assam. However, the possibility of establishing an industry emerged only after the successful borings in the 1880s conducted by the ARTC. Subsequently, the ARTC promoted a new company, named the AOC to exclusively deal with the petroleum business. Consequently, a nascent petroleum industry with a refinery at Digboi started operating from 1900. It is to be noted that this period also coincides with the shift in the policy of the British navy.[1] The British navy

[1] After 1900, the British oil policy had an effect on Assam. The government reserved the right to work for petroleum only for the British citizens and added two new conditions on the lessee. The conditions were that the lessee would supply fuel oil to the requirement of the British navy in ordinary times and in emergency, and that the refining of the crude oil produced by the syndicate had to be in British territory. The development of marine engines using fuel oil in naval vessels had already made inroads into the Russian and Italian navies and was under active consideration by the British navy. The navy informed the Secretary of State for India in 1904 about its desire for obtaining right in any concessions to prospect oil within the British empire 'of pre emption of suitable residual oil(s) for naval use, and to secure a supply of such residual oil by requiring that the refining of the crude oil should be carried out in British territories'. For details, see Ronald W. Ferrier, *The History of British Petroleum Company: Volume I The Developing Years, 1901–1932* (UK: Cambridge University Press, 2000), p. 68.

became more dependent on petroleum than that of coal and in such context all the oil producing areas of the British Empire became important for the supply of the resource. Besides, the growing knowledge and technology of exploration of petroleum and the use of petroleum as illuminant and later as fuel, led to the growth of an increasing enthusiasm both amongst entrepreneurs and the state. It was in such context, even after the formation of the AOC, a number of syndicates and individuals and speculators came forward to make fortune in the petroleum industry with hardly any success. This chapter discusses various aspects of efforts leading towards the establishment of petroleum refinery and growth of related fuel market in Assam.

Oil Explorations in Assam (1850s–1880s)

The first lease for extracting petroleum at Makum and Bapu Pung for 10 years was made to Wagentriber, a tea planter at Dibrugarh in 1854.[2] The Board of Revenue at Calcutta, on the recommendation of the Commissioner of Assam did not object to the lease. The Indian government, till then, did not have standard mining rules to govern the petroleum lease. Therefore, the only condition that was applied to the lease was that Wagentriber could not interfere with the government's elephant catching operations, as Bapu Pung was used by the government as trap to catch elephants.[3] The government expected that

[2] It is to be noted that the lease was granted before Medlicott's survey of the region in 1864 and his subsequent recommendation of experimental boring. Neither Medlicott nor Mallet had mentioned about Wagentriber in their reports.

[3] For various aspects of elephant catching by the British government in Assam, Arupjyoti Saikia, *Jungles, Wildlife, Reserves: A History of Forests in Assam* (Guwahati: Wildlife Areas Development and Welfare Trust, 2005).

Wagentriber would develop the resources of the wells and work them 'so as to make a valuable addition to the exports of the district'.[4] However, Wagentriber did not commence any work and his lease expired in 1864.[5]

In 1866, F.A. Goodenough on behalf of the firm, MeKillop, Stewart and Company,[6] of Calcutta, applied to the Board of Revenue for a petroleum lease for 20 years.[7] He attempted to take the risk of getting involved in an uncertain enterprise of exploration of oil. Goodenough applied after Medlicott made the recommendation of experimental boring in 1864. Hence, unlike Wagentriber's lease, the government took interest in the application of Goodenough. To work out the terms and conditions and practicability of the lease the Board consulted geologists and asked for their guidance. The Board of Revenue was averse to grant a lease to Goodenough 'in the dark'. Therefore, the Board asked Thomas Oldham, Director of the GSI to prepare a report on the petroleum exploration in the region. Oldham also advised experimental borings.[8] Following Oldham's advice, the Board decided to

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[4] Office Note, "Petroleum in Assam," Assam, *Revenue*, File No. 68 of 1878, ASA, p.1.

[5] Reasons behind Wagentriber's not re-commencing operations could not be found.

[6] Assam was already attracting European capital in its tea industry. The famous agency house — Carr, Tagore and Co.— took the initiative to form a joint enterprise of both Indian and European capitalists at Calcutta, known as the Bengal Tea Association back in 1838. Meanwhile, entrepreneurs from London were also negotiating to invest in the tea industry. As a result, both the interests came together to form the Assam Company in 1839.

[7] Office Note, "Petroleum in Assam," p.1.The first set of rules for prospecting and other ancillary matter were made by the Department of Revenue and Agriculture through a resolution of 1894. Prior to it, the rule-framing authorities were the Secretary of State for India in Council or the Governor-General in Council.

[8] *Ibid*., p.1.

conduct experimental borings. However, it did not have the means of conducting experimental borings on the scale suggested by Medlicott and Oldham. As a result, the Board was prepared to encourage private enterprise and private capital for the development of a petroleum industry in the region. The government also realised that petroleum may become 'an important article of trade, and possibly a source of revenue'.[9] In such a situation, Goodenough's application received attention from the government. Goodenough, in his proposal made to the Board of Revenue at Calcutta, asked for a lease of 'all petroleum and petroleum springs, wells and fountains' over an area of around 700 square feet for a period of 20 years.[10] He also proposed that the lease should confer him the right to enter any land that had been asked for lease, to break the surface, dig for petroleum, make all necessary erections, and cut timber and brushwood required for the work.[11] Colonel Henry Hopkinson, the then Commissioner of Assam, found that the demands of the proposal went too

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[9] *Ibid*., p.2.

[10] In colonial literature, the notion that Assam had abundance of land has been repeatedly established. The colonial officials attempted to attract European capital to transform Assam's 'wasteland' into productive resource even before the prospect of tea plantation was proved. The Waste Land Grant Rule of 1838 was enacted to provide large tracts of land to tea planters. Under the rule, one fourth of the grant was perpetually revenue free and no revenue had to be paid on the remaining land for 20 years. After the expiry of that period, the rates of revenue to be paid were also very low. Moffat Mills recommended even more liberal terms in his magisterial report on Assam in 1853. Consequently, in 1853 the terms of land grants were liberalised to give 99 years' lease and the minimum area for grant was raised to 500 acres.

[11] Office Note, "Petroleum in Assam", p.3.

far and that it would lead to a practical monopoly in extracting petroleum in Assam for the next 20 years.[12]

Cecil Beadon, the then Lieutenant Governor of Bengal, and Hopkinson had different approach towards leasing out land for mining purpose. Hopkinson was opposed to lease mines to any single firm or company, as this would pave the way for monopoly by the lessee and then they would have control over the market. For instance, in 1864, when Beaden sought to grant lease for the mining of Tirap coal or any other mine for ninety nine years subject to an annual rent of 6 *annas* per acre and a royalty of Rs. 1 for 100 *maunds* of marketable coal, Hopkinson opposed strongly.[13] Hopkinson recommended the Board of Revenue to conduct geological and topographical surveys of the mining areas before granting lease and not to lease out coal beds arbitrarily.[14] On the contrary, Beadon stressed the importance of opening up the coal beds to private entrepreneurs without any delay. In the case of Goodenough's lease, Hopkinson was equally anxious of creating monopoly over the mineral resource. Thus, to have check on such monopolistic control over the petroleum industry by private enterprise, Hopkinson advertised a notice seeking applications for licenses to work petroleum springs, wells and fountains and to bore for petroleum in eastern Assam.[15] Beadon, however, asked to withdraw the notice from the gazette in 1866. Beadon while defending the cause of Goodenough argued that:

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[12] *Ibid*.

[13] H.K. Barpujari, *The Comprehensive History of Assam*, Vol V, 2nd Edition (Guwahati: Publication Board Assam, 2004), p.80.

[14] *Ibid*.

[15] *Ibid*., p.5.

> If,... practical monopoly of Assam petroleum were to be given to Goodenough, it would not be a monopoly as against consumers, who are amply protected by foreign competition, but merely an exclusive local privilege as against other adventurers; and, since no one else has asked, or as far as the Government knows, is likely to ask, for permission to work these petroleum fields, while it is certain that the former lessee, who held the Makum springs for ten years, did little or nothing to develop them, the government is free to act as it thinks best for the public interests.[16]

Beadon was convinced that there would not develop any monopoly because of low profit and price control through the import price of kerosene. The government of British India was prepared to give every possible encouragement. Beadon suggested a rent-free lease in the neighbourhood of Jaipur and Makum in eastern Assam, within a defined area, for a period of 20 years. The only condition applied was, 'he should not interfere with the government operations for catching elephants, and if in two years he did not commence practical operations the lease would be cancelled'.[17] Thus, Beadon took the initiative in granting a lease to Goodenough and to begin the industry in Assam.

Goodenough after getting the lease over a large tract of land on both sides of the Dihing, started drilling. At Naharpong, near Jaipur, he bored a well by hand and abandoned it dry at 102 feet.[18] Oil was struck in one hole in 1867

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[16] Office Note, "Petroleum in Assam,"p.3.

[17] *Ibid*., p.4.

[18] Goodenough was the first to commence systematic borings. In addition to hand borings, he also used a Mather and Platt steam boring machine to bore a hole to the depth of 195 feet. He had to face difficulties in storing the oil as wooden tanks failed

at 118 feet and as many as eight borings were done in the Makum area. The yield varied in each well. In January 1868, 100–125 gallons a day were collected from Well Number 4 and 550–560 gallons were collected from Well Number 5. Yet, despite the successful borings, Goodenough could not transform these initiatives into a petroleum industry. There were a number of reasons behind the commercial failure of Goodenough's project. The difficulty of availing easy and cheap transport to consuming markets, the competition with the oil from Burma and America, and the 'general inexperience in making and securing against damage ascertain borings',[19] had been the main causes behind his failure. Mallet argues that the difficulty of transport and the competition with the oil from Rangoon and America had been the main cause of his failure.[20] Colonel Clarke, Deputy Commissioner, Lakhimpur, reported in 1871, 'the grantee, Mr. Goodenough, is dead…All operations have ceased since 1867, or before that time.'[21] One of the conditions of the lease granted to Goodenough provided the government with the right to cancel the lease if the operations of the lessee had been suspended for more than three years and in that case, the lessee would have to remove all his property off the ground. However, the government did not take any steps to formally resume the lease.[22]

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to store. Due to insufficient storage room, the flow from the Hole No. 5 was diminished by fixing a valve to the well pipe.

[19] R. A. Townsend, *Report on the Assam Petroleum Deposits*, Proceedings of the Revenue and Agriculture Department, January 1889, NAI.

[20] F.R. Mallet, "On the Coal–Fields of the Naga Bordering the Lakhimpur and Sibsagar Districts, Assam,"*Memoir of GSI*, Vol 12, Pt. 2 (1876), p. 3.

[21] Townsend, *Report on the Assam Petroleum Deposits*.

[22] In 1877, a notice appeared in the *Assam Gazette* regarding the sale of the whole of the extensive plant and machinery, comprising complete sets of steam boring and

For the next 20 years there was not much activity in the field of oil. In 1874, Theodore W.H. Hughes of the GSI, procured sample of oil from the spring worked by Goodenough to conduct test in order to assess the quality of oil in Assam. The test conducted indicated positive result.[23] In 1878, the managing agent Messrs. Balmer, Lawrie & Company.,[24] on behalf of a company known as the Assam Mineral Oil Company — a private partnership firm to be converted into a joint stock company — applied to the government for a concession in 'raising, manufacturing, and selling all petroleum oil and other liquid and solid hydrocarbons to be found in the sub division of Jaipur, in the district of Lakhimpur'.[25] The company was formed by John Berry White, civil surgeon of Lakhimpur district in eastern Assam, J.C. Batchelor, traffic manager of the East Indian Railway Company; A. Lawrie, C. Hudson and H.J.

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refining machinery, together with the stock of petroleum, as it lies, in the neighbourhood of Jaipur. Applications were asked to be sent to John Elliot & Co., No.4, Clive Street, Calcutta.

[23] The analysis of the sample suggested that the first six portions contained lamp oil, the sample oil had a higher specific gravity than the American oil, and the seventh and eighth portions contained solid paraffin. Hughe's findings demonstrated the commercial viability of Assam Oil. For details, see T.W.H.Hughes, "The Oil Fields of Burma," *Memoir of GSI*, Vol.2, part 2(1874).

[24] Balmer Lawrie started its corporate journey as a partnership firm in 1867 at Calcutta, founded by two Scotsmen — George Stephen Balmer and Alexander Lawrie. From tea to shipping, insurance to banking, trading to manufacturing, there was hardly any business, Balmer and Lawrie did not delve into in its formative years.

[25] Letter from Managing Agents of the Assam Mineral Oil Company to the Secretary, Chief Commissioner of Assam, dated 13 January 1878, Calcutta, Office Note, "Petroleum in Assam".

Simpson, members of the firm Balmer, Lawrie and Co.[26] The company also proposed that if a large plot could not be granted then the company should be granted Bapoo Pung near Makum, Nahor Pung near Jaipur, and Borhat Pung near Borhat on the Disang river as well as all wells or deposits that might be found within a radius of three miles each of such *pung*s (wells). The AMOC asked the Assam government to grant the lease in perpetuity or for 99 years. The government was reluctant to grant such an exclusive right to the extraction of all mineral oils throughout the subdivision of Jaipur for a period of 99 years, which the Chief Commissioner did not consider as necessary for the successful working of the company or expedient in the interests of the public or the state. The Chief Commissioner, on the other hand, suggested that the company would be allowed to select the most advantageous sites for operations and then restrict themselves to those defined localities.[27]

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[26] In the early 1860s, Assam experienced a rush of speculators to open tea estates, especially from 1859 to 1866. Consequent overproduction in relation to export facilities led to a serious crisis in the tea industry during 1866–69. Though the tea industry started to recover by 1870–71, a further slump occurred in 1879. In the next three years the situation improved only to face another slump from 1896 and continued till 1904 due to overproduction. Many tea gardens had to be closed during the period of slumps. Such a situation might have pressurised agency houses to look for alternative avenues for diversifying capital to earn profit. For details, see P.C. Goswami, *The Economic Development of Assam* (New Delhi: Kalayani Publishers, 1988), p.156.

[27] Letter from S.O.B. Ridsdale, Secretary to the Chief Commissioner of Assam to Messrs. Balmaeer, Lawrie& Co., Agents of the Assam Mineral Oil Company, Calcutta, dated 18 April 1878, Shillong, Office Note, "Petroleum in Assam". The chief commissioner added that Colonel Keating was desirous of 'encouraging the development of the industry (oil) which it is the objective of the Company to set on foot, and will give such an enterprise ....every assistance in his power'.

The AMOC, before commencing on operations, employed C.M. Pielsticker, mineral engineer and chemist, to examine the petroleum-bearing areas of Jaipur and Makum.[28] This was the first instance of employing a trained professional for examination of petroleum before starting practical work in Assam. Pielsticker's report was encouraging enough to motivate both the government and the company to start work immediately. Pielsticker reported:

> [I] noticed particularly three spots in two different localities about 100 yards from each other.…The formation here is sandstone and salty clay, and I have not the slightest doubts that a bore hole put down here would yield petroleum in quantities. What this quantity might be impossible to say, but, from the frequency of the indications, I feel convinced that a large reservoir or deposit of petroleum is on this very spot, and that by boring for it a large and regular supply of crude oil will be obtainable...The reason why a former Company, who bored here, failed to reach the deposit was simply that they did not go deep enough.[29]

Pielsticker reported that the wells bored by Goodenough in Makum were producing oil even after it been unattended for 10 years. The well produced oil at a rate greater than 100 barrels of 40 gallons each, in 24 hours without any pumping. The report refused to accept the official position that difficulties of transportation prevented success in the enterprise of Goodenough. He argued that the crude oil could be transported from the wells to the riverside, which

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[28] Letter from Messrs. Balmaeer, Lawrie& Co., Agents of the Assam Mineral Oil Company, Calcutta to the Secretary to the Chief Commissioner of Assam, dated 13 January 1878, Calcutta, Office Note, "Petroleum in Assam".

[29] Letter from C.M. Pielsticker, Engineer and Chemist for Mineral Oils to Messrs. Balmer, Lawrie & Co., Agents of the Assam Mineral Oil Company, dated 12 April 1878, Calcutta, Office Note, "Petroleum in Assam".

was only two and half miles away, in tubes, iron pipes, earthen ware pipes, or V-shaped wooden troughs.

It was at this moment, the issue of royalty became the bone of contention between the government and the company.[30] The latter offered a royalty of Re. 1 on every 100 gallons of refined oil manufactured at the works and one half of such royalty was to be devoted to the development of navigation of the rivers and the roads leading to the company's land. The royalty that the government asked for was at the rate of 10 per cent (*ad valorem*) on crude and of 5 per cent on refined oil, which according to the company would 'crush the enterprise in the bud' because of the then depreciated value of oil.[31] The Chief Commissioner of Assam denying the company's request argued that the royalty had been calculated at a percentage on the market value, therefore when the price of oil would fall, the royalty would also fall and vice-a-versa.[32] Besides, the government offered a lighter rate of royalty for the first six years of the lease, that is, 5 per cent on crude and 2 per cent on refined oil.[33] The lease was for 50 years and over an area not

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[30] Royalty is a payment to mineral rights' holder (lessor) from mineral producer (lessee) in consideration for the extraction of valuable and non renewable natural resources. A lessor has a right to royalty based on mineral production. It forms a vital part of a fiscal regime of mining and provides important revenue to the government. On the other hand, rent is the consideration payable for the use of tangible assets.

[31] Letter from S.O.B. Ridsdale, Secretary to the Chief Commissioner of Assam to the Secretary to the Government of India, Department of Revenue, Agriculture and Commerce, dated 15 November 1878, Shillong, No 3,043, Office Note, "Petroleum in Assam".

[32] *Ibid.*

[33] *Ibid.*

exceeding 30 square miles. Within the tract, the company was entitled to extract and use coal for the purpose of extraction, refinement or manufacture of mineral oil, on payment of a royalty of Rs 8 *annas* per ton, but were exempted from paying royalty during the first three years.

The lease granted to the AMOC came into conflict with the rights of the Forest Department. According to draft lease prepared for the grant, the company was bestowed with the right to cut timber for the construction of buildings, bridges over streams, and also as fuel to be used only for the working of oil. The Company could also use timber and wood for the manufacture of boxes for the packing of oil. But it could not sale or export timber, except in the shape of boxes containing vessels full of oil.[34] The Deputy Conservator of Forests in Assam, Gaustav Mann, questioned the intention of the government, published in the draft lease of the grant to be made to the AMOC, to permit the company the free use of all the timber and wood within a tract of 30 square miles, not only for buildings and bridges, but also for fuel and boxes for packaging along with free use of coal limited to the first three years.[35] Since the government was investing considerably in forest conservancy which was also dependent on the resources generated from forest revenue, Mann requested the government to limit the free grant of timber and wood to a fixed period in the beginning, as in the case of coal.[36] The government,

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[34] Letter from Gaustav Mann, Deputy Conservator of Forests, Assam to the Secretary to the Chief Commissioner of Assam, dated 24 December 1878, Shillong, No 123 A., *Proceedings of the Revenue Department*, March 1879.

[35] *Ibid*.

[36] *Ibid*.

accordingly placed a limited restriction on the company by putting the condition that better kinds of timber, enumerated in the reserved list of the Forest Department, should not be cut down for the purpose of fuel only.[37]

By the second half of the nineteenth century, the forests of Assam came under gradual inspection of the EIC and it became clear that the forests were rich in timber. It was from the 1870s the newly established provincial Forest Department, created to have a supervisory control over deforestation of the Assam forests as well as creating a sustained supply for future imperial needs, began to affirm its right over the forest resources of the province. The forests became the site of contention amongst the Forest Department, tea planters, agrarian communities and finally the various agencies that were engaged with the exploitation of mineral resources.[38] In the following years, while leasing out forest areas to the Assam Railway and Trading Company Ltd. for the development of oil in eastern Assam, the government had to take into consideration the advice of the Forest Department.

The AMOC not only employed a mineral engineer to survey the work, but also had the objectives of constructing a refinery and erecting residences for the employees of the company. Pielsticker, in his report, recommended Jaipur as the place for the construction of the refinery, because large steamers

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[37] Letter from L. Hare, Assistant Secretary to the Chief Commissioner of Assam to Messrs. Balmaeer, Lawrie& Co., Agents of the Assam Mineral Oil Company, dated 28 March 1879, Shillong, No 813, *Proceedings of the Revenue Department*, March 1879.

[38] For details, see Arupjyoti Saikia, *Forests and Ecological History of Assam, 1826–2000* (New Delhi: OUP, 2011).

could come up there and Jaipur was well connected with Dibrugarh by road.[39] Most importantly, Pielsticker was convinced that sufficient crude oil for a refinery at Jaipur, could be produced in close proximity at Nahorpung.[40] The company also asked the government the right of laying tubes or pipes on all government land or roads in the district for the conveyance of the oil from the wells to the refinery.[41] The capacity of the proposed refinery would be not less than 400 barrels of crude oil per week. The plant required for the refinery would consist of 4 stills of 33 barrels each, two sets of agitators for the treatment of distilled oil with chemicals, and the necessary gearing, bleaching tanks, etc. The plan of the refinery plant was designed by the engineer and he was convinced of the success of the refinery. He stated:

> Considering the already very large and increasing demand of American petroleum in India, which pays an import duty of 7½ percent, while the inland product is free, and the immense deposits up the Dehing exist under the most favourable circumstances, a refinery built on the most approved principles, and properly managed and worked, cannot fail to give more than satisfactory results to the proprietors.[42]

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[39] Letter from C.M. Pielsticker, Engineer and Chemist for Mineral Oils to Messrs. Balmaeer, Lawrie& Co., Agents of the Assam Mineral Oil Company, Calcutta, dated 12 April 1878, Calcutta, Office Note, "Petroleum in Assam".

[40] *Ibid.*

[41] *Ibid.*

[42] *Ibid.*

The AMOC did not commence any practical work of drilling.[43] In 1881, the AMOC finalised the transfer of their oil concession to the ARTC.[44] In return, the ARTC was to refund the expense made by the AMOC till then. The expense made by the AMOC was chiefly in obtaining reports, surveys, and analyses regarding the quality and character of Makum and Jaipur petroleum.[45] Though the company did not succeeded in establishing an industry in the field of petroleum in Assam, yet it was the first company to have a vision or a plan of developing an integrated business in petroleum in Assam.

The Final Moment: Assam Railway and Trading Company (1880s–1890s)

The oil dealings throughout the nineteenth century were volatile in nature. The companies had to move from 'outright competition to collaboration' even with

[43] S. Hogarth, Manager of Jaipur Tea Estate and Agent to Messers Balmer, Lawrie, & Co., informed the Deputy Commissioner of Lakhimpur that the AMOC was a speculation of very doubtful promise and therefore, could not afford heavy initial expenses such as constructing stone prisms or *pucca* pillars to have a permanent demarcation of their land. The company's decision to lessen expense intended to amalgamate their grant with that of the ARTC for demarcation purpose as their grants were almost identical. But, the ARTC did not accept and finally the AMOC transferred their rights to the ARTC. For details, see Assam Mineral Oil Concession, *Proceedings of the Department of Revenue and Agriculture*, May 1882, ASA.

[44] Letter from C.J. Lyall, Officiating Secretary to the Chief Commissioner of Assam to Messrs. B lawrie& Co., dated 16 February 1882, Shillong, No.264, *Proceeding of the Chief Commissioner of Assam*, Department of Revenue and Agriculture, May 1882.

[45] Letter from Messrs. B lawrie& Co to the Secretary to the Chief Commissioner of Assam, dated 7 February 1882, Calcutta, No.103, *Proceeding of the Chief Commissioner of Assam*, Department of Revenue and agriculture, May 1882. The estimated expense was around £800 or £ 1,000.

the rivals.[46] As already discussed in the above section, the AMOC lacked enough capital and expertise and had to sell their lease to the ARTC. Meanwhile, in 1882 the ARTC[47] had also applied for a lease to exploit oil and was granted an oil concession over 30 square miles within their Makum coal concession, on the south bank of the Dehing river, for 18 years and 10

[46] Stephen C. Pelletiere,*Iraq and the International Oil Systems: Why America went to War in the Gulf* (US: Greenwood Publishing Group,2001),p.14.

[47] Stuart Bayley, the Chief Commissioner strongly felt the need of railways with the growth of the tea gardens and working out the coal beds in the Makum area. He, therefore appealed to the Government of India to construct a meter gauge railway from Dibrugarh along the Sadiya road. Accordingly, the idea of constituting a railway company sprang up in 1887 when Dr. John Berry White, a civil surgeon invited applications in London for shares in the proposed Assam railways Company with the objective of laying down railway line from steamer *ghat* in Dibrugarh to the 51 mile on Sadiya road and three branch lines to the areas having coal and oil deposits. However, the scheme failed due to the limited public response even after government providing a subsidy of Rs. 100,000. By the end of 1880, Dr. White with assistance of Benjamin Peircy, an engineer from London, widened the scheme to include the Makum coal fields, timber and petroleum rights so that it could attract shareholders. The ARTC was incorporated in 1881 mainly to construct a railway line from the Brahmaputra river to, and a branch railway through heavy forest for 24 miles from Makum junction to Margherita coal fields for the purpose of raising coal and petroleum and carrying on a timber trade. The government assisted the enterprise by a railway concession, to facilitate the construction and maintenance of the railway, a timber concession providing them a monopoly over the forest bordering on the Makum branch, and a coal and petroleum concession around Margherita which was at the end of the branch. For details see, Assam Railway and Trading Company Ltd., *Proceedings of the Department of Revenue and Agriculture*, February 1888, ASA; W.R. Gawthrop, *The Story of the Assam Railway and Trading Company, 1881–1951* (London: Harley Publishing Co.Ltd.,1951).

months.[48] The area included the sites on which Goodenough had worked. The concession included the Makum area worked by the AMOC. Till 1884, the ARTC could not extract any oil and operations were not satisfactory. As per the government rules, the company was required to extract 10,400 barrels of oil, containing 40 gallons each between 1884 and 1886 to hold on the lease.[49] The company being unable to find oil and investment requested for an extension of term.

In 1887, the company admitted that it could not give enough time and energy in the business of oil, as the attention of the officials of the ARTC was mainly focused on the construction of railways and the operations of the collieries.[50] The company in its effort to develop the coal business, raised 5,949 tons of coal till 1885 and with 1,214 coolies working under the company in its coal field, the company assumed that there would not be any fall in the production of coal.[51] The company also assured the Assam government that the saw mills at Margherita would soon become the largest in Assam. The coal

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[48] Letter from S.S. Hawkins, Agent and General Manager, Assam Railways and Trading Company Ltd to the Secretary to the Chief Commissioner of Assam, dated 1 April 1898, No. 52, *Assam Secretariat Proceedings*, Revenue-A, May 1898, ASA.

[49] Letter from the Seceratary to tthe Chief Commissioner of Assam to the Commissioner of Assam Valley Districts, dated 16 November 1885, No.785, *Proceedings of the Department of Revenue and Agriculture*, January 1887, ASA.

[50] Letter from the Deputy Commissioner, Lakhimpur, to the Commissioner, Assam Valley Districts, 3 February 1885, Dibrugarh, No.1,096, *Proceedings of the Department of Revenue and Agriculture*, January 1887, ASA.

[51] Letter from the Agent and General Manager, Assam Railways and Trading Company Ltd to the Deputy Commissioner, Lakhimpur, 3 December 1885, Dibrugarh, No.4,715 G., *Proceedings of the Department of Revenue and Agriculture*, January 1887, ASA.

and the timber, as pointed out by the ARTC would generate considerable revenue for the state. Under such diversified business interests, the company argued that it could not invest much energy in the field of petroleum and asked for an extension in the terms of the oil lease for another two years. Government officials were also in favour of such an extension. The Deputy Commissioner of Lakhimpur recommended the extension the time of the oil lease to the ARTC and wrote to the Secretary to the Chief Commissioner of Assam:

> There is not the least chance of any one besides the Assam Railways and Trading Company embarking on the petroleum business in this district. We get moderate revenue (Rs 1,500 a year) for the monopoly granted to the Company. No one is any the worse for it, except the Company, who has not as yet got their money's worth out of the concession. The business is a very uncertain one, and to embark on it requires a large capital. I see no prospect of any one risking his money in the attempt; but, if the railway Company is allowed an extension of time they may be lucky in finding sufficient supplies of petroleum to pay for the working. It would be of undoubted advantage to the district if this additional enterprise were started.[52]

The ARTC while requesting the government to extend the term of the concession reported the volatile nature of the business. The Company was convinced that to establish an industry in oil, it would have to submit to 'many failures and many disappointments and to make many sacrifices'.[53] The risk

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[52] Letter from the Deputy Commissioner, Lakhimpur, to the Secretary to the Chief Commissioner of Assam, 4 October 1886, Dibrugarh, No.2,352, *Proceedings of the Department of Revenue and Agriculture*, January 1887, ASA.

[53] Letter from the Agent and General Manager, Assam Railways and Trading Company Ltd to the Deputy Commissioner, Lakhimpur, 1 October 1886, Dibrugarh,

and uncertainty of the business was well known to the company, as the knowledge regarding the petroleum business was flowing to this remote part of the Indian empire from the other parts of the world. The warning that the mere existence of fossil oil could not be the sufficient condition for the existence of commercially viable oil left the Company with suspicion about the Makum oil field. The government largely agreed on this and finally sanctioned the extension of the term of the Makum concession by another two years.[54] The Makum concession was to expire in October 1901, and there was no provision of renewal for further period. Consequently, the ARTC applied for a lease over an area of four square miles near Margherita within the 30 square miles of the Makum concession in 1898, so that it could work on oil after the expiry of the Makum concession. It may be pointed out here that Assam Land Revenue Regulation of 1886[55] by defining and fixing the land rights of the farmers of Assam allowed land lease for the oil speculators. Government enjoyed rights over mines and minerals. As per the resolution of 1894, license to explore mineral was given for one year without any exclusive or preferential right. The

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No.5269 G, *Proceedings of the Department of Revenue and Agriculture*, January 1887, ASA.

[54] Letter from the Secretary to the Chief Commissioner of Assam to the Commissioner of the Assam Valley Districts, dated 2 November 1886, No.3, 932, Shillong, *Proceedings of the Department of Revenue and Agriculture*, January 1887, ASA.

[55] The regulation was to change the land title of the people of Assam from annual lease to decennial lease. The decennial settlement provided the colonial state with a vast amount of land in which the state could claim its right. Sanjib Baruah argues that the effect of the land settlement was to eliminate the access of the cultivators of the Brahmaputra Valley to natural resources of the state. For details, see Sanjib Baruah, "Clash of Resource Use Regime in Colonial Assam: A Nineteenth-century Puzzle Revisited", *Journal of Peasant Studies*, Vol.28, No.3 (2001), pp.109–124.

surface of unoccupied and unreserved land which was the property of government could be freely searched without license, but if asked for a license government did not object to grant a license.[56]

In 1888, the ARTC applied for petroleum lease over an area of six square miles near Digboi on the north of the Dehing river.[57] However, the Chief Commissioner of Assam did not approve the plea of the ARTC as the land they asked for was situated within a Reserved Forest.[58] Conservation of forest under the colonial rule as argued by Saikia meant a command of the Forest Department over the forest resources.[59] In the process of commercialisation of the forest, the colonial state categorised the forestlands into the Reserved Forests and Open or Protected Forest.[60] By the end of the nineteenth century the Forest Department made rapid progress in bringing more forestlands under Reserved Forests. Before the classification of Protected Forests, the unreserved forest remained under the custody of the district administration.[61]

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[56] Extract from the Proceeding of the Government of India in the Department of Revenue and Agriculture, 12 December 1894, *Assam Secretariat Proceeding*, Revenue and Agriculture, April 1895, ASA.

[57] Letter from the Secretary to the Chief Commissioner of Assam to the Commissioner, Assam Valley Districts, 20 April 1888, Shillong, No.1,150, *Proceedings of the Department of Revenue and Agriculture*, April 1888, ASA.

[58] *Ibid*.

[59] Arupjyoti Saikia, *Forests and Ecological History of Assam*, p 69.

[60] The administration of and control over the Reserved Forests entirely belonged to the Forest Department. Whereas in the case of Protected Forests, the department had rights over specific reserved trees or exclusively over specific forests.

[61] The district administration extracted nominal revenue from 29 Reserved trees,

The forest resources of Assam being one of the important concerns of the colonial government, the Chief Commissioner, D. Fitzpatric was not in favour of granting right to the ARTC over a considerable portion of the forest near Digboi which would result in the destruction of valuable timber. Fitzpatric pointing to the company's exclusive concession over a large tract on the south bank of Dehing, which was lying unused, wrote:

> The land applied for is situated within a tract which has recently been constituted a reserved forest, that is to say, a forest which, in the public interest, it has been determined to maintain as such under a proper system of conservancy, and a proposal to burden a considerable portion of such a forest with rights the exercise of which would involve the destruction of the timber is one which cannot be lightly entertained.[62]

Fitzpatric though refused the application of the ARTC for the grant of land on the north bank of Dehing river in Digboi, made the provision that the area asked by the company would not be leased out to any other party for two years.[63] During the two years, the ARTC could investigate and explore the area and if they found the area worthwhile and at the same time if they could utilise

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[62] Letter from the Secretary to the Chief Commissioner of Assam to the Commissioner, Assam Valley Districts, 20 April 1888, Shillong, No.1,150, *Proceedings of the Department of Revenue and Agriculture*, April 1888, ASA. The deputy commissioner pointed out that the ARTC had not fulfilled the conditions of the lease, i.e., the starting operation from October 1884 and extracting 10,400 barrels of oil, containing 40 gallons each between 1884 and 1886. The first condition had already been waived by the government. When the deputy commissioner visited the field he found that the company had extracted nothing.

[63] Letter from R.S. Greenshields, Esq., C.S., Officiating Deputy Commissioner of Lakhimpur to the Commissioner of Assam Valley Districts, dated 20 April 1891, Dibrugarh, No.363, *Revenue A*, June 1894, ASA.

the area of the Makum oil concession on the south bank of the river and could prove the area to be worthless, and relinquished it, then Fitzpatric would consider of leasing the area on the north bank to the company.[64] The decision of the government on the issue of granting further concession to the ARTC on the north bank of the Dehing river was forced to change.

Meanwhile, in1888, at the instance of the Assam government, R.A. Townsend, Superintendent of Petroleum Works, Baluchistan, made an examination of the petroleum deposits in eastern Assam and submitted a report reflecting a possible existence of commercially viable oil on the north of the Dehing river.[65] The report showed that the exploitation of petroleum should be encouraged in all parts of the field without waiting for the operation of the ARTC on the south of the Dehing. Townsend's report was followed by several applications for grant of concessions.[66] The government decided to grant

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[64] From the Office of the Secretary to the Chief Commissioner of Assam to the Secretary to the Government of India, Petroleum Deposits in the Upper Assam Valley, *Proceeding of Revenue and Agriculture Department*, January 1889, NAI.

[65] Letter from R.A. Townsend, Superintendent of petroleum Works, Baluchistan to the Secretary to the Government of India, Public works Department, dated 14 September 1888, Shimla, NAI. The report suggested that there had been a property in oil in Assam of very great value with a market at hand to purchase any quantity of oil.

[66] The ARTC applied for a lease in the area even before Townsend submitted his report. Following his report, the Assam Oil Syndicate, formed by T.R. McLellan and G.W.F. Buckland, applied for a lease. Williams, the Agent of the ARTC also applied for a petroleum lease in his individual capacity. There was another application from L.M. Burt from England. McLellan, on behalf of himself and others, applied for a second lease. Similarly, Townsend along with a partner applied for a lease. All the applicants desired to acquire their lease on same favourable terms provided by the Government of British India to the first two concessionaries. However, the government was not ready to grant lease on such favourable grounds. For details, see

concessions to only two applicants who would apply first, extending over an area of four square miles each.[67] The concessions were granted to the ARTC and the newly formed AOS. Once the report of Townsend confirmed the possible existence of petroleum in the north of the Dehing, Fitzpatric who had earlier refused the application of the ARTC, had to grant concessions for exploration of oil on the north of Dehing as well. As the ARTC had already applied for a lease on the north of Dehing even before Townsend's report, it became the first choice of the government.[68] The GOI, however made it clear that the terms offered to any other subsequent applicants would be less favourable, both in respect to areas granted and the royalty demanded.

The two grantees – the ARTC and the AOS were asked by the GOI to select their respective areas not exceeding 4 square miles each by the middle of 1890s.[69] The grantees were required to submit an actual plan with a map of the selected site. After mapping the selected site, the Deputy Chief Commissioner of Lakhimpur, R.B. McCabf along with Gaustav Mann, the Conservator of Forests of Assam, would go for inspection of the selected sites. However, before the leases could be worked out by the government, the two companies

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application of B.J. Townsend to Work Petroleum in Lakhimpur, *Revenue-A*, June 1893, No. 62–65, ASA.

[67] Letter from the officiating Secretary to the Chief Commissioner of Assam to the secretary to the Government of India, Revenue and Agricultural Department, dated 17 November 1888, Shillong, No. 3,397, *Proceedings of the Department of Revenue and Agriculture*, November 1888, ASA.

[68] Letter from the Officiating. Secretary to the Chief Commissioner of Assam to the Secretary to the Government of India, Revenue and Agricultural Department ,dated 17 November 1888, Shillong, No.3397, *Department of Revenue and Agriculture*, Branch-Minerals, Pros. 4–13,1888, NAI.

[69] *Ibid*.

came into conflict with each other regarding the selection of respective plots of land and defining the boundaries. The ARTC accused the AOS of not following the government rules while selecting their plot and demanded that a belt of 100 yards be left between the two concessions.[70] The main issue of contention was the claim over Bapu Pung; both the parties laid their claim over it. Townsend, on behalf of the AOS, pointed out that the ARTC initially gave consent to the plot selected by the AOS. He also argued that the ARTC already had similar concession over an area of 30 square miles for exploration of oil in the south of Dehing at Makum and therefore, the AOS should be favoured by the GOI. Townsend wrote to the commissioner of Assam that:

> […] the Railway Company is refused the particular area known as Bapu Phung, and that it be granted to Mr. McLellan's Syndicate. In order to accomplish this, I beg further to suggest that the Railway Company be requested to move their present proposed eastern boundary, say, twelve hundred feet to the westward, thus shifting their 4 square miles 12,000 feet to the west. This will still leave to them a maximum of rich oil territory extending upto BapuPhung, and it will enable those of the McLellan Syndicate to spend their money with more confidence in ultimate success, by having possession of a minimum quantity of promising oil rocks at Bapu Phung, which I believe, under the circumstances and without prejudices, to be their legal and moral right to claim.[71]

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[70] Letter from the Secretary to the Chief Commissioner of Assam to the Secretary to the Government of India, Revenue and Agriculture Department, dated 22 April 1891, Shillong, No. 1508R, *Revenue-A*, June 1894, Nos.78–236, ASA.

[71] Letter from R.A. Townsend, on behalf of the Assam Oil Syndicate, to H. Lutiman Johnson, Commissioner in Assam, dated 13 March 1891, Dibrugarh, No. 008, *Assam Secretariat Proceedings*, Revenue-A, June 1894, ASA.

The AOS was aggressively putting forward its cause to have control over Bapu Pung as they considered it to yield commercially profitable crude oil.[72] The battle between the ARTC and the AOS delayed the process of the settlement of the leases. Thus, the government deputed Munshi Muzafar Ali, a government surveyor, to resolve the problem between the two companies by demarcating and fixing the boundary line between the two.[73] However, the ARTC objected to the line of boundary demarcated by the government surveyor as incorrect, and it pointed out that the line demarcated by Ali did not correspond to the original boundary line selected by the ARTC and accepted by the AOS.[74] The agent and the general manager to the ARTC argued that the ARTC made the selection of its area at a time when the AOS was only preparing to conduct its operation and the ARTC at that time did not realise that the AOS would select an area so close to that of the ARTC.

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[72] The Deputy Commissioner of Lakhimpur wrote to Commissioner of Assam valley:

> The Railway Company has sunk two wells near Digboi, but has done nothing further to exploit or takes possession of the Bapu Pung area. They have applied for that area and naturally wish to exclude everyone else from this valuable oil tract. To grant their application…would tend to create a monopoly, which they have not earned, and would delay the development of the industry. I would recommend that the Railway Company be granted the Digboi area and that Bapu Pung and the area surrounding it to…the Syndicate.

Letter from Deputy Commissioner of Lakhimpur to the Commissioner, Assam Valley Districts, dated 20 April 1891, Dibrugarh, No.363, *Assam Secretariat Proceedings*, Revenue A, June *1894,* ASA.

[73] Letter from R.S. Greenshields, offg. Deputy Commissioner of Lakhimpur to the Commissioner of the Assam Valley Districts, dated 20 April 1891, Dibrugarh, No. 363, *Assam Secretariat Proceedings*, Revenue-A, June 1894, ASA.

[74] Letter from the Agent and General Manager to the ARTC Ltd to the Deputy Commissioner of Lakhimpur, 21 May 1891, Dibrugarh, No. 272G., *Assam Secretariat Proceedings*, Revenue-A, June 1894, ASA.

While rejecting the boundary demarcated by the government surveyor, the ARTC made it clear that it was satisfied with the line of boundary laid down by them after conducting a tedious survey.[75] Since, the dispute arose regarding the boundary line, the ARTC demanded appointment of a duly qualified and independent surveyor towards which the company would bear half the expenses and did not accept the government surveyor's demarcation of boundary.[76] The Assam government asked the two parties to resolve their dispute amongst themselves as the working out of the lease was getting delayed. The two companies after almost six months of negotiation came to an agreement and the government could work out the lease.[77] The Forest Department retained its right to the timber cleared by the lessee to explore and mine resources. The lessee needed to pay for the disposed timber.

The concessions that were granted to the ARTC and AOS leased out for a period 25 years and they were further renewable for another equal year. The leases were officially commenced from January 1892.[78] The other important issue that needed to be settled was the subject of royalty to be paid to the government. The government asked for a royalty of 4 *annas* per 20 gallons of crude oil as equivalent to 5 per cent royalty on crude oil produced. Both the companies argued that the market value of Pennsylvania crude petroleum — which was the most important factor of the petroleum market of the world then

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[75] *Ibid*.

[76] *Ibid*.

[77] Letter from the Deputy Commissioner, Lakhimpur, to the Commissioner of the Assam Valley Districts, dated 14 September 1891, Dibrugarh, No.2374, *Assam Secretariat Proceedings*, Revenue-A, June 1894, ASA.

[78] Petroleum Concession in Lakhimpur, *Revenue- A*, June 1894.

— be taken as the basis on which to fix once and for all what a royalty of 5 per cent would represent.[79] The lessees were required to pay for all the timbers cleared for the working of the concessions, for the first 15 years of the term of 25 years at only half the rates of royalty being in force charged by the Forest Department and full rates after in the remaining years.

This large transaction clearly shows how the nascent oil industry in the eastern most corner of the British India was gradually becoming not only part of global capital, but also in terms of knowledge and expertise on petroleum. The knowledge about petroleum exploration ran through different oil-bearing parts of the world. Along with this, the circulation of highly skilled experts/labour also gained popularity.[80] In the late nineteenth century, Petrolia, a town in Canada was supplying skilled drillers to other parts of the world. By the 1890s, the depletion of the local oil resources forced many skilled drillers of Canada to seek employment in foreign oil fields. These drillers would travel to Java, Borneo, Sumatra, Persia, Galicia, Germany, India, Italy, Russia, and the United States and provided service as skilled labours and technical

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[79] The market value of the 100 gallons of Pennsylvania crude petroleum at the wells was 214 cents at the rate of 75 cents per 35 gallons or 1 barrel which was equivalent to Rs 6-4-0 and 5 per cent of Rs 6-0-0 was equal to 5 *annas*. Hence, 5 *annas* per 100 gallons was estimated as the royalty of 5 per cent. However, taking into consideration the disappointing conditions and the huge expenses, the two pioneer concessionaries demanded a royalty of 4 *annas* per 100 gallons. The Government of British India had left it to the chief commissioner to decide the amount of royalty. The Chief Commissioner, referring to the royalty in Burma, which was 10 *annas* per 100 gallons, calculated the royalty in Assam to be 8 *annas* per 100 gallons.

[80] Christina Burr, *Canada's Victorian Oil Town: The Transformation of Petrolia from Resource Town into a Victorian Community* (Canada: McGill Queens University Press, 2000).

experts.[81] The global outflow of skilled labour began around 1873, when few numbers of workers from Petrolia made their journey to Java.[82] Earnings in foreign lands were much higher than what they used to earn at home. Similarly, Assam also witnessed the flow of Canadian experts, drillers and machineries in the late 1880s and the AOS brought boring plants and machinery from Canada as well as an experienced driller from Canada to work in its Digboi concession.[83] The flow of Canadian experts to Assam was not only in the form of drillers, but a few of the members of the AOS also had Canadian origin. Similarly, in Punjab, oilmen from Canada were taking the initiative of exploring the petroleum business.[84] For instance, R.A. Townsend, Superintendent of Petroleum Works, Baluchistan, was from Canada who also investigated the petroleum fields of Assam at the insistence of the government in 1888. Townsend was the acting manager of the AOS and came to Assam to supervise the borings. He was closely associated with the work of the AOS. Similarly, T.R. Maclellan, manager of the AOS, was also in charge of the Punjab and Oriental Oil Syndicate was also from Canada.[85] The AOS brought skilled drillers and machinery from Canada.

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[81] *Ibid*., p.10.

[82] *Ibid*.

[83] Letter from T.R. McLellan, Esq to the Secretary to the Chief Commissioner of Assam, dated 22 March 1890, Karachi, *Assam Secretariat Proceedings*, Revenue A, June 1884.

[84]*The Ottawa Daily Citizen*, 21 July 1888.

[85] The Canadian connection in the British India in the realm of petroleum originated in 1888, when John Noble from Petrolia was granted a concession for the development of oil in Punjab. The government granted the exclusive right to bore for oil in the northern part of Punjab. Noble was an experienced oil refiner and representative of a

The ARTC, by September 1889, found oil at a depth of 178 feet in Digboi.[86] Drilling continued and at the depth of 662 feet, Digboi Well Number 1 was completed.[87] The company drilled four more wells in Digboi in the following three years and by 1893–94, a total of seven wells were drilled.[88] They drilled another three wells by 1898. In 1893, a small refinery was built at Margherita to process crude oil produced at Digboi.[89] The possession and transportation of dangerous petroleum had legalities that needed to be fulfilled by the individual proprietor or company. The company needed to apply for a license to store, transport, and sell dangerous petroleum. Thus, the ARTC was required to apply for the license to store crude oil at Digboi in iron tanks and open earth reservoirs, transport the crude oil to the refinery at Margherita, keep

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syndicate of Canadian capitalists, anxious to explore the Punjab oil fields. They formed a company called The Punjab and Orient Oil Company. The grant provided that if the borings of the company would prove successful then the company would have the option of selecting five square blocks of land at different points where they might find oil containing 10,000 acres each. For a report on the company, see *The Ottawa Daily Citizen*, 21 July 1888.

[86] It was deeper than the first boring conducted by Goodenough near Jaipur, which was bored to the depth of 102 feet.

[87] S.N. Visvanath and Dilip Kumar Das, *The Luminous Arc: Digboi's Passage through 100 years* (New Delhi: Corporate Communications Indian Oil Corporation Ltd.), p.12. By 1901 at Digboi 16 wells were drilled. As compared to the modern drilling the progress was slow. The average feet drilled per month ranged between 38 feet and 98 feet. The first well also took around 14 months to drill.

[88] *Ibid*.

[89] *Ibid*., p.13.

at the refinery a certain stock of dangerous petroleum for certain manufacturing processes, and if needed, sell dangerous petroleum.[90]

Refining Crude Oil: Early Days

The crude oil from Digboi was transported to the refinery at Margherita, at a distance of nine miles, by specially constructed railway tank wagons with a dome and hermetically closed screw manhole.[91] At general temperatures, due to the large amount of paraffin wax in the crude oil, it remained in a solid or semi-solid state and was safe to transport. The technique used to refining oil was very simple in comparison to the modern, complex and expensive refineries of the later periods.[92] The process of refining was a lengthy and messy resulting in poor quality lamp oil, fuel oil, wax and grease. At the Margherita refinery, only a few products were produced. The estimated quantity of crude oil to be dealt with by the refinery during the year 1897 was

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[90] Letter from the Secretary to the Chief Commissioner of Assam to the commissioner of the Assam Valley Districts, dated 11 December 1897, Shillong, *Assam Secretariat Proceedings*, Revenue-A, December 1897.

[91] Letter from S.S. Hawkins , Agent and General Manager, ARTC Ltd to the Deputy Commissioner, Lakhimpur, dated 11 December 1896, No.3544-G.,*Assam Secretariat Proceedings*, Revenue-A, December 1897.

[92] The refinery was little more than an array of retorts or 'stills' or big iron pans arranged sequentially in 'Bench' formations in which refining was carried out in batches. Crude oil was boiled in such stills and the vapours were guided through copper pipes where they cooled and fell into enamel basins. In separating in accordance with boiling points, the most volatile components came first, with the tar being left at the bottom. The distillation for kerosene was done in wrought iron boiler stills and that for paraffin in cast iron pot stills. A lower portion of one such 'still' has been recovered from the Digboi oil field.

50,000 gallons per month.[93] The Chief Commissioner of Assam recorded in his tour diary in 1898 that the Margherita refinery could turn out 1,200 first-rate paraffin wax candles a day.[94] The kerosene produced was sold in bulk transported by railway tank wagons, or in smaller quantities in steel barrels, iron drums or tins. Country boats on the Dehing river were used to collect the products at Margherita and then return to the downstream, mainly at Jaipur, to distribute them at various places.[95] At Jaipur, bullock carts became the mode of transportation of the products and were supplied to Sonari, Simaluguri, Nazira and Sibsagar.[96] We have record of the monthly value of sales of the Margherita refinery for the month of December 1900.

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[93] Letter from S.S. Hawkins , Agent and General Manager, ARTC Ltd to the Deputy Commissioner, Lakhimpur, dated 11 December 1896, No.3544-G.,*Assam Secretariat Proceedings*, Revenue-A, December 1897.

[94] Extract from tour diary of the Chief Commissioner of Assam, December 1898, *Assam Secretariat Proceedings*, Revenue and Agriculture, January, 1899. There is hardly any evidence available to confirm the exact site of the refinery, its machinery and plants and the number of people employed.

[95] Visvanath and Das, *The Luminous Arc*, 13.

[96] *Ibid*. Bullock carts became the most efficient modes of transport of petroleum to remote areas, and to the tea gardens situated outside the reach of railways. According to the rules, the carts could not move before sunrise, and after the sunset, and could not carry any load.

Table 3

Monthly Value of Sales at Margherita Refinery (December 1900)[97]

Products	Value of Sales
Kerosene	Rs 13,418
Lubricating Oil	Rs 237
Timber Staining and Preserving Oil	Rs 612
Iron Coating Oil	Rs 198
Candles	Rs 536

Realignment of Economy: Birth of the Assam Oil Company

By the late nineteenth century a number of merchant houses promoted companies to deal with the oil business. However, being a capital intensive industry, development of the oil industry depends on finance, technology and managerial expertise. As a result, very few of such companies survived. By 1895, the AOS also started realising their incapability in terms of further investment of both technical and financial capital on the petroleum business. Consequently, S. Hogarth on behalf of the AOS proposed to the Commissioner of Assam valley districts to form a Company with a capital of Rs 1.2 million.[98] But the legal agreement, which they entered into with the government, clearly indicates that the Syndicate would not be conferred with the right to transfer its

[97] Priyam Goswami, *Assam in the Nineteenth Century: Industrialization and Colonial Penetration* (Guwahati: Spectrum Publication, 1999), p.120.

[98] Transfer to a company of the lease granted to the Assam Oil Syndicate to work for petroleum at Digboi in Lakhimpur, *Revenue-A*, October 1897, Nos.127–143, ASA.

rights and privileges to any person or company without the sanction of the government.[99] The GOI initially did not consider the formation of a Company necessary, and instead suggested a transfer of the interests of the AOS to a second and differently constituted body, thus confining the risks to a syndicate, and not to the public at large.[100] Henry Cotton, the then Chief Commissioner of Assam inspected the oil wells at Digboi, and was convinced that the business required a larger capital than the present syndicate, that is, more than the AOS could afford, and according to him if such a promising industry could be worked by a company, rather than a syndicate, then it would be more successful in developing the resource.[101] EA Gait, the Officiating Secretary to the chief commissioner of Assam, on the basis of Cotton's field inspection wrote to the GOI:

> The wells which have been sunk and on which a considerable amount of capital has undoubtedly been expended lie in a neglected state. A Canadian expert is in charge of them and resides on the concession, but

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[99] *Ibid*.

[100] Letter from S Hogarth, Esq., of the Assam Oil Syndicate to the Deputy Commissioner of Lakhimpur, dated 22 March 1895, Jaipur, *Assam Secretariat Proceedings*, Revenue A, May 1895, ASA.

[101] Letter from P.G.Melitus, Secretary to the Chief Commissioner of Assam to the Secretary to the Government of India, Revenue and Agricultural Department, 8 May 1895, Shillong, *Assam Secretariat Proceedings*, Revenue A, May1895, ASA. Hogarth, on behalf of the AOS, pointed out that mere transferring the concession to a new syndicate would not solve the problem of finance. A syndicate was intended for the embryo stage and to develop a business. After a successful well at Bapu pung, it became essential to prove the value of the oil and to move out of speculation experiments with very expensive machinery. In such circumstance, the syndicate proposed to transfer the lease to a company.

> he is not authorized to spend further money on them at present. Oil has been struck and found in abundance, but it is pouring away and wasting away over the hillside. No attempt has yet been made to construct refinery buildings. The enterprise lies in abeyance pending the application of further capital to develop it. Mr. Cotton understands that the Syndicate is unable to find the necessary capital among themselves, and that the only prospect of working the concession lies in the formation of a Company. In these circumstances he [Cotton] does not hesitate to say that there is no reason why the sanction of the GOI to the formation of a Company should be withheld.[102]

The GOI, in 1897 agreed to the transfer of the Syndicate's interest to a company with the condition that the Syndicate should retain a substantial interest in the venture for a substantial period.[103] However, the Syndicate should not claim an unduly large share of the profit and should receive only a fair sum for their concession. The promoters should be debarred from putting their shares on the market for 18 months from the date of registration of the company. The GOI asked the Syndicate to submit the draft memorandum and Articles of Association of the company to be formed to work for petroleum in Digboi.[104]

In the meanwhile, the Syndicate was also experimenting with another possibility, that is, either to amalgamate their interests at Digboi with that of

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[102] Letter from the Officiating Secretary to the Chief Commissioner of Assam to the Secretary to the Government of India, dated 15 February 1897, Shillong, *Assam Secretariat Proceeding*, Revenue A, October 1897, ASA.

[103] *Ibid*.

[104] Letter from the Officiating Secretary to the Chief Commissioner of Assam to the offg. Commissioner of the Assam Valley Districts, dated 3 August 1897, Shillong, *Assam Secretariat Proceedings*, Revenue A, October 1897, ASA.

the ARTC, or to sell their interests to the ARTC.[105] For the purpose, few members of the Syndicate got involved in negotiation with the ARTC in London. The negotiations resulted positively and the GOI sanctioned the transfer of the lease held by the AOS at Digboi to the ARTC in 1897.[106]

Within a year of this transfer, the ARTC also realised that the oil business was a full-time business and it could not be mixed up with the business of timber, coal and railways. At the same time, the ARTC lacked both technical and financial capital and expertise to carry on the petroleum business. Therefore, the company prepared to set up a separate company exclusively to deal with petroleum business. Thus, in January 1898, the ARTC applied to the government for a permission to 'form a separate Company and for the transfer of all the oil rights and privileges under the existing leases to the new Company in respect of both the Digboi and Makum oil concessions.'[107]

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[105] Letter from McLellean to H.J.S. Cotton, dated 27 August 1897, Karachi, *Assam Secretariat Proceedings*, Revenue A, October 1897, ASA. .

[106] Letter from Secretary to the GOI to the Chief Commissioner, Assam, dated 8 November 1897, Shimla, No.3317-30-4, *Assam Secretariat Proceedings*, Revenue A, May 1898, ASA.

[107] Transfer to a Company of the Makum and Digboi Oil Concessions held by the Assam Railway and Trading Company, *Assam Secretariat Proceeding*, Revenue-A, November 1898, ASA. The Government of India sanctioned the transfer of the lease of the AOS to the ARTC as the ARTC was already a well established concern and its status itself was a guarantee. However, the government was not enthusiastic enough to sanction the appeal of transferring ARTC's Digboi concession to a new company. Henry Cotton, on the other hand, believed that a separate company was necessary for the development of the valuable industry. He had also advised Hawkins, the agent of the ARTC, to form a new company, as without the expenditure of capital, the grants would never pay. The government wanted to be cautious so that the concession would not be used for the purpose of speculation.

Before transferring the mining lease to a joint stock or limited liability company, the GOI laid down few conditions.[108] The ARTC as the promoters of the new company met with all the conditions of the government and a new company was floated in 1899 London, named The Assam Oil Company. The ARTC also informed the government that it would not part with any shares allotted to them as it was anxious to retain a large interest in the new company.

Diversification of Capital: The Case of Oil Industry in Assam

The nineteenth century witnessed the growth of British overseas investment with the evolution of trading firms centred in London and developing world wide networks and their greater involvement in the Far East in general and India in particular.[109] Many commercial firms sprang up with branches in India to deal with products such as indigo, cotton and opium. By the early nineteenth century, 'agency houses' came to dominate British private trade.[110] The

[108] To safeguard the transfer of the concession to a limited company, the GOI had laid down few condition: an adequate and bona fide investigation into the property covered by the lease had to be made; the promoters of the new company had to bear the responsibility of providing the public with a correct statement of the facts; the price that the new company would pay to the promoters for the concession should not be excessive; the promoters had to retain their shares paid by the new company as purchase price for a period of 18 months from the date on which the company would be registered; and the prospectus should be clear on the point that the government would not be the guarantor.

[109] Stanely Chapman, *Merchant Enterprise in Britain: From the Industrial Revolution to World War I* (UK: Cambridge University Press, 1992), p.107.

[110] By the end of the eighteenth century, European merchants and the ex employees of the EIC in collaboration with Bengali capitalists set up firms in Calcutta, known as agency houses. Agency houses were partnership firms that not only controlled trade

opening of the Suez Canal and the coming of technologies and inventions such as railways, telegraph, steam ships and the bringing of India under the Crown provided further impetus towards the expansion of the British trade in India by the middle of the nineteenth century.[111] In this context, the role of the managing agencies became a significant aspect of the Indian economy. The initial work of the agency houses was to buy and sell on behalf of the principal firm at a fixed rate of commission. However, the agency houses, by the mid nineteenth century, accumulated sufficient capital to diversify their interest into other non-trading fields such as coal mines, steam shipping, tea cultivation, etc., and also became promoters and subsequent managers of joint stock companies on their own private account. Kling maintains that the managing agency system was an Indian innovation by dating its root back to 1836 when the firm of Carr, Tagore and Company promoted and then acquired the management of the Calcutta Steam Tugg Association.[112] By the 1870s, the managing agency system became a dominant form of corporate management in India.[113] Rungta argues that the system originated with the life insurance

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but also had diversified interests in indigo, coastal trade, farming, manufacturing, banking and insurance.

[111] Tirthankar Roy, *The Economic History of India, 1857-1947* (New Delhi: OUP, 2006) p.73. Roy argues that the economy of India between 1857 and 1947 was much more open and India actively participated in the first globalisation of the nineteenth century, in which there was integration of the world economy in terms of commodity, trade, capital flow and labour.

[112] B.B. Kling, "The Origin of the Managing Agency System in India," *The Journal of Asian Studies*, Vol.26, No.1 (1966), p.38.

[113] The system was, however, not popular among the shareholders and by the end of the nineteenth century there was increasing agitation from the shareholders against the

companies in India. The factors behind the growing importance of the system in India as pointed out by Rungta, was not only because of the lack of an investing class or managerial class, but due to the fact that at the initial stage of a project the capital was raised from a prosperous but busy merchants who did not had enough time to invest in a new idea.[114] The managing agents in some cases took managerial decisions and played significant role in raising loans and deposits.[115] The diversification of interests of the managing agency houses in India coincided with the period when the big merchant houses were diversifying their business into commodity production and mining. Jones argues that investments in new minerals and commodities occurred in Asia to avoid the risk of over exposure to one commodity.[116]

The emergence and development of the petroleum industry in the late nineteenth century 'coincided with the growth of the British merchant houses as diversified business groups'.[117] The British merchant houses started the business of exporting oil to other areas in the world in the late nineteenth and early twentieth centuries. There were then only two principal oil producing areas, the United States of America and Baku in Russia. After having firm hold over oil marketing, the merchant houses took the opportunity of

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system. For details, see Radhe Shyam Rungta, *Rise of Business Corporations in India 1851-1900* (Cambridge: Cambridge university Press, 1970), p.220.

[114] Rungta, *Rise of Business Corporations in India*, pp.227–228. When the firms of managing agents develop a new idea the merchants invested money to run and prosper the new company in return for a guaranteed and high remuneration.

[115] Roy, *The Economic History of India*, p.260.

[116] Geoffrey G Jones, *Merchants to Multinationals: British Trading Companies in the Nineteenth and Twentieth Centuries* (US: OUP, 2000), p. 260.

[117] *Ibid*., p.278.

integrating backwards into the production of oil by finding new sources of oil. Consequently, a number of merchant houses became oil producers by floating joint stock companies; for example, M. Samuel & Co. founded the Shell Transport and Trading Company (1897), Finlay Fleming founded the Burmah Oil Company (1896) and Steel Brothers, along with an Indian merchant founded Indo Burmah Oil Company Co. (1908), and so on.[118] In the Asian market, the Wallace Brothers were the pioneers in the distribution of oil produced by Standard Oil of USA and then from Russia in the late nineteenth century. In India also, we find a number of managing houses and merchants who while diversifying their business developed interests in the petroleum sector which was developing at a small scale in the province of Assam. Merchants, speculators, tea planters and agency houses came together to form syndicates to prospect and mine oil in Assam. In 1910, while recognising the possible expansion of investor's interest *The Economist* stated that:

> The use of oil as a fuel has been developed, and numerous experiments made as to comparative merits of coal and oil for naval purpose. If the superiority of the oil as naval fuel can be proved, it will naturally become of great importance to develop any supplies that exist within the boundaries of the British territory. The mere possibility of such an event has been the signal for an outburst of speculative and prospecting zeal over the whole empire. Within the last few years companies have sprung into existence for the purpose of exploiting the oil resources, real or imaginary, of almost every British colony.[119]

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[118] *Ibid*., p.279.

[119] *The Economist*, 31 December 1910.

This work has already explained that in comparison to coal, the petroleum industry experienced slow development and it was only in the late nineteenth century that the oil industry made inroads in Assam. The role of the AOS and the ARTC in the field of petroleum exploration and in the formation of a joint stock company, the AOC has already been discussed. However, there were other entrepreneurs and tea planters who developed a desire to invest in the field of petroleum exploration. As has already been mentioned, the first lease for working out petroleum at Makum and Bapu Pung for 10 years was made to a tea planter, Wagentriber, in 1854. However, nothing came out of the lease.

One of the earliest ventures in the field of mining by tea estates was by the AC.[120] The AC already held lease from the Jaktung and Namsang Nagas on the boarders of Sibsagar district, which lay beyond the inner line.[121] The lease was to mine coal and extract timber and bamboos from 1850 onwards.

[120] The Assam Company was formed in 1839 with the object of cultivating tea and was based on the acquisition of the government's experimental tea berries and establishments. The growing of tea industry and its manufacture was the main objective. For the history of the company, see H. A. Antrobus, *A History of the Assam Company, 1839 –1953* (Edinburg: Priv. Print. by T. & A. Constable, 1957).

[121] The Inner Line was introduced in 1873 and was drawn along the foothills separating the hills from the Brahmaputra valley. No British subject or foreign citizen could cross the Line, without license, and trade or buy land. Sanjib Baruah argues that the line was drawn to facilitate the expansion of tea plantation which needed guarding of large tracts of land. The encroachment of the British capital into new lands resulted into conflict with the hill 'tribes'. The purpose of the Inner Line according to Baruah was also to defend the property right of the newly established tea gardens. It was a sharp break of economic and cultural relation between the hills and plains that existed in the pre -colonial period. For details, see Sanjib Baruah, *India Against itself: Assam and the Politics of Nationality* (New Delhi: OUP, 1999), pp.28 – 29. Besides, catering to the needs of the British entrepreneurs the Line also satisfied an idea about 'savages' and 'primitiveness' of the people living in the hills, who a separate needed set of law.

The land under the lease measured 13 square miles, out of which 9 miles were in the Mokokchang subdivision and 4 miles were situated outside the British territory, that is, beyond the inner line in the east of the Dikhu river. According to the *Inner Line Regulation* (1873), no British citizen could do trade or possess land beyond the line without permission from the government. Besides, in the territories beyond the inner line, it was the Nagas who had the right to grant mineral concessions. In return for such mining concessions, the respective company or person had to pay rent to the Nagas. When the AC developed interest in the exploration of oil in the areas lying beyond inner line, it had to take permission from the government. Subsequently, in 1894–95, the government permitted the company to enter into negotiations with the Nagas to acquire further mineral rights, especially to bore and mine oil within the limits of their coal concession.[122] However, in case of inner line, we have references to establish the fact that the line moved to cater the imperial needs. As the rights over minerals in general was appertained to the state, the administration found it irksome to negotiate with the Nagas and pay them rent and at times considered to push back the inner line to take over such areas. The imperial interest of the state to have exclusive privileges regarding the regulation of natural resources came into conflict with the rights of 'ignorant savages' beyond the Inner Line. Arguing for the moving back the Inner Line, R. Reid, the Deputy Commissioner, Naga Hills wrote:

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[122] Letter from the Chief Secretary to the Government of eastern Bengal and Assam to the Commissioner, Assam Valley Districts, dated 29 May 1906, Shillong, *Revenue (Misc.)-A*, September 1906, ASA.

> The Assam Company undoubtedly has a valuable property east of the Dikhu…. I submit it would be better to throw back the Inner Line so as to make the small area concerned British territory. The Assam Company would then deal directly with Government…. There are numerous precedents, and I need only instance the throwing back the Inner Line near Jaipur and Margherita in the Lakhimpur district. In the former case it was found that seed garden had been opened on independent territory, while in the latter more space was wanted for coolie lines at the Namdang colliery.[123]

In 1891, F.F. Mackenzie, Superintendent of the Kalliencherra, Natwanpur, and Doona Tea Company in the Sylhet district applied for a lease over 50 acres of land for the purpose of boring for petroleum.[124] Mackenzie was the agent of the Messrs. Thomas and Co. of Calcutta, the proprietors of the tea gardens. The land applied for was in the Jaintia Hills Unclassed State Forest.[125] It was claimed by Mackenzie that petroleum was found to exude in the bed of a stream called Umbluh, a tributary of the Doona River, North of Modderpur. Mackenzie pointed out on the basis of the experience gained by the other oil

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[123] Letter from W.J.Reid, Deputy Commissioner, Naga Hills to the Commissioner, Surma Valley and Hill Districts, dated 12 April 1906, Kohima, No.87 G., *Government of Eastern Bengal and Assam*, Revenue (Misc.)-A, September 1906, ASA.

[124] Letter from G. Godfrey, Deputy Commissioner, Khasi and Jaintia hills to the Secretary to the Chief commissioner of Assam, dated 29 January 1891, Shillong, No.335,*Assam Secretariat Proceedings*, Revenue-A, September 1891,ASA.

[125] After the enactment of the Assam Forest Regulation Act of 1891, the category of the Protected Forests was replaced by Unclassed State Forests. The Revenue Department assisted by the Forest Department became the de facto authority of Unclassed State Forests. The Revenue Department and the Forest Department contested over the forest lands. The Revenue Department wanted to expand agriculture into the forests area whereas the Forest Department wanted to be the sole authority of the forests. See Saikia, *Forests and Ecological History of Assam*, p.95.

companies in other parts of Assam, Burma, and Quetta and on the basis of the fact that though petroleum exists in other parts of India, it does not exist in such profusion as in America and at Baku on the Caspian sea that the production of petroleum in Assam had to be quite economic. Mackenzie also pointed out the growing local demand of oil as lubricator for the tea garden machinery and river steamers and as burning oil and so he expected to be able to sell the products at a remunerative price.[126]

Another tea planter, Robert Spicer of Pathimara Tea Estate, was granted a license to prospect for petroleum over an area of 79,060 acres or 123.53 square miles in the Cachar district in 1902.[127] The license was renewed for another year from 1904 to 1905, on the application of Traill, the administrator of the estate of the late Robert Spicer. Messers Cresswell& Co., managing agents of the Syndicate formed to work for the oil concession granted to the late Spicer, applied further renewal of the license for another year. The members of the Syndicate were W. Aldam, tea broker, Calcutta; William Frederick Buckland, Solicitor; W. Carter, tea broker, Calcutta; and Thomas Traill, administrator of Spicer's estate.

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[126] Letter from F.F. Meckenzie, Superintendent of Kallinecherra and Natwanpur Tea Company to the Secretary to the Chief Commissioner of Assam, dated 8 February 1891, Sylhet, No.421, *Assam Secretariat Proceedings*, Revenue-A, September 1891, ASA.

[127] Letter from H.M. Halliday, Deputy Commissioner of Cachar to the Secretary to Chief Commissioner of Assam, dated 14 June 1901, Silchar, No.1979, *Assam Secretariat Proceedings*, Revenue-A, February 1902, ASA.

In Cachar, W.G. Stocker,[128] on behalf of the Badarpur Tea Estate, applied for a license to prospect for mineral oil over an area of 423.39 square miles in 1905 and a mining lease if sufficient oil could be found.[129] The estate was covered under the fee simple grant, which provided the grantee with the mining right within the respective area. As such, the estate, before applying for a lease, already made a boring of over 100 feet within the fee simple grant.[130] This venture had been financed by A.J.M. Maclaughlin from England, a proprietor of the estate.[131] To raise further capital and to deal exclusively with petroleum exploration, a separate syndicate was formed in 1910. The syndicate drilled a well to a depth of 730 feet with the help of a tea factory engine.[132] The initial satisfying results prompted the syndicate to form the Badarpur Oil

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[128] W.G. Stocker from Dublin joined his father in the Budderpore Tea Garden. After retiring on pension, instead of returning back to Dublin, he settled down in Panchgram and died in 1958.

[129] Letter from the W.M. Kennedy, Officiating Deputy Commissioner Cachar to the Secretary to the Chief Commissioner of Assam, dated 14 April 1904, No.195, *Assam Secretariat Proceedings*, Revenue (Misc.) A, May 1906, ASA.

[130] Fee Simple rule was formulated by Canning in 1861 and it was in practice till 1872. It was used as a means of granting waste lands at a low price. Under the rule, the land was sold for 2.8 to 5 rupees per acre without any clearance conditions. The land was put up for sale at auction, instead of granting it as lease. Once paid the price, the holder enjoyed absolute proprietary and hereditary right. For details, see Suparna Roy, *Land Systems and Management in the Colonial Period* (New Delhi: Mittal, 2007), p.22.

[131] From the W.M. Kennedy, officiating Deputy Commissioner Cachar to the Secretary to the Chief Commissioner of Assam, dated 22 August 1905, No.2453, *Assam Secretariat Proceedings*, Revenue (Misc.) A, May 1906, ASA.

[132] S.N. Visvanath, *A Hundred Years of Oil: A Narrative Account of the Search for Oil in India* (Delhi: Vikas Publishing House: 1990), p. 31.

Company Ltd.[133] The company soon faced troubles in the field of expertise and the results of exploration was not satisfying as reflected from the fact that T. Dewhurst, geologist of the BOC wrote:

> The DC [Deputy Commissioner] of Badarpur informed me that the Badarpur well gave some oil some months ago but not in paying quantities. I also hear that Stocker has no money and both he and Dr. Maclaughlin are dissatisfied with the results and would be glad if someone took over the syndicate. The planters and other people in the district are keenly interested in the oil… Our work in Assam is still of a pioneer nature and it seems the first objective should be to safeguard all areas of possible value such as this.[134]

Accordingly, the BOC in 1915 started negotiation with the Badarpur Oil Company and obtained a testing option over the Badarpur structure. The field was developed without delay, but the production declined sharply by 1921. After drilling 63 wells and producing a total of 1,864,000 barrels (321,000 tonnes) of oil, the field was abandoned in March 1933.[135]

Eastern India was known to be British 'enclave' with the managing houses controlling all the major industries – the tea plantations, jute mills, and the coal mines. Without denying the importance of those houses, it should also be mentioned that there emerged native corporate entities particularly in eastern India by the late nineteenth century. The Marwari entrepreneurs were involved in the business of jute procurement, trade and export. In coal also, the Marwari and Gujrati traders conducted much of the internal trade, from pitheads to the

[133] *Ibid.*

[134] *Ibid.*

[135] *Ibid.*, p.17.

consuming centres.[136] In Assam too the internal trade of petroleum was carried out by the Marwari traders (discussed in the next chapter). The Marwari traders though insignificant in number also came forward to try their fortune even in the oil industry. P.N. Sen, Attorney from Calcutta, for and on behalf of a syndicate applied for a prospecting license for the Khasimara oil fields in the Khasi and Jaintia Hills and was granted the license in 1909.[137] The syndicate was composed of Sen and his associates and Chogemull Sookhani of Messers. Jetmull Bhojraj. Bhojraj were Marwari bankers and merchants of Darjeeling and Sikkim. Chogemull Sookhani was a well-known banker and owner of landed properties both in Bengal and Assam.[138] In Assam, he had a flourishing mill and a factory, a lease in Jharia coal fields, and also 35 square miles of mica land near Kodarma (in Jharkhand), and was the principal capitalist behind the venture. The syndicate took the guidance of C.M.P. Wright, a mining engineer and a member of the Institute of Mining and Metallurgy, London, as a member of the syndicate.[139]

A number of syndicates were formed by merchants, planters and agency houses to prospect oil and then mining in the province during the late

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[136] In spite of the dominance of the British entrepreneurs, the Marwaris had been active in raw jute procurement, trade and export. In coal too they were involved in internal trade (from pitheads to the consuming centres). After the WW I, the Marwaris successfully moved from trade to industry. For details, see Omkar Goswami, "Sahibs, Babus, and Banias: Changes in Industrial Control in Eastern India, 1918-50," *The Journal of Asian Studies*, Vol.48, No.2 (1989).

[137] Letter from P.N.Sen, Esq to the Officiating Chief Secretary to the Government of Eastern Bengal and Assam, dated 25 January 1909, Calcutta, *Revenue (Misc.) A*, September 1909, No.1–32, ASA.

[138] *Ibid.*

[139] *Ibid.*

nineteenth and early twentieth centuries. This was a universal trend in the late nineteenth and early twentieth century. However, petroleum was a capital-intensive industry with large-scale investments in drilling, pipelines and refineries and needed an increasing technical competence. Therefore, the general pattern was either the syndicates withdrew from the petroleum business or the oil affiliates outgrew and absorbed the parent founders.[140] In case of Assam, there was a withdrawal of all the syndicates, while the AOC and the BOC took over the business. Even the ARTC lost its association with the petroleum business after the AOC was merged with the BOC in 1921.

Conclusion

The late nineteenth century witnessed unprecedented investment in non renewable resources in mining and petroleum. Britain became the global centre of international industry resulting in the growth of many overseas companies. Indian coal industry was one such mining industry. The British agency houses controlled almost all the coal mining companies and coal along with tea and jute became the nucleus of investment by the British merchant houses in Calcutta.[141] The history of large scale industry and plantations and mining industry has focused on cotton, jute and coal industries. The tea plantation of Assam has also received historical attention. However, the

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[140] Jones, *Merchants to Multinationals,* p.278.

[141] A few other important mining interests of the British companies were copper mining in Chile, gold mining in Sarawak and the tin industry in Malaya. In eastern India, at the eve of the WWII, 86 per cent of tea plantations were managed by the British. Also almost all jute mills were under the control of European managing agencies as were 89 per cent of the major collieries in the country.

development of an oil industry in the eastern most corner of India has hardly been studied. The initial attempts to establish an oil industry in the mid nineteenth century failed due to lack of capital and infrastructure. As discussed in the chapter, the initial failures, however, did not result in the complete withdrawal from the industry. The managing agencies floated new companies and invested in the new industry. The growing demand of kerosene and oil as a lubricator for machines in the tea industry provided further impetus to come forward to invest in the industry. The attempts by a number of syndicates and companies along with the protection from the government, an oil industry emerged by the end of the nineteenth century. With the formation of the AOC and its subsequent merger with the BOC, the region was integrated with the international market of oil.

Chapter 4

The Assam Oil Company: Economic and Social Challenges (1900-1950)

In the previous chapter, I have discussed the attempts made by a number of companies to establish an oil industry in Assam. The ARTC in the 1880s was successful in commercially exploiting the resource and also started refining the crude oil at Margherita. However, the ARTC with its diversified business interests felt the need to establish a separate company. Consequently, the AOC with its head quarter in London was promoted to exclusively deal with the oil business. It was also important to raise further capital. This chapter attempts to reconstruct the history of the AOC from its time of inception. Against the large international oil companies, the AOC was modest in size and commerce. Yet, the company in 1900 was significant as the British Empire by then was anxious of developing a British owned oil company.

The AOC was formed to 'acquire, work, and develop valuable petroleum properties, situated at Digboi and Makum in Assam'.[1] It was one of the earliest enterprises that engaged in the business of oil exploration and production in India. The capital was £310,000, in £1 shares, of which 210,000 shares were offered for subscription. Its initial capital outlay was £4, 50,000.

[1] The Assam Oil Company Ltd, *Prospectus, Agreements, Concessions & C.* (London: Secretary and Registered Offices), p.1. The purchase price of all the properties that the AOC had to pay to the promoters, the ARTC was fixed at the sum of £185,000 out of which £85,000 would be paid in cash and £100,000 in fully paid up shares.

As compared to tea, the investment in the oil industry was meagre.[2] The Digboi oil field comprised an area of eight square miles that had been held by the ARTC and the AOS for a term of 25 years from 1892, renewable for a further term of 25 years.[3] The Makum field, consisting of 30 square miles was also held by the ARTC and after its expiration in 1901, the area would be reduced to 4 square miles within the same territory on terms identical with those on which the Digboi concession was held. The properties also include a refinery, bungalows, and pumping stations, hydraulic presses, stills, tanks, tank wagons, casings, engines, boilers, and other plant, machinery and tools, at Margherita and Digboi.[4] The Company, in addition to the assets acquired, started with a cash working capital of £125,000. Boverton Redwood, a prominent chemist and petroleum expert (1846–1919), became the Technical Advisor to the Company.[5] The profits anticipated by Redwood, in his report, estimated that

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[2] The Assam Company was the only tea company working in Assam till 1859. The Company was formed in 1839 with a capital of £500,000 in 10,000 shares of £50 each. Between 1841 and 1853, the expenditure in the field of tea plantation was around one-fourth to one-fifth of the total government's expenditure on Assam per year. In Lakhimpur alone, the expenditure was around 50,000 to 60,000 in 1857. For the history of the Assam Company, see H.A. Antrobus, *A History of the Assam Company, 1839–1953* (Edinburg: Priv. Print. by T. A. Constable, 1957).

[3] *The Economist*, 6 May 1899.

[4] *Ibid*.

[5] Boverton Redwood co-founded, and became the first President of the Institution of Petroleum Technologists, now known as the Institute of Petroleum, in 1913. He was instrumental in persuading the British Navy to change from coal-fired ships to oil-fired ones. Redwood was concerned with imperial defense and advised the navy to secure an imperial source for the supply of oil. Accordingly, the British navy supported the BOC in various ways. About the AOC, Redwood remarked that the company had 'laid down the foundation of an important local industry of a most promising character,

the net profit of producing, refining, and marketing 500,000 gallons of crude oil a month (after deducting all expenses, including administration and allowances for depreciation) would exceed Rs.45,335 a month. On the subject of quality and profitability of the venture Redwood reported:

> Satisfactory evidence has been obtained by practical work on a sufficiently large scale that the crude oil can be refined so as to yield commercial products of excellent quality that a local market exists for these products in considerable quantity, and that there are ample grounds for the belief that the crude oil can be produced and refined at a large profit.[6]

Meanwhile, by the turn of the century the home market for oil, particularly kerosene was growing incredibly. The imports of foreign mineral oil in India rose from a valuation of Rs.5, 98,797 in 1870–71 to Rs. 48, 70,580 in 1880–81, to Rs.85, 18,279 in 1885–86, and to 2, 96, 74, 004 in 1895–96.[7] In the five years form 1885-86 to 1895-96 the value of import rose more than 300 per

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which if properly conducted should be a source of large profit'. *The Times*, 6 May 1899.

[6] The Assam Oil Company Ltd., *Prospectus, Agreements, Concessions & C.*p.2. By the time of the takeover of the Digboi property by the AOC, 15 wells had already been drilled and only one of them was unproductive. Redwood anticipated that such a valuable property would yield 500,000 or 6,000,000 gallons a month for many years without drilling to a greater depth than about 1,600 feet. There was a possibility that production could even be increased up to 1,000,000 gallons a month. Thus, the new company was not only confident of making a fortune; it also encouraged the shareholders to invest for profit. About the quality of Assam oil , Dr. Warden, Chemical Engineer to the government of Bengal reported that the crude oil under report 'is capable of yielding at least 45 per cent of a burning oil of practically as good a colour and high flash as the usual grades of American and Russian petroleum now being imported'. *The Times*, 6 May 1899.

[7] The Assam Oil Company Ltd, *Prospectus, Agreements, Concessions & C.*

cent. The use of kerosene lamps for lighting purpose was the cause behind such growing demand. The whole of these enormous quantities of oil used in India came from Russia and America.[8] In such a situation the home market for the produce of the forthcoming refinery at Digboi would be limitless. It was assumed that in such a growing market the AOC would have an advantageous position, because of its close proximity to the Indian market and subsequent saving in the transportation cost and from the fact that all foreign petroleum imported was subject to import duty (one *anna* per imperial gallon or 15–16 per cent).[9] Redwood anticipated that the net profit of producing, refining and marketing 500,000 gallons of crude oil a month would be more than Rs.45,335 and the Company would be able to pay a dividend of 11 ½ per cent on the capital.[10]

In 1900 the AOC reported satisfactory progress with the work of building the refinery at Digboi, paraffin sheds and refrigerating houses were built, boilers for the stills were being moved into place and foundations were ready for the workshops, tin making plant, stores, and office and laboratories buildings were set up.[11] The chimneys of Ledo bricks for the boilers and stills were limited in height as a precaution against earthquakes.[12] The expectation to complete the refinery project by the end of 1900 could not be fulfilled and the refinery at Margherita had to be operated for another year.[13] In 1901, the agent

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[8] *Ibid.*

[9] *Ibid*., p.4.

[10] *Ibid.*

[11] *Digboi Batori*, July 1954.

[12] *Ibid*.

[13] *Digboi Batori*, August 1954.

and general manager of the AOC was encouraged by the increasing sales of the products, mostly kerosene.[14] The sales increased from Rs.15, 007 in 1900 to Rs.21, 240 in 1901.[15] As a result, the general manager himself went for a survey over the Brahmaputra river to find out better means of marketing the products of the existing refinery and the refinery under construction.[16]

In 1901, the AOC sold kerosene at Rs.4 per *maund*.[17] The company by the same time was producing kerosene, paraffin wax mostly for candles, batching oil, spindle oil, timber oil, lubricating oils, and fuel oil for tea driers.[18] Subsequently, the AOC, from 1900, started advertising for their products in the local news paper, the *Assam Times* each week to attract the attention of the

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[14] *Digboi Batori*, January 1955.

[15] *Ibid*.

[16] *Digboi Batori*, March 1955. The General Manager (GM) sailed through the river as far as Gauhati. He suggested establishing depots and agencies at seven of the river stations. According to him, kerosene should be sold through cash on delivery and he proposed that the *ghat* agencies should be provided a commission of 2½ per cent on sales. The locally sold kerosene was sold in those districts served by the Dibru-Sadiya Railway was dispensed with boxes. The tins used for carrying kerosene were without any cover to lower the cost of production. However, in case of downriver shipments of kerosene, the tins had to be boxed. The GM suggested giving the contract of making box hooks to the Assam Railway and Trading Company's sawmill at Margherita. The only commercial product that oil produced in the nineteenth century was kerosene, which was traded in the international market. In 1880, around 50 per cent of US kerosene was exported mainly to Western Europe and the Far East. Similarly from Russia also it was exported to Western Europe and Far East. For details, see Bernard Taverne, *Petroleum, Industry and Governments: A Study of the Involvement of Industry and Governments in the Production and Use of Petroleum*, Second edition (Netherland; Kluwer Law International, 2008), pp.53–54.

[17] *Digboi Batori*, September 1955. The kerosene sold was untreated with a gravity of about 835/840 and flash point of between 85 and 90 degrees Fahrenheit.

[18] *Ibid*.

consumer and middleman alike at fixed rates.[19] Besides, the AOC also printed leaflets for general distribution.[20] During this time, practically all the oil (mostly kerosene) was sold to the small shopkeepers. The AOC made arrangement to deliver its products free to any railway station on orders amounting to Rs.20 or above.[21] The Company's terms were in cash, except in a few special cases and for the convenience of the customers the Company made an arrangement where the cash could be collected at the station of delivery.[22] Though the oil was sold locally, but much of the wax, which was of fine quality, was sent to England.[23]

Within few years of its operation, the AOC declared a profit of £18,960 in 1904 and also paid 31.33 per cent dividend on ordinary capital.[24] The output of the refinery at Digboi rose from 555,204 gallons in 1898–99 to 3,565,160

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[19] *Digboi Batori*, August 1954. The earliest reference of the use of oil by the tea gardens for tea driers can be found in the letter sent by the GM of the AOC to its London office in September 1901. Over 1 million gallons of oil per month had been supplied for the purpose of tea driers.

[20] *Ibid*.

[21] *Ibid*.

[22] Few correspondences between the agent's office of the AOC at Margherita and the Board in London for the year 1900 have been found in *Digboi Batori*. On the basis of those correspondences, the initial attempts by the company to market kerosene have been written. For the correspondences, see the volumes of *Digboi Batori* for the year 1954.

[23] Priyam Goswami, *Assam in the Nineteenth Century: Industrialisation and Colonial Penetration* (Guwahati: Specturm, 1999), p.121. In 1907, the production of wax was 16, 38,649 lbs, the bulk of which was sent to England, America and South Africa.

[24] *The Economist*, 29 July 1905.

gallons in 1911.[25] By 1910 the Company expended on capital account a total sum of £438,096.[26] Drilling till then was mostly confined at the Digboi field and at Bapu Pung, to the east of the Digboi fileld. The office of the AOC at London made an enquiry whether the AOC would be able to produce synthetic indigo could be produced from the naptha obtained from oil.[27] However, S.S. Hawkins, Agent and General Manager of the AOC informed that the AOC was not the place for such elaborate and extensive scientific chemical research and the composition synthetic dyes made out of coal tar was different.[28]

The AOC being an infant industry received considerable government support and this became clear in the case of royalty. The royalty to be paid by the AOC was lower than the royalty to be paid by the BOC.[29] The royalty charged on Burma crude oil, ranged from 8 *anna*s to 9 *anna*s and over per 40 gallons or equivalent to 25–28 per cent on the current price of earth oil.[30] On the other hand, the Assam royalty was fixed at 8 *anna*s per 100 gallons equal to 3.20 *anna*s per 40 gallons, the percentage on the current price of crude oil

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[25] EH. Pascoe, "The Petroleum Occurrences of Assam and Bengal," *Memoirs of Geological Survey of India*, Vol.40 (1912).

[26] *Digboi Batori*, May 1955.

[27] *Ibid*.

[28] *Ibid.* Synthetic indigo was first produced for commercial use in 1877 by a German chemical company following the findings made by the Berlin chemist Adolf von Baeyer.

[29] Letter from the Secretary to the Chief Commissioner of Assam to the Secretary to the Government of Burma, Revenue Department, dated 17 November 1899,Shillong, *Assam Secretariat Proceedings*, Revenue A, November 1899, ASA.

[30] Letter from Messrs. Finlay, Fleming & Co., Managing Agents, Burma Oil Company, Ltd. to the Secretary to the Financial Commissioner, Burma, dated 17 July 1899, No.48, *Assam Secretariat Proceedings*, Revenue A, November 1899, ASA.

being only 10 per cent.[31] The BOC apprehended that the lower rates of royalty charged on the AOC would place them at disadvantage.[32] The company argued that though the lower rates of royalty might be necessary to develop a young enterprise such as the AOC, yet that would be unfavourable for the BOC in the matter of export facilities. Consequently the BOC appealed to the government to get their royalty reduced.[33] The BOC wrote:

> We beg to point out that the productions of the Burmah Oil Company will be in direct competition with those of the Assam Oil Company in the Indian markets, and it seems to us to be an anomaly that this Company working under the same government as the Assam Oil Company should be placed at such a serious disadvantage in the matter of royalty. The case is one which calls for immediate consideration, and we trust that His Honour the Lieutenant Governor will be pleased to use his influence with the Government of India to remove this anomaly, and have Burma placed upon an equal footing with India as regards royalty payable upon crude earth oil.[34]

The appeal made by the BOC was not accepted on various grounds. The AOC was one of the pioneers working in an area which was only recently connected with the railway. The oil had been found in Assam, but whether it could be produced in paying quantities was not sure and under such vulnerable business

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[31] *Ibid*.

[32] Letter from the Revenue Secretary to the Government of Burma to the Secretary to the Chief Commissioner of Assam, dated 9 September 1899, Rangoon, No.170 – 2 P.-2, *Assam* Secretariat *Proceedings*, Revenue A, November 1899, ASA.

[33] *Digboi Batori*, December 1954.

[34] Letter from Messrs. Finlay, Fleming & Co., Managing Agents, Burma Oil Company, Ltd. to the Secretary to the Financial Commissioner, Burma, dated 17 July 1899,*Assam Secretariat Proceedings*, Revenue A, November 1899, ASA.

situation, the government considered that the AOC was not in a position to compete with any well established oil companies.[35] Thus, the AOC received protection from the British government.

It is to be noted that when in 1886, the BOC was floated by Finlay, Fleming & Co., it received state protection. The colonial government excluded all non-British companies from exploiting oil in Indian and Burma. Thus, the applications made by the subsidiaries of the Standard Oil – the Colonial Oil Company of New Jersey and the Anglo-American Oil Company were refused by the GOI.[36] Shell was also denied access. The BOC was also provided with tariff protection and its kerosene was lowest priced in India. Thus, the BOC's share in the total consumption of kerosene in India rose to 34 per cent in 1904 – 05. The GOI, however, refused to comply with the BOC's appeal to raise the rate of royalty to be paid by the AOC.

Oil, Native Entrepreneurs and Doing Commerce

Beyond the limited export of the products from the Digboi Refinery, products also reached out to the local consumers. The AOC itself could not afford to be the retailer and it had to reach out to the existing trade networks. In Assam both in the interiors and urban areas, it was the Marwari traders through their *k*aya*golas* and *bargolas* primarily controlled the trading activities. The new opportunity for retailing petroleum products was readily seen by the Marwari

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[35] Letter from the Secretary to the Chief Commissioner of Assam to the Secretary to the Government of Burma, Revenue Department, dated 17 November 1899, Shillong, *Assam Secretariat Proceedings*, Revenue A, November 1899, ASA.

[36] Raja Segaran Arumugan, *State and Oil in Burma: An Introductory Survey* (Singapore: ISEAS, 1977), pp.4–5.

traders as another leap forward. The period between 1810 and 1910, there had been significant spread of Marwari merchants which transformed them into a 'much thicker network of traders, merchants, and moneylenders controlling a significant chunk of trade and finance' across the country.[37] It was roughly between 1860 and1914, there was the expansion of Marwari traders in eastern India.

In eastern India, Marwari traders had already established a clear dominance over regional trade and finance over other local trading groups.[38] The network of Marwari traders started expanding from Goalpara to the east from 1820s. Jenkins in 1833 reported that, 'the merchants of Hindoostan…have already begun to establish themselves at Sudiya'.[39] The *golas* brought into eastern Assam a regular shopping culture and between 1870 and 1914 the Marwari firms and their shops grew more than hundred.[40] The Marwari firms,

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[37] Claude Markovits, *Merchants, Traders, Entrepreneurs: Indian Business in the Colonial Era* (New Delhi: Permanent Black, 2008), p.199. Provisioning and supplying the Company armies and the smuggling of opium from India to China had provided impetus to the expansion of Marwari traders in the sub continent.

[38] In northern, western, and central India, and in the Deccan, Marwari traders and moneylenders remained an essential component of the economy. They however could dominate only certain specific areas in trade and finance and had to compete with other merchant communities such as Bohras and Kutchi Memons, the Parsis, and the Gujrati Hindu *banias*. For details, see Markovits, *Merchants, Traders, Entrepreneurs*, p.202.

[39] Letter from F. Jenkins, Agent to the Governor General on the North Eastern Frontier, to W.H. Macnaghten, Secretary to the Government of India, dated 22 July 1833, Political Department, in Foreign Department, dated 11 February 1835, Nos.82-106, NAI.

[40] Bodhisattava Kar, "Historia Elastica: A Note on the Rubber Hunt in the North-Eastern Frontier of British India," *Indian Historical Review*, Vol.36, No.1 (2009),

throughout the nineteenth century played a significant role as suppliers of rural credit, sellers of provisions and developed networks of informal trade.[41] Kar has extensively dealt with the Marwari firms dealing with rubber trade in the region.[42] By the late nineteenth century the Marwari traders established their control over the commerce of *eri-muga* silks, cotton, metal ware and rubber and later they traded in opium as well.[43] With the growth of tea gardens these merchants worked as moneychangers, bankers, agents to the managers of tea gardens. They provided credit to the tea gardens. The Marwari traders supplied 'everything from rice to opium' to the provision stores of the tea plantations.[44]

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pp.135–136. More than hundred Marwari firm were set up during the period between 1870 and 1914. The Marwari traders in most parts of the western Assam dealt with the settled cultivators as creditors and shopkeepers. They also had significant stake in jute cultivation in the region.

[41] For details, see Sajal Nag, "Economic Roots of the Regional capitalist Class: a Study of the Primitive Accumulation of the Marwari Community in Colonial Assam," in *Studies in the Economic History of North East India* edited by J.B. Bhattacharjee (New Delhi: H.A. Publications, 1994).

[42] Kar, "Historia Elastica". Meghraj Kothari was one of the most significant traders dealing with rubber in the region. His father, Mahasingha Kothari came to region from Bikaner in 1816 to work as a servant. He worked in the shop of Golocha Seth in Goalpara at the salary of Rs. 2 per month. Between 1818 and 1838 Mahasingha could establish around eighty *golas* (they operated as provision stores for the army) between Goalpara and Dibrugarh, which was possible because of the profit earned by selling opium at high price. Meghraj consolidated his father's business and established more shops near the tea gardens which were also involved in the trans border in ivory, timber and rubber.

[43] Jayeeta Sharma, *Empire's Garden: Assam and the Making of India* (New Delhi: Permanent Black, 2012), pp.87–91.

[44] *Ibid*., p.88. Also see Arupjyoti Saikia, *A Century of Protests: Peasant Politics in Assam Since 1900* (New Delhi: Routledge, 2014), pp.52–67.

A Marwari firm, SRCB was the pioneer in the marketing of kerosene in Assam.[45] Saligram Karwa was holder of the Dibrugarh rubber *mahals* since 1852 and earned significant profit to become one of the successful traders. Saligram Karwa and Chunnilal Bakliwal came to eastern Assam from two different places from Rajasthan in search of better livelihood around 1850. They became partners in their joint venture named as Messrs Saligram and Chunnilal around 1860. Though, the firm consisted of two different families from two different places and two different communities, that was, Saligram was a Hindu belonging to the sub caste Maheswari and Chunnilal was Jain Sarawagi, yet it remained united till 1955. The colonial government honoured Chunnilal with the title Rai Bahadur in 1893 and the firm became SRCB and remained so till 1955. The SRCB in the nineteenth century undertook various businesses, providing finance to the tea and rubber plantation, trade in grains, supply of rations to various divisions of the British Indian Army. The firm was involved in the marketing of kerosene when it was produced at the Margherita refinery and later at the Digboi refinery under the AOC. The SRCB was the sole distributor of kerosene in Assam and the firm continued its effort to develop its business by marketing various products of the new refinery and gradually acquired properties throughout North East. The firm also competed

[45] Few of the major firms were: Bansidhar Badridas Modi in Dibrugarh, Mahasingha Meghraj Kothari, Ganapatrai Mangilal in Guwahati, Narasimhadas Surajmal Jalan, Ramjilal Ganeshilal Khaitan in Tinsukia, Juharmal Muralidhar Chokhani in Makum, Chunnilal P*anna*lalkashera in Panitola, Ganesh Das Shriram Goenka, Nathuram Jaydayal Khemka in Sibsagar, Bhingbharaj Chauthmal Kajeriwal, Ramchandra Lachminarayan Singhania in Shillong. For details, see Kar, "Historia Elastica," pp.135–136. About the role of the SRCB, I was provided information by Gajendra Bakliwal of Jorhat (belongs to the family of Chunnilal Bakliwal).

with the other retailers like the Stanvac and the BOC. As business expanded, the firm inducted many members from their close relations of the two original families into partnership and was further expanded when Chaganmal Pandya Sarawgi (head *munim* of the firm) joined the firm in his individual capacity and shared it with his brothers.[46]

The SRCB also acted as banker of the ARTC. The SRCB was also the main banker to the AOC even after opening of bank branches at Digboi and Margherita and was also appointed as *khajanchi* for the then Imperial Bank (later named State Bank). To meet the transportation needs of the firm the main office of the SRCB had cars, horse driven buggies and bullock carts. Retailing network to sell kerosene was set up by transporting kerosene by bullock carts, country boats and later by RSN company steamers from Mohanghat in Dibrugarh and transported to places like Neematighat, Silghat, Tezpur, Vishwanathghat, Gomerighat to cater the needs of interior villages by delivering to individual shopkeepers in barrels and 4 gallon tins on credit recoverable at the time of next supply. Almost all the big rail head storage depots were also managed by the SRCB. The depots used to be near the rail stations.

[46] The firm was enlarged and maintained its name till 1955, when it was first reorganised by splitting it into four groups, viz., SRCB (Lakhimpur) consisting of members of Karwa family, SRCB (Jorhat) consisting of members of Bakiwal family, SRCB (Guwahati) consisting of members of whole Pandya family baring members of Kundanmalji Pandya which was included in the fourth group, SRCB (Shillong).

A small community of merchant[47] could control the trade and finance of such a large area was possible, as pointed out by Markovits due to their control over 'information and knowledge channels' rather than their ethnic solidarity.[48] Marwari traders were often considered as the exploiters of the peasantry, particularly in the absence of a native trading community.[49] The Marwari traders used to advance cash to the peasants at a higher rate of interest (around 75 per cent of interest) and seized crop in case of non payment of loan. As a result, there were instances of peasants reacting against the Marwari traders and moneylenders. However, we do have instances of successful assimilation, for example the family of Haribilas Agarwala.[50] Lakshminath Bezbaruah, the

[47] The table gives an empirical idea about the emigration of Marwari traders into the region:

Table A:Male Emigrants in Eastern India,1921

Province	Bikaner	Jaipur	Marwar
Assam	4,464	3,855	1,489
Bengal	14,532	11,345	3,491
Bihar/Orissa	1,257	7,475	986
Eastern India	20,253	22,675	5,966

Source: Markovits, *Merchants, Traders, Entrepreneurs*, p.*200.*

[48] *Ibid.*

[49] Devabrata Sharma, *Asomia Jatigathan Prakriya Aru Jatiya Janagosthigata Anusthan Samuh* (Guwahati: Ekalavya Prakashan, 2008, 3rd print), pp.518–519.

[50]Navarangram Agarwala represents the example of migrant assimilation. The family not only continued their trading activities in tea, opium and rubber, but also successfully established themselves into the Assamese gentry class. Chandrakumar Agarwala (1867–1938) is remembered for his cultural activities and his contribution in launching the Assamese journal, *Jonaki* and his nephew Jyotiprasad Agarwala (1903–1953) is credited with the making of first Assamese film in 1935. Jyotiprasad is a nationalist icon of Assam and his songs are popular as *Jyoti Sangeet*.

celebrated Assamese literary figure and who also began his life in trade, in his autobiography celebrates his friendship with Chandrakumar Agarwala and considers the family as Assamese.[51] While mentioning about the *kothi* of Haribilas Agarwala at Armenian street Bezbaruah states that 'I am overwhelmed with pride to see such a large *kothi* of an Assamese at Barabazar in Calcutta'.[52] Without denying certain integration, the Marwari community retained their separate identity.

Merger with Burmah Oil Company: New Economic Possibilities

At the eve of the WWI, the AOC in 1912 had a capital of £450,000 and its area of activity was limited to an area of 8 square miles in and around Digboi.[53] The profits earned by the AOC in the wake of the WWI could not be sustained. Towards the end of 1920s the AOC was lacking capital for expansion of its activities, as a result the production of oil declined to 14000 gallons per day in 1920 from 18000 gallons per day in 1919.[54] By 1920, the AOC could complete only 80 wells. In the meanwhile, the US started producing huge quantities of oil becoming a leading oil producer with more than 60 per cent share of the world oil.[55] The period witnessed an increasing flow of capital into the oil

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[51] Lakshiminath Bezbaruah, *Mor Jivan Suaron* (Guwahati: Banalata, 1998, reprint), p.12 (2nd part).

[52] *Ibid.*

[53] Arupjyoti Saikia, "Imperialism, Geology and Petroleum: History of Oil in Colonial Assam," *Economic and Political Weekly*, Vol. 46, No.12 (2011), p.53.

[54] Assam District Gazetteers, Lakhimpur District, 1976, p.230.

[55] In 1913 the production of oil by the United States was estimated to be 54,000,000 tons, whereas the British India around the same time produced only 1,000,000 tonnes which was less than 1 per cent of the world oil production.

marketing. On the unprecedented increase in demands of oil during the WWI, *The Times* reported:

> At the outbreak of the war the oil industry was to all appearances entering upon an unprecedented expansion and prosperity...the war may be said to have increased the prestige of oil industry by revealing the mineral oil and its products as constituting a group of munitions of first class importance and indispensable for prosecution of warfare on the modern lines.[56]

The BOC formed in 1886 enjoyed monopoly over the oil fields of the British Burma and by the first decade of the twentieth century, it could also provide dividend to its shareholders. The BOC also had right to drill in southern Assam over 500 acres of land.[57] The BOC was determined to expand its activities as John Cargill, Chairman, Burma Oil Company, stated that 'no stone must be left unturned in order to try and discover fresh sources of supply, particularly in Burma and India where the company hold such a commanding position in the market and possesses all the transport, refining and marketing organisation required to deal with a large production of crude oil'.[58] Meanwhile, the directors of the BOC after careful geological examination of the properties of the AOC, the geologists of the BOC advised that 'the possibly productive area

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[56] *The Times*, 23 January 1920.

[57] *The Economist*, 18 June 1921.

[58] *The Times*, 28 April 1911. The period of amalgamation of the AOC and BOC also coincided with the attempt of the Government of British to create an all new British oil company by combining the Company, The BOC, Royal-Dutch and Lord Cowdray's Mexican Eagle Company after the WWI. The British oil policy before WWI was mainly to secure supply for the Admiralty. The WWI had proved the importance of oil in war like purposes.

is greater than had been previously imagined, and that satisfactory, steady, and lengthened production can safely be looked for even only from the proved areas'.[59] The BOC decided to acquire the shares of the AOC at £2 each for cash or to offer them shares in the BOC in the proportions of nine shares of the AOC for two shares of the BOC shares.[60] The AOC offered not less than 75 per cent of its shares to the BOC. By 1921, the BOC acquired more than 90 per cent of the AOC's capital.[61] After the takeover of the AOC by the BOC the office of the AOC in London was also transferred to the Burmah's London office.[62] In the annual meeting of the AOC in London, John Cargill explained the advantages of the BOC's control to the shareholders as:

> These changes give your company (the AOC) the full advantage of the Burmah's large technical staff in the spheres of geology, production, refining, and marketing, and in the last direction secure for your company the protection and assistance of the commanding position of the Burmah in the Indian market.[63]

During the WWI, the consumption of oil as fuel by the British navy increased from 80,500 tons in 1915 to over 1,90,000 tons in 1917.[64] In such a situation, by 1916 the British navy faced oil shortage and had to depend on American

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[59] Annual Meeting of the Burma Oil Company, Ltd., *The Economist*, 9 July 1921.

[60] *Ibid*.

[61] *Ibid*.

[62] *Ibid*.

[63] *The Times*, 27 July 1921.

[64] GG Jones, "The British Government and the Oil Companies 1912-1924: The Search For an Oil Policy," *The Historical Journal*, Vol. 20, No. 3 (1977), p.658. The new weapons used in the war, viz. tanks, submarines and airplanes all were fuelled and lubricated by oil.

supplies. The British government felt it necessary to form a giant British owned oil company so that it could develop new oil fields, particularly in the Middle East. The importance of oil after the WWI led the British government to take keen interest on the overseas oil sources as reflected in the statement of the government in 1918 which says that 'it is absolutely vital to the British Empire to get a firm hold of all possible sources of petroleum supply…'.[65] The British government though lacked a coherent oil policy, but after the war it wanted to establish a 'national' oil company.[66] The move towards such a policy was initiated in 1914, when the British government purchased shares of the APOC. The government planned to bring the Shell under British control by amalgamating with the BOC and APOC in the early 1920s.[67] The scheme of merger was also influenced by the conviction of the foreign office of Britain that the Standard Oil and Shell seemed were aggressively moving forward their monopolistic interests.[68] The amalgamation of small British oil companies to form a large oil company became a serious matter.[69] The takeover of the AOC by the BOC can also be put into such context.

After the taking over, the BOC provided the AOC with much needed financial, technical and managerial and commercial expertise. The takeover by the BOC resulted in a gradual increase of production to 30000 gallons per day

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[65] Quoted in Charles More, *Black Gold: Britain and Oil in the Twentieth Century* (UK: Continuum, 2009), p.25.

[66] *Ibid*., p.23.

[67] Jones, "The British Government and the Oil Companies," p.671.

[68] *Ibid*., p.652.

[69] *Ibid*., p.653.

in 1925 and 180000 gallons per day in 1931.[70] The refinery was rebuilt in 1923 and was updated with the then existing technologies. The BOC imported technologies mostly from the US and UK. But despite these improvements the production remained static during 1934–52.

The technological improvement during this period aimed at diversification of products. For instance, in 1928, a *Wax Extraction Unit* was installed at the Digboi refinery. In this unit the *Pressable Waxy Distillate* (PWD), which was an intermediate product with wax content obtained from the *Crude Distillation Unit* was separated into crude wax and 'blue oil' (oil that remains after getting the wax).[71] In the *Wax Extraction Unit* other associated technologies were installed, viz, the *Wax Sweating Stoves* (1928-29), *Bauxite Plant* (1928-29), *Acid Washing Plant* (1929). The basic function of the *Wax Sweating Stoves* was to further separate oil trapped within the wax crystal structure and thereby increasing the quality of oil in terms of oil content, melting point and colour. To remove the colouring matter from the wax the Bauxite plant was installed. The *Acid Washing Plant was* indigenously designed to remove certain poly nuclear compounds present in the wax which was not good for health.

As the Indian domestic market faced increasing challenges from international kerosene producers, it became imperative that kerosene from Digboi be better refined. Accordingly, a *Kerosene Treating Unit* (KTU), a refining plant was installed in 1932. The unit was responsible for improvement of the quality of kerosene. It removed aromatic components from the kerosene

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[70] Visvanath and Das, *The Luminous Arc*, p.18.

[71] *Ibid*., p.19.

with the help of using 100 per cent liquid sulpher dioxide. This helped in the improvement of final kerosene.[72] As Assam crude had a higher ration of wax a specially designed crude oil distillation plant, known as the Crude Oil Distillation Unit – Bench C was imported from UK and was installed in 1934 that functioned till 1997. In 1940, another *Crude Oil Distillation Unit – Bench G,* imported from USA was installed. With the expansion of road construction, there was an increasing demand for bitumen. Consequently, a *Bitumen Plant* was installed in 1938 and was expanded in 1943 and further in 1971. The BOC adapted a resolution at its Head Quarters at London in 1933 to invite the French Electrical Coring Company, M/s. Schlumberger to Digboi for conducting some electrical surveys. The Digboi well No. 269 was the first well logged by Raymond Sauvage under M/s. Schlumberger in India. Since then well logging continued in Digboi by AOC and later in Naharkatiya and Moran by BOC/OIL.

From mid nineteenth century onwards massive 'technology transfer' took place between the west and the colonies like Africa and Asia.[73] The technologies were mostly imported from the US and London.[74] The modern machines originated in the west and entered into India through the 'agency of colonial state or through the networks of international business firms'.[75] The

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[72] This plant was supplied from Germany. Initially, the plant had the capacity for processing 250 tonnes per day of medium kerosene, which was increased to 350 tonnes over the years.

[73] Daniel R. Headrick, *The Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850-1940* (New York: OUP, 1988), p.6.

[74] Regarding the technological development in the AOC after 1921, see Visvanath and Das, *The Luminous Arc*, pp.18–20.

[75] David Arnold, *Everyday Technology: Machines and the Making of India's Modernity* (Chicago: University of Chicago Press, 2013), p.5.

labour intensive industries demand a modest capital investment, whereas in capital intensive industries like oil refinery large investment is required in equipment. In such context, large companies are at advantage. The import of technology (earlier in case of railways, steamships, and telegraphs in the mid nineteenth century) also reflects the whole notion of the 'technology transfer' from the materially prosperous west to the 'backward' peripheries. Hence, Arnold argues that the 'social construction of technology' occurred outside countries like India, which were 'the recipients of machines'.[76] Imperialism created the infrastructure and socio-economic conditions for 'technology transfer'. Under colonial rule, India did not have tariff rules to exclude foreign manufacturers, at the same time it also lacked entrepreneurial and technological foundations. Although, such 'technology transfer' led to the growth of tropical production and an increase in international trade, it did not raise the per capita incomes of the colonies. Thus, Headrick argues that due to the import of technologies 'tropical economy grew, but did not develop'.[77]

Making of an Industrial Town

This place (Digboi) was no better than a hamlet in the jungle only a couple of decades ago, can now be called a town with its magnificent bungalow, pucca staff quarters, well equipped hospital, well designed sanitary drainage and the excellent European club.

Henry B. Buchanan[78]

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[76] *Ibid*., p.41.

[77] Headrick, *The Tentacles of Progress*, p.6.

[78] Observation made by Henry B. Buchanan, GM of AOC, during his farewell speech in 1927. For the speech, see *Digboi Batori*, January 1956.

Digboi, where the refinery came up has always been glorified as one of the oldest oil towns. The clubs, 18 hole golf courses, a well-developed infrastructure, and a number of British bungalows complemented the symbolic importance of Digboi in the larger colonial social imagination. The construction of a collective identity of the people living in Digboi, around the origin of Digboi as one of the oldest oil town has been further strengthened by restoring the historic oil field and building up a living museum using the nineteenth and early twentieth century oil drilling relics, machinery and photograph.[79] The community's collective belief has also been expressed by narratives like coining of the name Digboi. At the popular narrative, it is believed that the name Digboi was derived from the phrase 'dig-boy-dig', which is what the Canadian driller urged the labourers as they dug for crude oil.[80] The British took pride in transforming Digboi from 'wildernesses' of jungles to an orderly, respectable and 'civilised' landscape, a Victorian oil town.[81] The oil industry in Digboi has provided the expression and precise definition of cultural boundaries as well. The town beyond the refinery area has different infrastructure and facilities.

The cultural and racial differentiation was part of the colonial rule which was based on the 'rule of colonial difference'[82] and Digboi even being a centre of a corporate business could not escape such segregation. The British ruling

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[79] The Digboi Centenary Museum had been inaugurated in 2002 and is built on the fringes of Digboi Well No.1 from which oil is still gently seeping.

[80] Visvanath and Das, *The Luminous Arc*,p.12.

[81] *Digboi Batori*, January 1956.

[82] Partha Chatterjee, *The Nation and Its Fragments: Colonial and Post- Colonial Studies* (Delhi: OUP, 1993), p.10.

elite created a number of idioms and rituals that created a distinct difference between British and Indians and it became more evident after the *sepoy* mutiny.[83] The colonial towns were also planned and constructed in such a manner that the British authority could be represented to Indians. In Digboi also such representation of authority was demonstrated. Europeans used to reside at Muliabari in bungalows; the entry by the Indians were restricted and had to follow instructions displayed on notice board along the road to Muliabari. Some of these instructions read, 'Observe strict silence while going through the area'.[84]

The cultural exclusion of Indians was also followed in other areas. No Indians were allowed to be the members of the European Club established in 1922 till the independence. The British officials of the AOC and the nearby tea gardens were regular visitors of the club. During nights, the members of the club used to bring their own hurricane lamps and horses as the roads were not lightened.[85] Digboi Club staged only English plays produced by Europeans till 1971, when the first Assamese drama was staged. After independence, this club was renamed as Digboi Club and it was opened to Indians as well.[86] Since the Indian officials were excluded from the club, they built up their own Sports Club and for all other Indians there was the Indian Club.[87]

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[83] Bernard S. Cohn, *An Anthropologist among the Historians* and *Other Essays* (New Delhi: OUP, 1987), p.644.

[84] Dwjesh Chandra Deba Sharma, *Saru Saru Manuhar Saru Saru Kotha* (Tinisukia: Print and Book Centre, 2000), p.107.

[85] *Ibid*.

[86] *Ibid*.

[87] *Ibid*.

The management of the AOC also maintained religious and caste hierarchies among the labourers if not in the workplace then in their private space. The housing settlement did reflect the racial and class differentiation in the town. The workers' private dwelling space was laid out strictly on communal lines. Labourers belonging to a particular community had to take up residences within the premises of single barracks. Thus, the township of Digboi came to be divided into separate barracks called Lines named after respective communities, for example, Gorakhpuria Line, Agreement Line (where the Nepalese dwelt), and Assamese Line etc. Interestingly, these residences were also segregated on occupational lines. The Goalparias who worked primarily as labourers lived in Goalparia line, which was separate from the Assamese line which housed the 'natives' that worked in the capacity of *Babus* in different clerical positions. Even in the canteen there were separate entrances and spaces for Hindus and Muslims. The politics of exclusion was not only practice between the Europeans and Indians reflecting, but also amongst the Indians.

Social Background of the Workforce

In the oilfields of Digboi about 22 per cent of the labour force was obtained from Assam.[88] The rest of the workforce was recruited mainly from eastern Bengal (mostly from Chittagong) and the United Provinces (mostly from Gorakhpur) and to a lesser degree from Punjab.[89] The Royal Commission on Labour of 1930 reported that 2,450 workers came from Bengal and 1200 from

[88] Government of India, *Royal Commission on Labour in India*, Vol. 6, Part 1 (1930), p.4.

[89] *Ibid*.

United Provinces.[90] The imported labour usually worked for short periods and then returned home. They returned again later or used to send their friends. The nature of the labour force was migratory, the average number of labourers that used to leave work and then again engaged in a month ranged from 400-500 in a total force of about 6,000.[91] Absenteeism was then a common feature, reflecting the rural tie of the workers. The Company considered six weeks without pay absence as recognised leave and those who were absent for more than six weeks were scored off the books and they needed to re apply for employment.[92] The industry, by 1930, had established such strong connection with the recruiting areas that it did not require any recruiting agencies or *sardars* to recruit labours.[93] A labour bureau was established in 1924 where applications for work were registered and in rotation were offered work when vacancies occurred. Of the Assamese workers, the largest number came from the district of Goalpara and followed by Sibsagar. At the managerial level, the superior managing staff consisted of the British, recruited directly from England.[94] Like the coal mines, the subordinate supervising staff at the AOC

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[90] F. McAllister, General Manager to the Assam Oil Company Ltd, Digboi, reported to the Royal Commission on Labour, *Minutes of Evidence taken Before the Royal Commission on Labour in India*, 1930, ASA.

[91] *Royal Commission on Labour in India*, p.4. It was estimated that 50 per cent of Assamese and per cent of Nepali workers returned to village every year in April and May. Absenteeism was much stronger in case of semi skilled labourers. Those labourers who did not come from distant places used to go for cultivation every year.

[92] F. McAllister, General Manager to the Assam Oil Company Ltd, Digboi reported to the Royal Commission on Labour, *Minutes of Evidence taken Before the Royal Commission on Labour in India*, 1930, ASA.

[93] *Ibid*.

[94] *Royal Commission on Labour in India*, p.5.

was partly European and partly Indian. Unlike the tea estates where the labourers had no scope of rising above the rank of foreman, in the Digboi oil fields the unskilled labourer could be trained and promoted to the post of drillers on a scale of pay rising from Rs. 45 to Rs. 90 a month.[95] In 1930, there were 60 drillers in the AOC, of whom 60 per cent were promoted men.[96] Besides, the regular skilled workers the company used to lease out contracts to the local contractors for works like clearing jungles, digging earth, construction of buildings under the company engineers.[97] The labour for clearing jungles were mostly recruited from indigenous communities like Nagas and Noctes who were already trained in felling trees and creating the environment for habitation.[98]

We have few references to the contribution by and involvement of the natives of different parts of India and their upward mobility in the industry.

[95] *Ibid*., p.6. The tea plantations of Assam employed one of the largest labour forces at the lowest level of wages. In the tea gardens of Assam the labourers were mainly brought from the 'tribal' areas of Chotanagpur, Central provinces and Madras presidency through the labour contractors, the *arkatis*. The labourers were 'indentured' to the employers as they had to sign a contract having harsh penal provisions. For details of the indenture system, see Nitin Verma, "Coolie Acts and the Acting coolies: Coolie, Planter and State in the Late Nineteenth and Early Twentieth Century Colonial Tea plantations of Assam," *Social Scientist*, Vol.33, No.5/6 (2005), pp.5–6; Rana P. Behal and Prabhu P. Mohapatra, "Tea and Money versus Human Life: the Rise and fall of the Indenture System in the Assam Tea Plantations 1840-1908," *Journal of Peasant Studies*, Vol.19 (1992), pp.3–4.

[96] *Royal Commission on Labour in India*, p.6.

[97] To build the refinery and for the housing, the Company required to clear the jungle and the contract was given to Chandra Gogoi.

[98] The Nagas were also used by the colonial tea planters to clear jungle for tea cultivation at a low cost. Nagas were adept at clearing jungle with fire and axe as it was required in shifting cultivation.

Bhaman Singh Thapa, a Nepali from Aijal joined the company as tractor supervisor, in the transport department in 1934 and worked for more than thirty years. While working as a driver in a tea estate in Silchar, Thapa came to know about a *tel* company and went to the Badarpur oil field. When it was abandoned he was transferred to Digboi to work at the AOC.[99] Uddham Singh, a 20 year old Sikh, a petty businessman in Calcutta, originally from Hoisarpur, Punjab responded to an advertisement 'Drivers wanted in Digboi: for heavy vehicles' in 1929.[100] D.N. Dutta joined the Company in 1919 initially as a surveyor at the geological department and later in 1931 became the draughtsman of the department. He was involved in the surveying the remote places of Naga, Mismi and Tikok Hills. Dimbeswar Baruah, from Sibsagar, former president of the AOC Labour Union, joined in 1921 as allocation clerk in General Workshops and became Assam Oil transport supervisor. Ram Naresh from Gorakhpur joined in 1929 in the production department as an ordinary worker and promoted to Headman of a production gang.[101] Hazara Singh joined the company in 1928 as a derrick erector at the insistence of his cousin who was already working at the AOC as a headman in rig building.[102] This is an example of how a network of kinship ties played a role in the recruitment process. Besides, the formal advertisement brought people to the AOC. To be a part of the oil industry was also about mobility in the social status and it gave a sense of stability. Dwjesh Sharma left the post of Middle

[99] *Digboi Batori*, April 1956.

[100] *Digboi Batori*, August 1954.

[101] *Digboi Batori*, December 1956.

[102] *Digboi Batori*, April 1957.

English teacher in Sarupeta near his village to join the primary school ran by the AOC as assistant teacher. By his own admission, the monthly salary of Rs 32 offered by AOC proved irresistible when compared with Rs 14 he was presently drawing.[103] Jamu Thapa of Tusha village in Nepal started working at a young age of 16. After eight years of back breaking work as a mail- runner, Thapa found himself a more 'settled job' with the oil company in 1928.[104] Similarly, Raghu Sukul from Bihar, after completing Middle English examination started assisting his parents in the paddy field before joining the AOC at the wax rundown sheds in 1930 at the age of 23.[105]

Though at the workplace, the labourers were not organised on the basis of religion or caste or region, but the segregation of the labourers was followed in the neighbourhood on the basis of caste and communities. The celebration of various festivals, the observation of rituals kept the labourers connected with their communities at the everyday level. The living space outside the company was spatially segregated with different communities inhabiting different areas. On the one hand, the segregation was between the Hindus and Muslims, and on the other hand, it was between the upper and lower castes Hindus. We also have example of regional clustering that reshaped the primordial ties. As already mentioned, the area resided by the people from Goalpara was known as 'Goalporia Line', the area resided by the senior Assamese clerks was the 'Asomiya barrack', 'Gorakhpuria Line' for the people coming from Gorakhpur, Dhaka line to be resided by the workers from Chittagong etc. The company

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[103] Deba Sharma, *Saru Saru Manuhar Saru Saru Kotha*, pp.49-50.

[104] *Digboi Batori*, January 1957.

[105] *Digboi Batori*, June 1957.

used to organise under its supervision various festivals and before each festival leading representatives of different communities were consulted thereby providing the scope for strengthening community ties. The first Durga puja was celebrated in the refinery ground in 1929. The Company used to supply wax cakes for lighting *diyas* during Diwali. Besides, the Company employees had their own *naamghars*, temples, mosques, and churches to keep their community bonding intact. The labour force was heterogeneous and the heterogeneity was maintained in the neighbourhood which influenced the workforce inside the industry. The fragmented nature and the multiple identities of workforce even when the Company at the workplace provided a single identity were demonstrated in the communal riots of 1930.[106] The riot took place between Hindu and Muslim labour force over a bullock for *kurbani* at Bakr eid which resulted in around hundred casualties including three deaths.[107] But it was the same labour force that came together to strike against the management in 1939. Chakrabarty points out that the identities of workers were defined by the primordial ties of religion, caste and community.[108] However, to accept the primordial ties as static is problematic and the workers did redefine such ties in a new working environment. Chandavarkar argues that

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[106] Police B, March 1931, Nos.250–365, ASA. The official record noted that the two agitators from outside Assam having connection with the Hindu Mahasabha and the Arya Samaj were active amongst the labourers. On the other hand, an organisation named the All Bengal Muslim Young Men's Association tried to take advantage of the riot to mobilise Muslim sentiments.

[107] The jute mills of Bengal had also witnessed a number of communal violence in the late nineteenth century.

[108] Dipesh Chakrabarty, *Rethinking Working Class History* (Princeton: Princeton University Press, 1989).

the culture was actively constituted by the everyday experiences in the neighbourhood of the factories.[109]

At the work place the Company provided the scope for the construction of a single identity (employee of the Company) as it maintained muster rolls that allotted each worker with a registration number. The muster rolls recorded the registration number of the employee, the dates on which the photo pass was issued and the date on which finger prints was taken down.[110] The muster rolls also documented the address of the employee, that was, the name of the village, the police station, the district etc. of the worker. Though the muster rolls loosely documented workers' caste, the main focus was on the documentation of their physical attributes. The master roll actually documented the native place of the worker and his religion.

The power and authority of the management was maintained through various means.[111] To create a committed industrial workforce, representation of the managerial authority was considered to be a necessary part of the working

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[109] Rajnarayan Chandavarkar, *The Origins of Industrial Capitalism in India: Business Strategies and Working Class in Bombay, 1900–1940* (Cambridge: Cambridge University Press, 1994).

[110] Muster Rolls of the Assam Oil Company Ltd, 1930, Corporate Office, Assam Oil Division of Indian Oil Corporation, Digboi, Assam.

[111] The disciplinary regime of the tea gardens of Assam practiced both legal and extra legal form of control and surveillance. Flogging, whipping, forced isolation (by fencing off the tea gardens and residents of the labourers both from the urban and surrounding rural areas) were part of the regular disciplinary processes. Physical violence was added with the legal right of the authority to private arrest of the absconding labourers. For details, see Rana P Behal, "Power Structure, Discipline, and Labour in Assam: Tea Plantations under Colonial Rule," in *Coolies, Capital and Colonialism: Studies in Indian Labour History*, ed. Rana P Behal and Marcel van der Linden (Cambridge: Cambridge University Press, 2006).

culture of the industry. In a number of industries of India, the managerial authority was also mediated through the *sardars* or *mistris*.[112] Due to the lack of evidence, we cannot firmly argue to have such *sardari* system in the Digboi oilfield and refinery. However, Dwjesh Sharma has argued that there was a rumour among the employees of the refinery that the labour officer, Towler had a network of spies to keep himself aware of the workers under the supervision of Sardar Hari Singh.[113] The way the workforce was structured, perhaps reflect the existence of the *mistri* system in the refinery as well. The labourers were subdivided into 'gangs' of eight to ten under a gang leader for carrying out different operations. Thus, there were the drilling gangs for drilling operations, construction gangs for building rigs etc. The gang leader might have played the role of the *mistri*.

The history of the labour force can be reconstructed as pointed out by Chakrabarty through the silences and sounds embedded in the official

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[112] The *mistris* enforced discipline in various departments and they were subjected to the managers. However, they enjoyed wide range of power in matters like leave, fines and absences, recruitment etc. which provided them with space to abuse power. The *mistri* system reduced the cost of supervision on the part of the management. It should also be mentioned that the source of power of the *mistri* was not necessarily managerial rather it was the influence that the *mistri* commanded over the workers forced the management to recognise the *mistri's* power. The influence and control of the *mistries* over the workers was also legitimised because of caste and kin relations between the two. For the details of the system see, Chitra Joshi, *Lost Worlds: Indian Labour and its Forgotten Histories* (Permanent Black, 2003); Dipesh Chakrabarty, *Rethinking Working Class History*; Omkar Goswami, "Multiple Images: Jute Mill Strikes of 1929 and 1937 Seen through Other's Eyes," *Modern Asian Studies*, Vol. 21, No.3 (1987).

[113] Deba Sharma, *Saru Saru Manuhar Saru Saru Kotha*, p.108.

documents.[114] In the Digboi refinery, as a measure of control the workers after the enrolment were issued photo identity card, which contained the registration number as well as the native address of the worker. It was mandatory for the worker to carry it on their person. The company strictly maintained time to ensure punctuality of the workforce. In the refinery and the workshops the workers had to carry metal tokens and keep them on a board while moving in and out of the work. Under strict supervision the clerks of different departments had to maintain time sheets. The wage of the workers was calculated while taking the time sheet into consideration. At the work place, the worker had no legal protection vis-à-vis the management, and the Labour Superintendent and the General Manager could control and discipline the workforce by their power to fine its employees for 'inadequate' service and dismiss or discharge any worker on the grounds of 'disobedience', 'reduction of staff', and simply on the grounds of 'unfitness' and 'laziness'.[115] Ramani Mohan De, a fitter was discharged after 7 years of service on reduction of staff.

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[114] Dipesh Chakarabarty, "Conditions for Knowledge of Working-Class Conditions: Employers, Government and the Jute Workers of Calcutta, 1890-1940," *Subaltern Studies*, Vol II, ed. Ranajit Guha (Delhi: OUP 1983), p.259. The Jnanpith award winner, novelist from Assam, Birendra Kumar Bhattacharya (1924–97) wrote his political novel *Pratipada* in 1977 taking up the issue of labour strike in the AOC. In the preface of the novel Bhattacharya laments that he has tried to break the silences with as far objectively as possible. The novel depicts the racial differences between the Europeans and the Indian employees and the sexual abuses that the female bungalow servants had to face. The author has dealt with the formation of the labour union and the subsequent strike. Birendra Kumar Bhattacharya, *Pratipada*, 3rd Edition (Guwahati: Banalata, 2007).

[115] J.C. Higgins, *Report of the Digboi Court of Enquiry* (Shillong: Assam Government Press, 1938), pp. 12–15.

On reapplying for employment, he was again rejected. Satya Narayan had worked as chowkider, fire gang, stoveman, etc. was also dismissed on account of reduction of staff and was reemployed as chowkider, cycle chaprasi, peon and was again discharged. When he applied for further employment he was declared as 'unfit' by the medical department. A production supervisor reported that he was dismissed for riding one of the Company's motor cycles with the result of injuring himself and causing damage to the cycle (Company's property). The system of punishment was fairly elaborate and the warnings and punishments were recorded on the registration cards of the employees. Abusive language was also a part of the disciplinary regime which injured the self esteem of the workers.

Against the managerial authority there were signs of resistance by the workers. Absenteeism was itself a form of rebel. Most of the workers used to leave work after six months. Some of them came back or send their friends or relatives. Perhaps, the workers also tried to steal time. As reported in the *Royal Commission*, Abdullah, a gas-engine fitter was dismissed for disobedience and insubordination as he refused to work under Darshan Singh, who was a gang leader in charge of a different type of engine so that he could learn new work. However, Abdullah asserted that he was transferred so that he could be punished as he had allowed one of the men working under him to make some tea.[116] It is mentioned by Sharma that the workers from Goalpara did not bear

[116] Abdullah was a witness to the Court of Enquiry appointed by the Assam Government in 1938. The Court considered Abdullah's allegation of punishment as his own improbable invention and agreed with the labour superintendent that it was a

the abusive language of the authority. Reacting violently against the managers was almost an everyday practise of the Goalpariya workers. Sharma argues that the Goalpariyas even had the audacity to keep the manager tied up at the derrick.[117] So, whenever the authority got a chance the workers from Goalpara were dismissed from jobs.

The culture of the workplace was developed not only by the management but also by the way the workers perceived the authority and through forming new alliances within and without the industry. The identity formation of the workers depended on different variables like redefining primordial ties, everyday experiences at the workplace and at neighbourhood, the assertion of self, the resistance to the authority, etc. The management also had to negotiate and recognise pre capitalist institutions like the *sardari* system. Due to paucity of sources it has been difficult to have a deft socio cultural study of the labour force of the Digboi refinery.

Oil Industry, Workers, and Political Strike

As already discussed, the labour force working under the AOC was heterogeneous in nature, but we find signs of class solidarity as well. Even before the formation of a labour union, the workers in the Digboi oil field protested against the authority. The workers were in many cases subjected to work fourteen hours a day including Sundays without extra allowance for over time work. About 800 workers of Digboi oil field in 1929 went on a strike

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case of disobedience. Jafar Khan another employee reported that the Company instead of granting leave dismissed him as he was having stone in his kidney.

[117] Deba Sharma, *Saru Saru Manuhar Saru Saru Kotha*, p. 111.

demanding weekly holiday on Sundays. They stopped working on Sunday and again resumed work from Monday with the intention of striking on every Sunday. The strike resumed with a promise from the authority of providing bonus for work on Sundays.

By the end of 1920, many national leaders were getting involved in mobilising labourers of the AOC to form union.[118] In 1929 labour leader Chowkha Singh of Jamshedpur along with Sambhu Charan Ray reached Dibrugarh to meet the oil workers. Besides, addressing several meetings they distributed printed bills in both Assamese and Hindi exhorting the workers to organise themselves into a union.[119] Jawaharalal Nehru too visited Assam in 1937, and received a hearty welcome at Jubilee field where workers had gathered for a public meeting. Around 350 oil workers dressed in *khadi* and wearing Gandhi topis volunteered in the meeting. Nehru asked the audience of workers to organise themselves in the form of a Union and to fight for their just rights and for India's freedom.[120]

The AOC Labour Union was formed in 1938. The office bearers again reflect the plural background of the workforce.[121] The Union not only brought

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[118] Dipankar Banerjee, *Labour Movement in Assam* (New Delhi: Anamika, 2005), p.78. Labour leaders and socialists like Subhas Bose, M.N.Roy, Sudhindra Pramanik, Dinkar Mehta, Jalaluddin Hashmi visited Assam during 1936-38.

[119] The police records describe him as a prominent labour agitator who was sometime inciting trouble among the labour force in the AOC oil fields at Digboi and Tinsukia. Abstract of Intelligence, Assam Police, Record Branch, Vol. XVIII, June 1929, ASA.

[120] Deba Sharma, *Saru Saru Manohar Saru Saru Katha*, p.306 ; also see *Political History of Assam*, Record, File no. 171, 1939.

[121] Jaganath Upadhya, a *mistri* from Faizabad was the president of the union; Muhammad Aminulla, a petition write from Noakhali became the vice president;

the workers belonging to the direct company rolls under its ambit but also those working on a temporary basis under contractors, known as *Nunias.*[122] The union also widened its base amongst the AOC's bottling plant in Tinsukia. Most significantly, the union could also take up the cause of around 500 bungalow servants working in the private quarters of mostly European officers. They did not enjoy any job security and they could even be dismissed if they failed to report for duty due to illness. The servants were imposed with fine if they failed to salute the officers to whose bungalows they were assigned to. The officers also exercised their power by abusing them, both physically and verbally. [123]

The AOC Labour Union tried to represent itself as an inclusive entity. It tried to do away with the various differences existing among the labour force. Muhammad Abdulla, a member of the Union, appealed to the bungalow servants stating that 'although your religion might be different you can all meet

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Jadunath Bhuyan, a clerk from Sibsagar was the secretary and Harnam Singh a fitter from Amritsar was the joint secretary.

[122] The workers supplied by the contractors affiliated to the AOC demanded equal treatment at par with Company employees. This meant access to certain amenities such as higher wage rates, periodic promotion, accident compensation including guarantee of security of service. They numbered around 2,500 to 3,000 working under the different contractors. See 'Labour Unrest among Employees at Digboi', A – (5) (a) 38, ii, 1938, Special Branch, Police Record Office, Kahilipara, Dispur, Assam.

[123] Report of the Proceedings of a Meeting of Bungalow Servants at Charali, Digboi, 29 August, 1938, Police Report, File No. A5 (5) 38, Police Record Office, Special Branch, Kahilipara, Assam. There were around 300-350 servants working for 16 to 18 hours at a low rate without any holiday. Booters used to get Re.1, cooks 7 *anna*s, the *mali* 10 *anna*, and the *paniwala* 10 *anna* per day.

under the banner of the union'.[124] Workers had also negotiated their newly acquired identity with their primordial ties.[125] Dhanusdhari Mali another member of the union asked the workers to look beyond their community by stating in a meeting of the bungalow servants that 'the Hindus should help the Muhammadans and the latter should help the former'.[126] Thus, the Union provided the workers with an alternative space of association and identity formation. Yet, the politics of labour union could not completely rupture ties of religion and workers had to negotiate. The Muslim workers were not ready to support the union and the strike as they considered the union as a Congress organisation.[127] In an effort to placate Muslim sentiment the union leaders reached out to the Muslim leaders of all India stature like Abdul Bari and Jalaluddin Hashmi, vice president of Jamiet ul Ulema, Maulvi Abaans Sobhan Arifi was also brought to Digboi to mobilise Muslims workers.[128] Eventually, the Muslim workers did support the strike and the union reflecting a class consciousness. Such class consciousness among the workers did not mean

[124] *Ibid.*

[125] According to Chitra Joshi such a new identity was away from primordial ties of caste and religion but one that was defined by new context of work place. Joshi, *Lost Worlds*.

[126] Report of the proceedings of a Meeting of the Bungalow Servants at Charali, Digboi, 29 August, 1938.

[127] Many Congress leaders like Bishnuram Medhi, Omeo Kumar Das were members of the relief committee which was formed during the strike. Banerjee argues that it was a 'divide and rule' policy of the Company management. Community ties did provide a basis on which strike breakers could mobilise support and fragment any strike. However, it cannot be denied that the workers had multiple identities and that the workers had to negotiate so that the differences could coexist. See Banerjee, *Labour Movement in Assam*.

[128] Banerjee, *Labour Movement in Assam*, p.83.

paralysing other identities and as Joshi points out 'Workers had to negotiate these oppositions in different situations, repressing parts of their shelves while giving expression to other parts.'[129]

The plural background of the labour force did not create any obstacle to come together in 1939 to fight against the managerial authority under the banner of the newly formed labour union. However, like authoritarian managerial regimes then prevailing in other parts of the country, the AOC was determined not to recognise the union and refused to deal with their representatives. In the colonial context, the elected agents of the labourers were often dubbed as 'outsiders'. This had been one of the most frequent causes of labour strikes in India. Infact, in many cases a labour union gets recognition only after a strike. The AOC management also refused to recognise the AOC Labour Union by questioning the veracity of the formation of the Union and as to whether it was truly representative of the workers.[130] While formulating the draft of demands to be presented to the managerial authority, the unconditional recognition of the AOC labour union remained the first demand.[131] Apprehending a dispute between the authority and the union, the

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[129] Joshi, *Lost Worlds*, p.276

[130] The questions raised by the AOC authority on the authenticity of the Union were:

i) Do the Union's membership represent a large body of the Company's workforce?

ii) Whether its President and Committee were properly elected by the members

iii) Are the Union's rule properly framed?

For details, see Higgins, *Report of the Digboi Court of Enquiry*, p.ii.

[131] The management was not ready to recognise the union and stated, '…unconditional recognition means accepting something we know nothing about and just as a man does

Assam Government appointed a Court of Enquiry to arbitrate the stalemate between AOC management and AOC Labour Union. The Court of Enquiry observed:

> In the present case the Company cannot even claim that the Labour Union consists of a minority of its employers. It is on record…that the Union has a membership of 5,825 out of which 5,794 have paid their subscriptions…It is obvious, therefore, that the Union is fairly representative…[132]

The AOC labour union also had to resort to strike to establish its right to represent itself as the representative of labourers. By taking the cause of bungalow servants who were not considered as Company employees, the AOC Labour Union was trying to assert its right in the recruitment policy of the Company.[133]

The immediate context of the strike launched by AOC Labour Union on 3 April 1939 was the arbitrary and continuous dismissal of workers on the

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not buy something with his eyes shut so the Company must see what the facts are about the Union.'

[132] The court was critical of the Company for its lack of enthusiasm to recognise the union and suggested that the Company '…should not insist too rigidly on the representative character of the Union or on the observation of strict formalities in connection with its institution and management, but should accord it early recognition and negotiate on the rules and formalities later'. See Higgins, *Report of the Digboi Court of Enquiry*, p.3.

[133] The labour union demanded that a board consisting of equal number of representatives of the union and the management should take up the cases of suspensions or dismissals. It also demanded that in place of the existing system of registering candidates and appointing them, there should be a competitive examination system and a board consisting of equal number of representatives of the union and management should be set up for the purpose.

ground of reduction of stuff without referring to the union. The strike was called in solidarity with the dismissed workers and demanded their reinstatement and challenged the right of the company to dismiss workers at its will. It is worth mentioning that the AOC Labour Union nominated Sudhindra Pramanik, a prominent national leader as the general secretary of Central Striking Committee.[134] Before moving towards the strike the union leaders wrote to the general manager of the Company to consider such unwarranted and repeated dismissals and reinstatement of the workers.[135] The president of the union, Jaganth Upadhyay, went to Burma to mobilise the support of the workers of the BOC and he was jailed there for one month and then sent to Digboi.[136]

The workers were aware of the connection between capitalist enterprise and colonial rule. One worker describes the AOC as 'a British company

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[134] This committee was in addition to the Central Committee of the AOC Labour Union. Sudhindra Pramanik was a trade union leader from Bengal and played a crucial role at the steel workers' strike in Tatanagar in the 1920s.

[135] The issue of dismissal was clearly stated in a letter sent to the management by the union in July 1938 as:

> Your workers do not even know under which rules they are employed and discharged. There are no safeguards against wrongful dismissals. There is no security of service which ought to be guaranteed by the Company, not only in the interest of the workers, but also in the interest of the Company. Security of service is the most vitally necessary condition for the best and efficient working of any industry.

Quoted from Banerjee, *Labour Movement in Assam*, pp.95–96.

[136] Letter from Jagannath Upadhaya to Jawaharlal Nehru, Prime Minister, Government of India, 1954, Labour Movement in Assam, 1939, *Political History of Assam*, ASA.

reaping crores by sucking the blood of labourers'.[137] The strike took place in an atmosphere complicated by the politics of nationalism and retreating imperialism. After the election of 1937, the coming of the Congress in the provinces of India generated great excitement amongst the workers in India. The worker's expectation rose high with Indians taking control of the provincial governments. The workers expected that the provincial governments would support the long standing demands of workers concerning their choice of leaders, better wage and remuneration, increase participation in the management and security against arbitrary dismissals.

The Union members resorted to peaceful means of protest. The workers posted themselves at short distances in the main road leading to the refinery and picketed peacefully. However, the management with help of police tried to employ labourers from outside to keep the production running. From then picketing which was carried out during the day was also extended to night vigil. The company along with the district administration took help from the Assam Rifles to suppress the strike. The situation turned worse when on 18 April 1939, the management and the accompanied armed personnel fired upon the striking workers who were trying to prevent fresh recruitment drive.[138] In the firing four workers were killed and several hundreds injured. A magisterial enquiry under Pabitranath Das was set up by the Congress led ministry and its proceedings took almost four months. The enquiry acquitted the alleged

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[137] Report of the Proceedings of a Meeting of the AOC Labour Union held at Chariali, Digboi, 29 August, 1938, Police Report, File No. A5 (5) 38, Police Record Office, Special Branch, Kahilipara, Assam.

[138] Banerjee, *Labour Movement in Assam*, p.102.

European officers of the company and justified the violence on the ground of 'self-defense'. The AOC management too explained the violence as self-defense mechanism. It had to resort to such violence to bring fresh recruits into the AOC compound. With the growing public distrust and the wide coverage of the incident at the national press,[139] the Assam government prohibited the company from any further recruitment drives and formed a Committee of Enquiry under M. Mukherjee, executive Chief Justice of Calcutta High Court to look into the Digboi affairs.

Pramanik met Rajendra Prasad, All India Congress President at Patna and reported about the strike but he regretted that Prasad did not take any decisive line of action.[140] A pamphlet, reporting Praminik's note on Digboi strike was distributed in Digboi, criticised the Congress in general and the Assam Government in particular for their lack of adequate support to the oppressed labourers.[141] The Government of Assam and the AOC labour union separately made appeal to the Central Congress leadership for intervention and Rajendra Prasad was given the mandate to fashion the Congress response. This

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[139] The incident was reported in several Indian newspapers like *The National Herald*, *Ananda Bazar Patrika*, *Hindustan Standard*, *Amrita Bazaar Patrika* which helped mobilising public opinion.

[140] Abstract of a meeting of the Congress held at Thana Maidan, Lumding, June 1939, Abstract of Intelligence, Assam Police, *Political History of Assam*, Record, 1939, ASA.

[141] Report from Lakhimpur, July 1940, Abstract of Intelligence, Assam Police, *Political History of Assam*, Record, 1940, ASA. The labour union demanded active intervention by the government, which the government had failed due to the lack of defined policy. The government failed to take necessary action against the company after the firing incident and it could not pressurise the company from recruiting new workers.

was preceded by difference of opinion between members of the APCC and the Congress led provincial government that shad widened in the aftermath of the firing episode.[142] Prominent Congress leaders like Hemchandra Barua and Bishnuram Medhi were critical of the government handling of the situation. They did not hesitate to express their differences openly in public.[143] At the initiative of Pramanik, the AICC in its Bombay session in June 1939 advised the government of Assam to appoint a conciliation board and to make the board's recommendations obligatory and in case of non acceptance of the board's decision the government of Assam might stop the renewal of the lease of the company.[144]

On the fourth month of the strike, the Assam government, on the recommendation of the AICC, appointed a Conciliation Board, on 26 July, 1939.[145] The Union had demanded that all striking workers should be taken back by the AOC management. The Conciliation Board, in its report recommended that 'All the strikers should be called back on termination of the strike, by discharging the new recruits. The case of these new recruits may be

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[142] The provincial Congress committee demanded the withdrawal of the military from Digboi after the firing, whereas Gopinath Bordoloi was reluctant to withdraw the arm forces calling it impracticable. As such, a section of the Congress leaders had also demanded the resignation of Bordoloi.

[143] Banerjee, *Labour Movement in Assam*, p.176.

[144] AICC papers, Bombay Session, 24-27 June, Proceedings of 27 June, 1939, NMML.

[145] The Conciliation Board was appointed to promote a settlement of the dispute between the AOC and the labour union with the following terms of reference:

i)The time and method of reemployment of strikers under the AOC

ii)to explore the possibilities of settlement regarding any outstanding matters still in dispute between the Company and the union

considered by the Company in making appointments to future vacancies.'[146] However, the AOC management refused to follow the recommendation and the union's demand and stated its position that it would take back strikers only for available vacancies. Pramanik negotiated with Rajendra Prasad and other Congress leaders and with the provincial government. In the meanwhile the war ordinance was promulgated on 3 September 1939 and the Viceroy dispatched troops in addition to the Assam Rifles to take charge of the protected areas of Digboi and Tinsukia and all obstruction with the production and transportation of oil products was prohibited.[147] In such a situation Bordoloi pleaded his helplessness in the matter of reinstatement of the strikers and pressurising the Company to follow the recommendation of the conciliatory board.[148] Taking advantage of the war ordinance the union office was closed down and locked by the Police.[149] Pramanik was arrested under the war ordinance and was deported to Calcutta under police escorts.[150] Upadhyay was forced to leave Fayzabad along with his family leaving properties

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[146] Letter from Jagannath Upadhaya, President AOC Labour Union to Gopinath Bordoloi, Premier and Minister in Charge of the Home Department and to the Government of Assam, 31 March 1949, Digboi, Labour Movement in Assam, *Political History* of *Assam*, 1939,ASA.

[147] *Ibid.*

[148] *Ibid.* Bordoloi asked Pramanik to meet the Governor. Accordingly, Pramanik met the Governor but without any effect.

[149] *Ibid.*

[150] *Ibid.* Also see Banerjee, *Labour Movement in Assam*; Amalendu Guha, *Planter Raj to Swaraj: Freedom Struggle to Electoral Politics in Assam 1826–1947* (Calcutta: People's Publishing House, 1977), p.241.

behind.[151] Many other union leaders were also evicted in the similar way under military and police escorts. Workers were compelled to take whatever was paid by the Company as their 'settlement money' and evicted from their quarters. Around 3,000 workers were compelled to leave Assam in 24 hours notice. The union was also banned from 1939 to 1946. The government of Assam termed the strike as 'lawless law'.[152]

Taking advantage of the war situation the strike and the union was suppressed by the state. However, the spirit of the strike of the AOC Labour Union moved beyond the immediate surroundings. A series of strikes and lockouts occurred at regular intervals in certain tea gardens of Dibrugarh town.[153] In 1938–39, the workers of the ARTC also launched a strike in the Company's establishment.[154] Indeed, the strike at Digboi had a considerable effect on the tea garden labourers in Assam. Under such circumstance, the Indian Tea Association had to set up definite procedures to deal with the wave of strikes in the tea plantations. The Bordoloi government also set up the Tea garden Labour Unrest Enquiry Committee on May 1939 to deal with the

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[151] After leaving Digboi, he worked at a dock factory in Bombay and left Bombay in 1947. Upadhyaya wrote to Congress leaders in 1946 regarding his deplorable plight. He came back to Digboi and again in 1949 wrote to Congress leaders of the Assam government, central government, and the Uttar Pradesh government and to Rajendra Prasad without much effect. Finally, in 1953, he appealed to Nehru to instruct the APCC and the District Congress Committee to consider him as 'political sufferer' and asked for the employment of his sons as he and his family had no source of income.

[152] Jagannath Upadhaya to Gopinath Bordoloi.

[153] Banerjee, *Labour Movement in Assam*, pp.195–196; *Report on the Administration of Assam*, 1938-39, ASA.

[154] Guha, *Palnters Raj to Swaraj*, p. 241.

increasing unrest in the province and the government made it clear that it would not welcome strikes and lockouts and would not hesitate to 'enforce mutual forbearance' as measure of urgency.[155]

Oil Production in Assam after 1947: An Overview

Immediately after independence India focused on the development of heavy industries so that it could move towards rapid growth in energy sector to make 'progresses'.[156] The aim was to set up industries under public sector in the field of minerals, metals, chemical industries, fuel, and transportation. Such industries utilise far more energy per unit of output than agriculture.[157] The faster growth of industries than the agriculture, therefore, resulted in the growth of energy sector. Coal remained an important source of energy, but its share declined steadily, from 82 per cent in 1950 to 69 per cent in 1965.[158] Whereas the share of hydroelectric power increased from 4 per cent to 9 per cent during the same period and the consumption of petroleum rose from 21 million barrels in 1950 to 88 million barrels in 1965, an increasing from 14 per cent to 22 per

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[155] *Ibid*., p.244.

[156] For details, see Partha Chatterjee edited, *State and Politics in India* (New Delhi: OUP, 1996); Ramachandra Guha, *India After Gandhi: The* History *of the World's Largest Democracy* (New Delhi: Picador, 2007); Francine R. Frankel, *India's Political Economy, 1947-2004* (New Delhi: OUP, 2nd edition, 2005); Michael Tanzer, *The Political Economy of International Oil and the Underdevelopment Countries* (London: Maurice Temple Smith Ltd., 1970).

[157] Tanzer, *The Political Economy of International Oil and the Underdevelopment Countries*, p.164.

[158] *Ibid*.

cent.[159] The shift in energy consumption resulted in sharp increase of domestic production of petroleum from 4, 51,000 tonnes in 1960 to 3, 11, 57,000 tonnes in 1986, yet it was not sufficient and the gross import of crude oil increased by 54 per cent during 1970–81.[160] It is to be noted that the oil industry in India, from its time of inception had been dominated by private foreign companies, particularly by the British companies. Burmah-Shell[161] marketed oil in India and the AOC/BOC produced and refined a small amount of crude oil in eastern India. The other major companies were the Standard Vacuum Oil Company and Caltex.

With the growth of growing oil consumption and import of refined petroleum products, India was experiencing a steady increase of oil import bill. In 1950s, to reduce the drain on foreign exchange, India pressurised the oil companies to build up refineries in India.[162] The second important cause for growing pressure on the foreign private companies was the development of

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[159] *Ibid.*

[160] Bishwanath Golder and Hiranya Mukhapadhaya,"India's Petroleum Imports: An Econometric Analysis," *Economic and Political Weekly*, Vol.25, No.42043 (1990), p.2373.

[161] The shares of Burmah–Shell are divided between Burmah Oil Company and Shell Transport and Trading, a branch of the Royal Dutch Shell group

[162] Standard Vaccum built a refinery with a capacity of 9 million barrels per year (1954); Burmal–Shell, a 15 million barrel refinery (1954) ; and Caltex, a 5 million barrel refinery (1957). Though the smaller refineries were not as profitable as the larger ones in the Middle East and Indonesia, the companies accepted to built up the refiners in India because, the companies saw India as a promising growth market for oil, as long as crude oil could be imported from their own sources the change became acceptable and most importantly the companies enjoyed legal protection against nationalisation of oil refineries. See Tanzer, *The Political Economy of International Oil*.

planned economy in India in which the state would control the key industries. One of the features of India's planning was to promote indigenous private sector to have a better control over the economy and to protect and encourage indigenous businessmen who would in turn become a support base of the new government. In 1956, the GOI placed oil in the public sector and created the Ministry of Petroleum and Natural Gas with its operating arm, the ONGC. The other concerns were to secure a share in the management and control of the British and American companies operating in the country, controlling distribution and fixation of prices of oil products.

After 1947 the first major discovery of oil fields in India was at Naharkatiya in eastern Assam. These new oil fields discovered in the north-eastern Assam, was expected to support a production of 2 ½ million tonnes a year, which would be able to supply a third of the country's requirements in the next three years.[163] The immediate concern of the GOI was to form a Rupee company[164] with the AOC and negotiate its share with the AOC and the BOC and to decide upon the establishment of new refinery. The discovery of oil at Naharkatiya was a result of a long series of efforts (investigation) to find oil away from Digboi. Exploration in the alluvial areas of Assam started with gravimeter surveys as far back as 1924.[165] However, the results were more

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[163] *The Economist*, 14 December 1957.

[164] In pre independence India, investment in a company was in terms of Pound and Sterling, after independence the investment was done in Rupees. Therefore, a company which was promoted during the process of transformation of investments from Pound to Rupee in the mid twentieth century was known as Rupee Company.

[165] *Digboi Batori*, April 1954. By the growing interest of the American companies in India, the British Companies intensified their exploration activities in India. In the

closely defined in 1939 by data from seismic surveys, a new development at that time. Due to WW II, the survey had to be stopped and again resumed in 1950s which resulted in the discovery of oil in Naharkatiya. A new road was cut through the jungle connecting Naharkatiya with Digboi and an eight inch pipe line been laid alongside the road to transport crude oil to the AOC refinery.[166] Meanwhile three different types of geophysical surveys, seismic, gravity and aeromagnetic were conducted to find more oil in eastern Assam in the 1950s.[167] These surveys were conducted simultaneously in search for more information about the condition of the earth's rocks deep below the alluvium. To speed up the seismic survey, the AOC, for the first time in India, charted helicopters to take men, materials and instruments to places where surface travel was impossible.[168] The surveys could not find oil by themselves; they can only provide clues to areas in which oil may be found.[169]

1920s, attempts were made for exploration of oil also in western and north western India. Gujarat was one of the important areas in western India. The British government discouraged Indian private entrepreneurs and called in British explorers to study the oil geology of Gujarat. Geological licenses were applied for in Assam, Bengal, Punjab, Rajasthan and Sindh. For details, see Hridaynath Kaul, *Keshav Deva Malaviya and the Evolution of India's Oil Policy* (New Delhi: Allied Publisher Ltd., 1991), p.19.

[166] *Digboi Batori*, February 1954.

[167] When the structure of rocks below the surface cannot be mapped by geological work on the surface, these methods are used. When the rocks are covered by alluvium, sand and silt is laid down by rivers in valley or delta those surveys were conducted. The Brahmaputra valley is such an alluvial demanding these methods of survey.

[168] *Digboi Batori*, February 1954.

[169] The intensity of various geophysical explorations conducted by the AOC in the Brahmaputra valley in 1950s to find out new sources of oil was reflected in a poem by an anonymous poet reproduced below:

The Oil Prospector's Dream

As I lay on my bed with a horrible head
From the echo of seismic explosions,
I trembled and tossed and in dreams I was lost
In a fantasy world of erosions.

No longer a biped – my feet were a tripod
Supporting a guge magnetometer;
For my face – never neater! – a gravity meter;
And, instead of a nose, a barometer.

I struggled to rise, but I found that my eyes
Were weighed down with a ton of barites;
And around me there pressed a seismic crew dressed
In drill collars and 'go-devil' nighties.

They told me to drill where the prospects were nil
In a jungle not shown on the map;
When no oil was found they buried me down
A dry stratigraphical trap.

Hurry here; hurry there, go by land, sea or air;
Helicopters are here to be flawn in.
Don't bother to eat, or keep yourself neat;
Just find oil – or you'll find yourself groanin!

Your "basha" is plonk in the leeches and "ponk"
You sweat and you toil to find rocks bearing oil,
Through ten thousand feet of alluvium.

You drill an you bore and you ream and you core
With geologists snarling about you
"Make fresh calculations," "Get more correlations"-
And whatever you tell them they doubt you

By 1954, the AOC acquired prospecting licenses for Hugrijan, Moran and Naharkatiya extension area on the condition that the mining rights over those areas were to be transferred to a Rupee Company in which India would be an active participant to be formed by 1956.[170] The AOC further applied for exploring and prospecting license over new areas, in Namrup-Manabum area, Darrang area, Lumding area, Jorhat area, BetjanTingrai area, Hugrijan Western extension area and Kakilamukh area in early 1954.[171] Accordingly, Government of Assam recommended the applications of the AOC to the GOI under different letters.[172]

However, under the new industrial policy framed by the GOI in 1956 made the development of mineral oil the exclusive responsibility of the state.[173]

Alas,there's no rest in this petrolic quest-
Day and night I get sadder and sorrier'
Each dawn I wake screaming to find I've been dreaming
Geological phantasmagoria!
Source*: Digboi Batori*, September 1954.

[170] Letter from the Secretary to the government of Assam to the Joint Secretary to the GOI, Ministry of Natural Resources and Scientific Research, dated 12 January 1954, No. RM.63/53/75, APCC, PKT 48, FNo-1, NMML.

[171] Grant of Petroleum Concessions to Assam Oil Company, Digboi, Department Power, Branch Mines, RGM 71/58, 1958, ASA.

[172] *Ibid*.

[173] At the eve of India's independence, the national consensus was in favour of rapid industrialisation, which would lead the country to economic development as well as economic sovereignty. The successive Five Year Plan and the industrial policies revolved around the Mahalanobis model of growth that emphasised on heavy industries and a strong state role. Accordingly, the Industrial Policy Resolution, 1956, was formed which classified industries into three categories. In the first category, there were 17 industries including the petroleum industry that would be exclusively

Therefore, the applications made by the AOC for further leases in new areas to explore oil were reconsidered by the Assam government. Meanwhile, considering this fact and other difficulties like that the areas applied for by the AOC were thickly populated and oil exploration would lead to displacement of thousands of people from their homes and cultivable lands creating the problem of rehabilitation, the Assam government withdrawn its earlier recommendations to the GOI for considering the applications for leases in new areas of the AOC.[174] The AOC tried to convince the Assam government by arguing that the applications for seven out of eight areas were filed during the pendency of the geophysical license and as such the Company had a vested right to obtain prospecting and exploring license over the areas.[175] The government, however, ruled out this position and pointed out that the geophysical license was not a statutory license and it only created certain contractual obligation between the parties, but no vested right in the Company to prospecting and exploring license.[176] Accordingly, the government declined to reconsider the applications of the AOC and the application of the AOC.

The AOC had started experiencing the effects of India's move towards gradual nationalisation of the mineral resources. The Company spelled out its dissatisfaction by pointing out that the government's objections regarding

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under the Government. The second category had 12 industries to be developed by the state with the help of private sector, and the industries under the third category were to be developed by private sector.

[174] Grant of Petroleum Concessions to Assam Oil Company, Digboi, Department Power, Branch Mines, RGM 71/58, 1958, ASA.

[175] *Ibid.*

[176] *Ibid.*

displacement of people from thickly populated areas would apply equally if other parties applied for prospecting and exploring license in those areas.[177] Perhaps, the AOC by other party meant the ONGC of the GOI.[178] The Company demanded that the GOI should make their position clear regarding nationalisation and if the government was moving towards that then the Company should be compensated.

The Indian government in 1956 approved the formation of a Rupee Company to deal with the production and transportation of crude oil from Hugrijan, Moran and Naharkatiya extension area in which India's share would be 33.33 per cent. K.D. Malaviya opposed the government's decision to limit its share to 33.33 per cent in the rupee company, which he considered as a negligent share to prevent the monopoly of AOC over Assam's natural resources. Negotiations started early in 1956 between the GOI and AOC/BOC over the issues of Government's participation in the rupee company, price of

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[177] *Ibid.*

[178] After independence, the development of the hydrocarbon industry was given utmost priority. Until 1955, the exploration of hydrocarbon resource was carried out by private oil companies. As the GOI decided to develop oil and natural gas resources as part of public sector development, the Oil and Natural Gas Directorate was established in 1955 under the Ministry of Natural Resources and Scientific Research. K.D. Malaviya, Minister of Natural Resource and Scientific Research, accompanied by a team, visited countries such as the Unites States of America, West Germany, Romania, and Soviet Union to study their oil industry and to facilitate training of professionals from India. With the help of the Soviet Union, a detailed plan for geophysical surveys and drilling operations was prepared in the Second Five Year Plan (1956–57 to 1960–61). After the Industrial Policy Resolution of 1956, the GOI decided to raise the status of the directorate to a commission under governmental control, so that its power could be enhanced. In 1959, the Commission became a statutory body. The main objective of the ONGC was to develop petroleum resources of the country.

crude mined, construction of a pipeline for transport of crude and mobilisation of foreign exchange resources.[179] Malaviya proposed that GOI should have 51 per cent share in the rupee company as AOC had asked for further permission to explore oil in new areas.[180] However, India lacked financial resources, including foreign exchange to invest on oil in Assam. Yet, the GOI insisted that it should have 51 per cent shareholding if AOC extends its exploration.[181] The AOC then declined its request for more areas with the formation of the rupee company.[182] The AOC urged that the refinery should be an integral part of the rupee company the GOI was against the integration of the refinery with the rupee company) and the shareholding should remain at the ratio of 33.33 per cent and 66.66 per cent. The GOI did not agree to integrate the refinery with the rupee company when its share was so minimal and oil had already been reserved for development in the public sector under the new Industrial Policy, 1956.[183] It was clear if refinery or refineries would be set up under the public sector, AOC would not join such a venture and in such a situation India would require funds and technical assistance.[184] Finally, in 1958 the negotiations concluded in a Promotion Agreement, under which, a joint company, the OIL was to be set up in which the BOC would invest two thirds of the equity and

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[179] Kaul, *Evolution of India's Oil Policy*, p.69.

[180] *Ibid*., p.70

[181] *Ibid.*

[182] *Ibid*., p.71.

[183] *Ibid.*

[184] *Ibid*.

other third by the GOI. The main function of the OIL was to explore and develop oil only in areas already leased out to the AOC.[185]

Conclusion

The formation of the AOC marked the beginning of a successful petroleum industry in eastern Assam. The first batch of kerosene went to the market in 1904. Though the AOC was European in terms of capital and management, yet it had to cooperate and negotiate with the local environment. The company had to depend on the Marwari trading community for the sale of their products. The labourers were recruited from different parts of the country and the company kept the labourers segregated on the basis of caste and community as a policy of surveillance.

After the WWI, the demand for oil increased significantly, which had an impact on the AOC. However, the company to expand its activities lacked capital in terms of finance, technology, and management. As a result, it had to be merged with the BOC. After the amalgamation the refinery in Digboi was modernised with imported technologies from US and UK. On the one hand, the company was being modernised and production increased, and on the other hand, the company experienced one of the strongest labour strikes of India. Though the strike was repressed by the company, it had a profound impact on the labourers of the tea gardens of Assam.

At independence the Indian government aimed at developing its oil resources under the exclusive control of the state. But in the interim period

[185] In case of increase of area under the joint company, the share of government would increase. Accordingly in 1961, the share increased by 50 per cent.

when the emerging Indian federal polity was yet to frame a clear policy regarding its oil resources, the Assam government asserted its right over natural resources and independently negotiated with the AOC and renewed AOC's geological license till 1950. The period witnessed extensive exploration in eastern Assam which resulted in the discovery of the Naharkatiya oil field and opened up new political scenario in Assam.

Chapter 5

Whose Oil is it?

Contest over Petroleum and Crisis of Indian Federalism

The discovery of oil field at Naharkatiya in eastern Assam in 1953 raised a number of issues in the public sphere and unfolded a different political scenario in post independence Assam. Oil being one of the important mineral resources of Assam has played an important role in the politics of Assam and a determining factor in the relation between the centre and the state. The right over petroleum of Assam has been an issue of contention between the central government and Assam in the post-independence India. The discovery of an oil field at Naharkatiya in Assam immediately after independence led to conflicts not only between Assam and the central government, but also between the GOI and the AOC and its equity holder the BOC as GOI planned to nationalise the mineral resources. Though the conflict between Assam and the GOI started over the location of the refinery, the debates in the public sphere and in the ALA raised larger issues like the rights over natural resources, the question of Assam's development, centre's role in it and the relation between the centre and the state. The conflicts over natural resources can be put into the context of capitalism where various agencies attempts to have control over natural resources. At the same time, they are also situated 'within the logic of sovereignty, or rule by command, where the landlord state assumes the right to use, allocate and profit from resources, and exercises coercive control to that

end'.[1] Resource extraction is part of the rule of a sovereign power in accordance with the techno-scientific rationality, which Foucault calls 'governmental'.[2] The extraction and management of natural resources is perceived as a responsibility of the state where the state is supposed to act as 'trustee'. However, various forms of movements intend to contest such the logic of government and question the hegemony of government rationality.

As the West in general and the US in particularly came to view certain conditions in Asia, Africa and Latin America as problems and with the construction of the notion of an undeveloped Third World, many countries in the early post world war period faced with the problem of 'un-under developing' (how to develop) themselves.[3] Escabor attempts to study development as 'regime of representation' over the Third World that guarantees a certain control over it.[4] He defines development as 'institutionalised discourse' used as an instrument of domination and exploitation of the newly decolonised countries. He even argues that 'development is the last and failed attempt to complete enlightenment in Asia, Africa and Latin America'.[5] Thus, development becomes in the words of Tucker a 'myth' which devalues and dismisses the non-western worlds as 'primitive' and 'backward' paving the way for economic, political , social and

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[1] Tania Murray Li, "Situating Resource Struggles: Concepts for Empirical Analysis," in *Contested Grounds: Essays on Nature, Culture, and Power*, ed. Amita Baviskar (New Delhi: OUP, 2008), p. 194.

[2] *Ibid.*

[3]Arturo Escabor, *Encountering Development: Making and Unmaking of the Third World* (UK: Princeton University Press, 1995), p.6.

[4] *Ibid*., p.9.

[5] *Ibid*., p.221.

cultural control of the non western countries by the west.[6] Similarly, W. Sachs states that 'development is much more than just a socio-economic endeavour: it is a perception, which models reality, a myth, which comforts societies; and a fantasy, which unleashes passions'.[7] However, critiques of the post development theorists point towards the reality of poverty and its relation to capitalism, environmental degradation, political exploitation and violence that go beyond the idea of development as 'discourse'. Without denying the importance of the concept of development as 'discourse' and the importance of local politics, we should also take into consideration the material inequalities arising out of complex relation between wealth and distribution. Thus, Baruah argues that 'development discourse is not merely reflective, but also constitutive of the condition of underdevelopment'.[8]

The question of development in Assam was no different from the post-war discourse on development. The feeling that Assam remained one of the most backward provinces in India was so strong that the Assamese leadership continued to show their concern for the economic development of Assam. The question of regional identity in post independence India was involved with the issues of cultural autonomy and economic development. As pointed out by Sathyamurthy the demands of the states for 'equitable distribution of political

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[6] Vincent Tucker, "The Myth of Development: A Critique of a Eurocentric Discourse," in *Critical Development Theory: contributions to a New Paradigm*, ed. Ronaldo Munck and Denis O'Hearn (London: Zed books, 1999), p.1.

[7] Sachs Wlofang, *The Development Dictionary: A Guide to Knowledge as Power* (London: Zed Books, 1992), p.2.

[8] Sanjib Baruah, *Durable Disorder: Understanding the Politics of Northeast India* (New Delhi: OUP, 2005), p.35.

power and privileged access for weaker regions to economic resources are often couched in the language of demands for greater autonomy for the different states and for as more generous investment of central plan resources in remoter regions'.[9] The regions unable to accumulate surplus through agriculture or other industrial and commercial activities have been involved in rebellion against the centre to increase the flow of resources from the centre and to have control over the resources.[10] The central government also perceives the entire North Eastern region a zone which demands special attention. Besides, the concept of 'natural resource' is an integral part of a territory and territory involves questions of indigeneity.

There surfaced a number of socio-political movements in Assam after 1947 which questioned the mega nation building narratives inherent in the industrialisation programmes of the Indian government. At the same time, the conflict between the hills and the plains resulted in the territorial reorganisation of Assam. Immediately after independence, Assam witnessed a number of movements such as the Naga movement for independence, the Mizo movement for independence in the mid 1960s, clashes over language policy in 1960, the food movement of 1966, demand for bridges over Brahmaputra, the movement for refinery and so on. The arguments and rhetoric build up by the movements had a significant impact on the later political developments in Assam. These movements and their leaders contributed in the development of a 'discourse'

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[9] T.V. Sathyamurthy, "Impact of Centre-State Relations on Indian Politics: An Interpretative Reckoning, 1947-1987,"in *State and Politics in India*, ed. Partha Chatterjee (New Delhi: OUP, 1998), p.235.

[10] *Ibid*., p.236.

that reflects upon the neglect of the entire north eastern region by the central government which is still very strong among the people of the region. In this chapter I have particularly looked at the refinery movement and attempted to place it within a larger political context.

The Noonmati refinery movement is one of the earliest movements in Assam that reflects the complex relation between the centre and the state, thereby posing a challenge to the unitary federal developmental state of India. The states after independence raised question on the common nation-state projects as the different post-colonial nations have 'different senses of urgency, deprivation and complacence' as the regions or the communities in the post-colonial India assess themselves on 'a scale of accomplishment naturalised by the developmental state'.[11] In these assessments, the extent and control over nature as resource or heritage became a measure of loss and aspirations. The chapter attempts to study this complex relation of natural resources and Indian development discourse with particular reference to the refinery movements in Assam, which demanded the establishment of the refineries in Assam for economic development of this backward frontier of India. This chapter studies how the discourse of development was linked to refinery movements and how it became part of the sub-nationalist discourse in Assam.

[11] Gunnel Cederlof, and K. Sivaramakrishnan,(Ed), *Ecological Nationalisms: Nations, Livelihood and Identities in South Asia* (New Delhi :Permanent Black, 2005), p.5

Seeking Space for a new Refinery

After the discovery of oil in Naharkatiya in 1953, the AOC recommended for building the new refinery at Calcutta, still an important port city and centre of several leading managing and business houses. On the other hand, the GOI preferred Barauni in Bihar as the site for the refinery. The press and people viewed the selection of Calcutta for the refinery was the AOC's gambit though it was projected to the GOI as the recommendation of the committee appointed to find out the viability of setting up a refinery in Assam.[12] The AOC and the BOC expected to set up the refinery at Calcutta to gain profit like the coast based refineries in Bombay and Vishakhapatnam.[13] A new refinery at Calcutta could sell the products in and around Calcutta and the surplus products could be exported through tankers of the company. To distribute the products beyond Calcutta, the companies would ask concessions or pool their products weakening the GOI in regulating the oil trade.[14] Besides, without oil tankers of its own, the GOI could not compete with the oil companies. Malaviya recognised these weaknesses and was opposed to the location of Calcutta for the refinery.[15]

The GOI favoured Barauni in the state of Bihar as best suitable site for construction of the new refinery.[16] The government presumed that Barauni carries with it several layers of advantages: its products could be distributed in

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[12] H.N. Kaul, *K. D. Malaviys and the Evolution of India's Oil Policy* (New Delhi: Allied Publisher, 1991), p.75.

[13] *Ibid.*

[14] *Ibid.*

[15] *Ibid.*

[16] *Ibid.*, pp.75–76.

the up-country region via Patna-Nagpur-Amritsar, using the favourable transportation system at more favourable rates than Bombay. As a result the Bombay and Vishakhapatnam refineries would be forced to cut down their prices. On the other hand, the price of crude would place the AOC's Digboi at the mercy of the Government, as between Digboi and Barauni, the latter's products would be cheaper. Similarly, the crude price could probably be further reduced on production touching 5 million tonnes. That would make then government refineries more profitable. Besides those considerations, the strategic position of Assam as a frontier province had also influenced the government to set up the refinery outside the state. The concern over security and defence of the borders might have influenced the decision of the government.

The decision of the GOI to establish the refinery at Barauni was challenged unitedly by the Assam government and most political parties representing the hills and the plains. In 1956 the AAORAC was formed under the leadership of Hareswar Goswami and Hem Baruah, both leaders of the Praja Socialist Party to mobilise people to protest against the government's decision. Rev. J. J. M. Nichols Roy representing the hills supporting the cause stated:

> …we in Assam, naturally expect that when this oil is found in the wells of Assam, the refinery should also be in Assam. That is our natural feeling that when we have the source of oil wealth in the state, we have the right to claim that the processing of crude oil also should be in

> Assam…We the people living in the Hills or Plains of Assam feel strongly that this refinery should be located in Assam[17]

The Action Committee in the next few months spearheaded a popular but united movement pressing the GOI to redefine its policy which is being discussed below.

The Refinery Movement (1956-57): Contesting Development Paradigm

Against the decision of setting up the refinery outside Assam, there was a popular mass protest in Assam. One of the moments of catalyst of this movement was a resolution passed by the ALA on 3 April 1956 demanding that the refinery should be established in Assam. However, no definite assurance was given by the Indian government. The people in Assam saw the government moves as being influenced by the British oil interests. Gaurisankar Bhattacharya, an MLA and leader of the Communist Party of India in Assam stated that 'the oil company in Assam has got a link with the oil kings of the world, and, therefore, we have been seeing that in their own interest the oil kings have been from the very beginning trying to have the refinery outside.'[18]

The first widespread protest for the refinery in Assam took place on 28 August 1956. The movement was jointly spearheaded by the opposition party and the AAORAC. On that day, both the opposition and AAORAC gave a call for strike. While the strike was successful, there were public meetings followed

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[17] Speech of Rev. J.J.M. Nichols Roy, Budget Session, ALAD, Vol.I, No.8 (1957), p.505.

[18] Speech of Gaurisankar Bhattarcharyya, Budget Session, ALAD, Vol I, No.8 (1957), p.489.

by street march in most parts of Assam.[19] Shops, schools, colleges, and offices remained closed and in some places the volunteers were also involved in picketing.[20] Both government owned transport, and the railway services had come to standstill. In Nagaon, local skirmishes took place between police and protesters.[21] In Guwahati, the police resorted to *lathi* charge and also used tear gas to disperse the protesters.[22] The police arrested 306 people at the end of the day.

The events of 28 August were highly debated in the floor of the ALA. The ruling Congress party criticised the strike as unnecessary and violent. The Chief Minister, Bishnuram Medhi termed it as unjustifiable, which 'degenerated into various offences and crimes involving violence and breach of peace'.[23] Medhi reminded the house that the GOI had not accepted the AOC's advice to set up the refinery at Calcutta and assured that the government was equally considering the question from Assam's point of view. Medhi criticising the role of Hareswar Goswami, leader of the committee argued that, 'a vital question like the location of an oil refinery could not be decided on the streets, it had to be decided only after a cool and dispassionate deliberations'.[24] The unfolding crisis in Assam was communicated to the Indian Prime Minister, Jawaharlal Nehru who opined that 'the question of refinery in Assam could not

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[19] *Natun Asomiya*, 29 August 1956.

[20] *Ibid*.

[21] *Ibid*.

[22] *Ibid*.

[23] Speech of Bishnuram Medhi, ALAD, Vol.II, No.18 (1957), p.1464. Bishnuram Medhi called the *hartal* the politics of the left to fetch votes in the next election.

[24] *Ibid.*

be resolved through violence; it should be decided only on the basis of feasibility'.[25]

The opposition fiercely contested the Assam government's contention. Hareswar Goswami argued that the *hartal* was peaceful except in Guwahati and Nagaon and the violence in these two places was the result of the overreaction of the police and the administration. While justifying the strike, Goswami pointed out that just one day before the strike, he met K.D. Malaviya to discuss the cause of Assam having a refinery. Malaviya in that meeting stated that the possibility of setting up a refinery in Assam was only 1 per cent, which according to Goswami was not a satisfactory proposition. Goswami defended the strike by arguing that:

> We organised this strike not because that we feel that this refinery, if established here in Assam will bring a millennium but the people had begun to feel, and too with plausible reason, that Assam had been persistently neglected by the centre, industrialisation of our state had been sadly delayed, and all our efforts to the Centre the urgent needs and demands of our country proved to be a cry in the wilderness , that the people have taken resort to the only way left open to them and when such negligence and indifference became no longer possible to bear , the strike was the logical consequence. [26]

The popular pressure and back-door negotiation by the Assam government with Delhi resulted in the GOI's decision to appoint an expert committee to resolve

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[25]*Natun Asomiya*, 20 September 1956.

[26]Speech of Hareswar Goswami, ALAD,Vol.II, No.18 (1957), p.1479.

the question of the location of the refinery.[27] An eleven member expert committee to be headed by S. Basistha, advisor to the Indian Ministry of Railway, apart from one representative from France and Romania, was formed towards the end of September 1956 to look into the subject. The issues to be examined by the committee were: to set up at the place of the oil field or, to set up at a place near to the place of the oil field or, to set up at a centre where oil would be used, and to set up at a place from where oil could be supplied easily to the countries using oil. Besides those considerations, the committee had to take under consideration the necessary transport facility, the cost of acquiring the raw materials needed for the construction of the refinery, the cost of the transporting the refined oil and other petroleum products from the place of the refinery, availability of land, labour, capital and security.[28]

Though the formation of the committee came as a relief to the troubled state, protesters were apprehensive about the outcome of the committee, as reflected in the editorials and letters to the editor of the Assamese newspaper. Medhi wrote strongly against the inclusion of members from the AOC, while excluding representatives from the state government of Assam.[29] Many pointed out that most of the members, including the president and the secretary of the committee were government officials and the ranges of issues to be looked at by the committee were technical issues without considering the demands of

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[27] *Natun Asomiya*, 28 September 1956.

[28] *Natun Asomiya*, 29 September 1956.

[29] Letter from Bishnuram Medhi to G.B. Pant, Union Home Minister, New Delhi, dated 11 September 1956, Shillong, Revenue (G) Department, Branch – Mines , RM 93/55, Part II, ASA. The GOI subsequently agreed to include nominated representative from Assam.

Assam.[30] On 18 October 1956, a group of representatives from the Action Committee met Nehru, during his visit to Assam. The delegation also told Nehru that the expert committee should have been appointed on the basis of establishing the refinery in Assam and the objectives of the committee should have been to find out the ways to do away with the problems on the way of setting up the refinery in Assam.[31] The technical and commercial angle of setting up of the refinery had already been discussed by the AOC and Assam had already protested against it.

The movement did not stop with the *hartal*. The Assamese press landed full support. When Nehru visited Assam on 18 October 1956 several hundred people demonstrated their demands by standing along the road with posters in hand with the slogans—*Tel Sodhanagar Asomot Laage*, *Asomor Udyogikaran Hoboi Laagibo*, and *Asomor Daabi Maaniboi Laagibo* (The Oil Refinery must be in Assam, Assam must be Industrialise. and Assam's Demand has to be recognised…*translation mine*).[32]

By June 1957, the Indian government decided to set up the refinery in Barauni against the popular demands of Assam.[33] This was sure to raise further political outburst in Assam. As a result all the members of the ALA came together to stand by the cause in 17 June 1957.[34] The assembly was convinced that the refinery was even technically and commercially possible in Assam. The members argued that the refinery was essential for the economic

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[30] *The Assam Tribune*, 29 September 1956.

[31] *Natun Asomiya*, 20 October 1956.

[32] *Natun Asomiya*, 19 October 1956.

[33] *The Assam Tribune*, 18 June 1956.

[34] *Natun Asomiya*, 18 June 1956.

development for Assam as it would generate petroleum based industries, employment in the region, and improve railway transportation. Regarding the socio-economic impact that the refinery could have in Assam, Biswadev Sarma who represented the Balipara legislative constituency, quoted from an observation made by Mr. Kinch, the Personal Adviser to the Iraq Petroleum Company:

> The oil industry has introduced into the middle-east an economic factor of immense possibilities. It has directly affected the economy of the region by bringing in modern technology, developing wage earning employment and improving the occupational skills of the local population ;similarly the large sums invested on the spot for prospecting, working the oil fields and transporting and refining the oil have greatly improved conditions in areas that were formerly little more than desert. Indirectly, where the govt. has invested wisely, the wealth produced by the industry in the form of royalties has made it possible to undertake major development works.[35]

Sarma, thus emphasised the possibility of economic growth of Assam through the establishment of the refinery. It was necessary for the economic self assertion of Assam. Besides, it was Assam's legitimate right to have the refinery as what was going to be exploited was Assam's natural resource. The question of the refinery did not remain simply an economic issue; the question of defining rights over one's own resources got entangled with it. Echoing such a sentiment Hareswar Goswami strongly argued:

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[35] Speech of Biswadev Sarma, Budget Session, ALAD, Vol.I, No.8 (1957), pp.479 – 480.

> ...This may be called a parochial view. If it is parochial, I will suffer to be parochial rather than to live in a house where I have no rights over my belongings. This is a question of regional development and we stand by it…Assam must have the oil refinery which is its natural abode.[36]

Outside the assembly and the press, protest meetings and processions in all the districts of Assam drew huge popular participation. It will be too early for me to speculate the nature and class composition of those who came to participate. Encouraged by such popular response, the Oil Refinery Action Committee held a successful meeting on 28 and 29 June. The conference was presided over by Hareswar Goswami. The conference criticised the Indian government for denying Assam's right to have the refinery and announced a two phase programme for a mass struggle starting from 28 July.[37] Hem Baruah, Member of Parliament from the Praja Socialist Party and a vocal leader with his great oratory skill emphasised the need to publicise the movement in the villages to make the movement successful.[38]

In the conference mentioned above, the plan of action for the first phase of the movement was formulated. To protest against the decision of the GOI, the committee asked all the members of the ALA not to participate in the assembly on 1 and 2 July. The Committee also asked the people and the ministers not to participate on the inaugural function of Umkro Hydro-Electric project to be held on 9 July 1956. On the other hand, the committee asked all the elected representatives from Assam to the parliament, to boycott the

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[36] Speech of Hareswar Goswami, ALAD, Vol.I, No.8 (1956), p.486.

[37] *Natun Asomiya*, 30 June 1957.

[38] For different speeches of Hem Barua, see Deepak Kr. Das, *The Fearless Democrat: Hem Barua* (Guwahati: Bhabani Books, 2010).

parliament session on 15 July 1957. On the same day, the committee proposed to hold meetings throughout Assam demanding the refinery in Assam. The resolutions of those meetings would be sent to the Indian Prime Minister and the Ministry of Oil and Petroleum.

The second phase of the movement had encompassed more organisational and structural programmes. For instance, the members of the ALA and the Parliament were asked to resign according to the Action Committee's resolution. The Action Committee also decided that from each subdivision 500 volunteers would be mobilised before 28 July, as there would be a general strike on 29 July. The Action Committee also pledged to establish its branches in each districts and subdivisions.[39] It was also established that all the members of the Action Committee would visit these branches explaining the future programmes of the committee. A central fund would be created by collecting Rs. 1000 from each subdivision of the province.[40] To popularise the movement, bulletins and pamphlets needed to be published and distributed. But more importantly the Committee requested the people to do picketing in the government offices.

Soon several branches of the Oil Refinery Action Committee were established in all the districts and subdivisions in Assam.[41] These branches were active in mobilising both *satyagrahis* and other resources for the movement. The *satyagrahis* needed to register themselves and then the record of the registration was sent to the provincial action committee. In the

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[39] *Natun Asomiya*, 18 July 1957.

[40] *Ibid*.

[41] *Natun Asomiya*, 20 July 1957.

meanwhile, the central government became concerned about the forthcoming general strike on 29 July 1957. The GOI asked the Assam government to look after the security of all the central government offices and the office of the Digboi refinery.[42]

On 29 July 1957, a general strike was observed throughout Assam.[43] In Guwahati, except the office of All India Radio, all other offices (both central and state), schools and colleges, shops, transportation were closed. The offices of the newspapers too observed partial strike in support of the movement.[44] In the railway station no officers turned out and the volunteers did not need to go for picketing.[45] The strike was a success in all parts of Assam and in the Digboi refinery, the various plants, drilling, and boiler all remained closed.

The AAORAC, after the spectacular success of the general strike on 29 July decided to carry on the movement by starting a *Satyagraha* from 14 August particularly in the areas around the oil fields and in Shillong and generally in the other districts.[46] In the first week of August, training centres would be opened to train the *satyagrahis*. The Assam government asked the Action Committee to withdraw the *satygraha* as the GOI had come forward to reconsider the cause of Assam. The committee refused to withdraw and was determined to carry on the *satyagraha* till the GOI came with its decision. By

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[42] *Natun Asomiya*, 22 July 1957.

[43] *Natun Asomiya*, 30 July 1957.

[44] *Ibid*.

[45] *Ibid*.

[46] *Natun Asomiya*, 2 August 1957.

4 November around 1000 *satyagrahis* were arrested in different parts of Assam.[47]

Meanwhile, the GOI decided to prepare separate plans for Assam and Barauni to study the feasibility of establishing the refinery against its initial plan of having only one plan for Barauni.[48] The American Foster Wheeler Corporation was asked by the GOI to advise the Planning Commission. The Indian government, after tremendous pressure from the Assam government and popular demand decided to establish two refineries, one at Noonmati in Assam and the other at Barauni in Bihar under the public sector.[49]

The decision of the GOI to build two refineries and two pipe lines to carry crude from the oil field to the refineries was against the suggestion made by the American firm IMPETCO (International Petroleum Consultants).[50] The consultants pointed out that since the Assam oil contains very high level of wax, it would require larger and more costly pipelines than most crude. In order to save substantially, it was suggested to build another refinery near the oil fields and then to carry the refined products through the pipelines to a central distributing point.[51] The BOC asked the GOI to endorse the

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[47] *Natun Asomiya*, 4 November 1957.

[48] *Natun Asomiya*, 27 July 1957.

[49] To establish the refinery at Narengi in Guwahati around 4,000 acres of land was acquired which led to the displacement of 1446 people. Most of the displaced people settled around *Ajuri* forest in Nagaon and they have even named the village as *Narengi.*

[50] IMPECTO was employed by the BOC as pipeline consultant to the OIL.

[51] The Financial Times, 16 August, 1958.The one refinery would have been cheaper on capital and running cost. According to IMPETCO such a project would save capital around $14 m, on pipe lines alone.

recommendation of the IMPECTO and made it clear that the BOC would provide 10 million pound in any case whether the pipelines were to carry crude or refined products.[52] The GOI did not consider the advice and decided to follow their earlier decision of building two refineries.[53] The BOC approached the GOI with a proposal of raising loan for the construction of the refinery in London on behalf of the Indian government on the condition that the BOC would be allowed to run the refinery till the loan was paid off.[54] The GOI was, however determined to run the refinery by them. The GOI did not consider the offer of the BOC and was negotiating with Rumania for aids. The Commonwealth Relations Office[55] was worried about the growing influence of the Soviet Bloch as reflected a report which states:

> …it is not in our interests politically and economically that India should become too deeply in debt to the Soviet bloch. If India is determined to push ahead with her industrialisation regardless of piling up external debt, then our attitude should be one of understanding and we should give as much help as we can. It is better that they be in debt to us.[56]

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[52] Commonwealth Relations Office to P. Gore-Booth, dated 31 July 1958, No.EC.1180/5/9, South-East Asia Department, DL1531/6, 1958.

[53] *Ibid*.

[54] Assam Oil Refinery, Minutes by J Doyle, Foreign Office, South East Asia Department, DL1531/10, 1958.

[55] Commonwealth Relations Office was a British Cabinet office which functioned from 1947–1966 to deal with British relationship with the members of the Commonwealth Nations (mostly ex–colonies of Britain). The office was merged with the Secretary of State for Foreign affairs in 1968. The office was part of the effort of Britain to keep political and economic relations with its former colonies.

[56] *Ibid*.

Several meetings were held between the Commonwealth Relations Office and the BOC on the issue of the refinery in Assam. When the BOC decided not to go further on the refinery issue the Commonwealth Relations Office insisted the Company to further negotiate with the GOI and pointed out that there was a possibility of 'muddying the water' so that the BOC could buy time for an alternative plan.[57] H.A.F. Rumbold, Deputy Secretary in the Commonwealth Relations office advised the BOC to form an Anglo-American consortium to raise capital which would be able to offer credit to India in the lines of the Russian Bloc. RP Smith, Joint Managing Director, BOC reiterated that like the West, the consortium too could not compete with the Russian credit terms and for a Company the commercial considerations were of more importance than the national ones.[58] The Office wanted atleast one refinery to be built by the British capital; however, it was becoming clearer that even if the refineries were built by the Western interests they would be run by the technicians from the Soviet Bloch.

The Movement Continued

The demand for a second public sector refinery in Assam soon came into the forefront leading to another popular movement. On 24 March 1969, the first

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[57] Letter from H. Rumbold, Commonwealth Relations Office to R.H. Owen, export Credits Gurantee Department, dated 11 July 1958, No.EC.11800509, DL153103, South-East Asia Department, 1958.

[58] Note of a discussion in Rumbold's room on 13 March 1958, Letter from H. Rumbold, Commonwealth Relations Office to R.H. Owen, export Credits Gurantee Department, dated 11 July 1958, No. EC.11800509, South-East Asia Department, DL153103, 1958.

phase of the movement started by the *Sadou Asom Tel Sodhanagar Sangram Parishad* (The All Assam Oil Refinery Sangram Parishad) by observing mass fasting throughout the state. The protest was to be held before the district and sub divisional head quarters. The 44 members of the opposition party decided to support the Sangram Parisad by demonstrating a strike in front of the Assembly on 24 March.[59] MPs, Hem Barua and Dhireswar Kalita and Jahanuddin Ahmed resorted to hunger strike and *dharna* in front of the Union Oil and Petrochemical Minister, Triguna Sen's residence at New Delhi.[60] The ALA also took the resolution in favour of the refinery and placed their demand to the GOI.[61] The GOI decided to form an expert committee to review the demand.[62] The ALA on 24 March 1969 unanimously passed a resolution extending its support to the demand for locating a second refinery in Assam. The minister in charge of industries, Government of Assam, Biswadev Sarma argued:

> Whereas the establishment of a second public sector refinery in Assam is the unanimous demand of the people and the government of Assam on

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[59] *Dainik Asom*, 25 March 1969.

[60] *The Assam Tribune*, 25 March 1969.

[61] *Dainik Asom*, 25 March 1969.

[62] The government of Assam demanded that the primary concern of the committee should be on the availability of crude oil rather than on the techno-economic feasibility. But the government of India's insistence on the study of the techno-economic viability and granting of the extension of another two month to the expert committee without consulting or informing the state government created an environment of apprehension and dissatisfaction in the state. The state government was also not informed about the terms of reference of the committee. The committee rejected the feasibility of second refinery in Assam on the grounds that the market demand for petroleum products was not sufficient in Assam.

> grounds of removing regional imbalances, on grounds of accepted principles of establishment of industries on the availability of the raw materials where found and on real and legitimate aspirations of the people of the whole state.[63]

On 20 February 1969, the Prime Minister, Indira Gandhi at Delhi reflected upon the serious limitation of resources infront of the seven men delegation representing the youth and students of Assam.[64] On the other hand, Bimala Prasad Chaliha, chief minister of Assam drew the attention of the GOI about the growing mass movement over the question of the second refinery in Assam.[65] On 27 July 1969, at a conference at Nagaon it was decided to resort to mass *satyagraha* from 15 September for 15 days.[66] For the purpose about 10,000 volunteers were being recruited.[67] The demonstration of protest was to be in front of the office of the district commissioner of every district, office of the sub divisional officers in every sub division and the office of Oil India and the ONGC. The students of University and colleges of Guwahati were to boycott their classes as part of the protest. Till the 15th day of the Satyagraha around 1, 80, 000 supporters were arrested[68], yet no incidence of violence had been reported. The faith on democratic and non violence movement was alive.

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[63] *The Assam Tribune,* 25 March 1969.

[64] *The Assam Tribune*, 22 February 1969. In the assembly the opposition also called for a motion of no-confidence against the council of ministers headed by B.P. Chaliha on the issues of the establishment of the third railway division in Assam, the second oil refinery and expansion of railway from Jogighopa to Gauhati.

[65] *The Assam Tribune,* 20 March 1969.

[66] *Dainik Asom*, 28 July 1969.

[67] *Dainik Asom*, 15 September 1969.

[68] *Dainik Asom*, 30 September 1969.

A new slogan was voiced, *Tej Dim Tel Nidiu* (We will give Blood but not Oil).[69]

During the movement for a second public sector refinery, demand for a petro-chemical complex grew. There was demand to provide the Assamese youth with necessary training so that they could be employed in the refinery. A petrochemical industry could produce several subsidiary products like naphtha, kerosene, diesel, and, ammonia.[70] Expectations grew high that such a multipurpose industry would help develop other peripheral industries. However, on the basis of the expert committee report, the GOI was prepared to expand the capacity of the Gauhati refinery from 0.75 to 1.7 million tonnes along with a petro-chemical complex which could produce only polyester fibre as it would be more economical.[71] The mass movement could finally force the GOI to grant a refinery using LSHS (low sulpher heavy stock). However, the second movement for a refinery could pressurise the central government in 12 October 1970 to announce Rs 100 crores project of a refinery cum petro chemical complex at Bongaigaon in western Assam.[72]

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[69] *Dainik Asom,* 28 September 1969.In one of the editorial, it was argued that in the distant past if a private enterprise could set up a refinery in a remote corner of Assam without having adequate infrastructure then why the government of India could not have refinery in Assam after independence under public sector. If the foreign capital in the nineteenth century could found the rationale behind establishing the refinery then why the centre had been unable to find a rational behind establishing second refinery in Assam. For details, see *Dainik Asom,* 24 March 1969.

[70] *The Assam Tribune,* 7 April 1970.

[71] *The Assam Tribune,* 9 August 1970. As a result there was a peaceful and complete Assam bandh on 2 September 1970.

[72] The conflict over the commercial use of natural resources was not limited to only between the centre and the state. The selection of Bongaigoan in the western Assam

The refinery movements based itself on such issue of development and the right of Assam over its own natural resources. Oil continued to remain a commodity of political importance and a tool for bargaining with the central government. Once again in the early 1980s oil would become a political weapon of the movement launched by the AASU and the AAGSP. The objective of the movement was to expel the 'foreigners', that is, the migrants, particularly from present day Bangladesh.[73] However, the leaders of the movement successfully utilised the natural resource to increase the pressure on

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for the refinery cum petro – chemical complex raised other voices of discontent within Assam. The Sibsagar Jila Sangram Parishad strongly opposed the selection of Bongaigoan as a site for refinery and petro chemical complex and demanded that the whole project should be established in Sibsagar as it is near to the oil field. That refinery and the petro-chemical complex should be located near to the oil fields had been an argument put forwarded by the Assam Government in its demand for the refinery in Assam. For details, see *The Assam Tribune*, 13 October 1970.

[73] The Assam Movement was organised largely outside the party leadership. The organisational support was provided by the AASU, the *Assam Sahitya Sabha* and the AAGSP which were not affiliated to any political party. The movement witnessed mass participation by people. Though the issue of immigration was at the forefront of the movement, Tilottama Misra argues that the economic factors motivated the movement. Misra identifies Assam as a colonial hinterland of India and increasing awareness among people about the extra regional big business in the region being one of the motivating factors. On the other hand, Amalendu Guha argues that the movement was national in form which was not free from chauvinistic and undemocratic tendencies. Monirul Hussain the movement was social movement in which the high caste dominated Assamese middle class played a significant role in shaping its ideology. For details, see Monirul Hussain, *The Assam Movement: Class, Ideology and Identity* (Delhi: Manak Publications Pvt Ltd, 1930); Tilottama Misra, "Assam: A Colonial Hinterland," *Economic and Political Weekly*, Vol. 15, No.32 (1980); Amalendu Guha, "Little Nationalism Turned Chauvinist: Assam's Anti-Foreigner Upsurge, 1979-80," *Economic and Political Weekly*, Special Number, October (1980).

the GOI. There was an oil blockade for almost 13 months starting from December 1979 and a rigorous picketing by the volunteers at the refineries and oil fields which led to disruption in the production of Gauhati and Digboi refineries and a closure of the Bongaigaon and Barauni refineries.[74] From January to May 1981 the estimated loss of crude due to the blockade of oil from the oil fields to the four refineries to be 1.89 million tonnes.[75] The government had to take the aid of the army to take control over the refineries, oil fields and the pipe line.[76] The blockade by the agitators was also imposed on jute, timber, plywood and cane. In protest to the forceful pumping of oil by the state with the help of the army the workers of the OIL resorted to non cooperation movement. While condemning the use of armed forces to pump oil to Barauni, as un democratic interference by the government into a peaceful, democratic mass movement, Profulla Kr Mahanta, the then President of the AASU pointed out that it is now high time that the people of Assam must draw up a program to establish its autonomy over the faith of its resources.[77] The question, who will own the natural resource or what should be the proportion of sharing between the centre and the state of the profit from the commercial use of resources remained an issue of heated debate and discussion. Between late 1970s and 1980s, as argued by Manor, political institutions and parties gradually became unable to redress rationally the social appeals. As a result

[74] *The Assam Tribune,* 5 April 1980.

[75] *The Assam Tribune,* 11 June 1980.

[76] *The Times*, 11 November 1980.

[77] *Dainik Asom*, 5 November 1980.

social groups gave up politics and moved inwards, 'battening on parochial sentiment and whatever internal resources they possessed'.[78]

The Contest over Royalty

The question of royalty over petroleum was also integrated with the Assamese nationalist sentiments and it could not escape from the discourse of Indian government being step mother to Assam's wishes and aspirations. Raising the question of royalty Syed Sadullah, Prime Minister of Assam from 1937–38, in the first budget session held in August 1937 suggested that Assam should be assigned the whole or at least portion of the central excise tax on petrol and kerosene.[79] It is to be noted that much before the emergence of the refinery issue, the peripheral role of Assam in the political economy of India came to be manifested. Nilmani Phookan, member of the ALA from the Congress party representing sentiment of the Assam's loss reminded his fellow congress men that:

> …When our revenue is only 12 corers or so, we give tea duty, oil and excise to the tune of Rs 10 corers to Rs. 12 corers every year to the Central Government. This was the habit of our alien masters who robbed us right and left in the past regarding these duties. Should we tolerate it for all time to come, or we must have courage and stamina

[78] James Manor, "Parties and the Party System", in *State and Politics in India,* ed. Partha Chatterjee, p.105.

[79] Amalendu Guha, *Planter Raj to Swaraj: Freedom Struggle to Electoral Politics in Assam 1826-1947* (Calcutta: People's Publishing House, 1977), p.222.

> enough to say, "You have no right to take away from us 12 annas out of Rs.1,which is quite unjust"…[80]

The amount of the state's share over the profit earned by the petroleum industry remained a contentious issue between the Indian government and the states. For two decades after independence the royalty that Assam received was fixed at Rs.10 a tone. In 1961–62, it was Rs.5 a tonne raised to Rs. 7.50 in the period 1962–67.[81] In 1962 K.D. Malaviya proposed to reduce the rate of royalty on crude oil produced in Assam from Rs. 10.50 a tonne to Rs.4.50 a tonne creating discontent in Assam.[82] This led to series of discussions between Malaviya and Fakhruddin Ahmed, Finance Minister of Assam.

The differences between the centre and the state revealed fundamental questions related to ownership of natural resources. Malaviya contended that the centre has the exclusive right to fix the rate of royalty, whereas Ahmed argued that the constitution has vested the right with the state government.[83] It is worth noting that the BOC, partner of the OIL was provided a guaranteed return of 9.3 per cent on the capital investment and that works out to be Rs.8.50

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[80] Speech of Nilmani Phookan, ALAD,Vol.I, No8 (1953), p.448

[81] *The Assam Tribune*, 8 June 1980.

[82] *The Times of India*, 15 October 1962. The reduction of royalty occurred due to a new method, under which from the market price of crude, the transportation costs from Calcutta to Assam was deducted to calculate the well head value. As a result the well head value reduced to Rs. 48 per tonne and the royalty was fixed at Rs. 4.80 per tonne. The estimated loss of revenue to Assam due to the reduction of the royalty would be Rs. 1.50 crores per annum. For details, see Assam Oil Royalty Dispute, *The Economic Weekly*, 7 July 1962.

[83] *The Times of India*, 15 June 1962.

a tone as royalty.[84] The Assam government also pursued that the centre should not fix royalty unilaterally without consulting with her.[85] It was only after strong opposition that the royalty was refixed at Rs.7.50 and subsequently at Rs.10 against the demand of the state government for Rs.15 a tonne.[86] In 1980 the Assam government once again put pressure on the central government for upward revision of royalty to Rs. 315 per tonne. The State Government argued:

> …oil is a non-replenishable asset the proprietors of the natural resources should be adequately compensated for the oil taken out of the wells. This principle is internationally recognized and followed, and there is no reason why Assam where petroleum is the only mineral found in considerable quantity, should be differentially treated.[87]

The exploitation of the natural resource of Assam by the Indian state as already pointed out in the introduction has been characterised by the ULFA as colonial in nature. Referring to the state's share in the profit from the tea gardens Homen Borgahain's shared similar view. He wrote:

> India is one of the largest tea producing country in the world. Assam alone produces 55 per cent of the total tea produced in India. Assam's total tea production is almost 275 million kilogram produces 20 per cent more tea than the total production of Sri Lanka...Assam have no control over tea. Had Assam received one fourth of the share from the world

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[84] *Ibid.*

[85] *Ibid.*

[86] *The Assam Tribune*, 8 June 1980.

[87] *The Assam Tribune*, 8 June 1980.

> famous tea industry, Assam would never have been regarded as one of the poorest states of India.[88]

Such writings had strengthened the process of narrativising the discourse that the Indian state, on the one hand, had been exploiting Assam, and on the other hand, had not been providing Assam with adequate fund for infrastructural and economic development. However, as discussed in the next section, the indexes of economic development reflect the materiality of Assam's poor performance in economic development.

India's Partition, Assam's Isolation and Debating Development

Along with the division of borders between India and the newly formed country, Pakistan in 1947, the railways in India were also divided between the two. The division of the railways did not create any serious problem in the North West, but in the East, Assam and the northern districts, it disrupted the communication between the north-eastern region and the rest of India with a narrow strip of 12 miles between Nepal and East Pakistan that allowed land transportation. Railway lines and river transportation between West Bengal and Assam ran through East Pakistan. The partition disrupted the complex economic ties that existed between Bengal-Assam-Arakan regions. Schendel calls the partition as 'the political assassination of this regional economy'.[89]

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[88] Homen Borgohain, *Oupenebeshik Susonor Birudhe Asomor Sesh Sangram* (Guwahati: Vintage Bookshop, 1980), p.8.

[89] This region enjoyed a dynamic global economy through its agro-industries producing tea, indigo, jute, silk and cotton textiles. After the partition all the three newly formed states disentangled the economy of the region in order to build up their own national economy. The pre partitioned trade now became illegal and it went

The problem of communication and the transportation of goods became much more difficult for India's north eastern region. There was transit trade between India and Pakistan where till 1965 the transportation of goods was mostly carried out by the railway.[90] Against such circumstances the problem of a borderland further increased the apprehension of the leaders that Assam would leg behind in the race of industrialisation. After independence India took the path of developmentalist state where the state would play active role in developing the national economy. Borderland became the 'economically suspected zone' to be able to attract huge investment and central developmental and infrastructural projects. Whatever projects took place were more because of strategic reasons than the motive of welfare of the borderlands. Assamese nationalists struggled against such context of borderland through its various movements. Centre's approach to the region became overshadowed by security concerns. For instance, the strategic concern significantly influenced to complete the railway link between Assam and rest of India within two years of independence. Ministry of Railways argued in their memorandum to the cabinet that 'the construction of the link cannot be justified only on purely financial grounds, but it is an absolute necessity both strategically and

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underground. However, certain cross border trade that would be profitable for the reconstruction of national economies was supported by the state. For the details regarding how the flow of goods changed its nature, see William van Schendal, *The Bengal Borderland: Beyond State and Nation in South Asia* (London: Anthem Press, 2005), pp.147–190.

[90] It involved the permission to carry goods originated in a country destined for another part of that particular country to take a shorter route through another country.

administratively'.[91] In the objective of the project it was clearly mentioned that the province of Assam needed a direct rail and road connection with the rest of India, for 'political, strategic and commercial reasons'.[92]

The uneven economic development of different regions in India under the British rule continued to be the same under the independent government even after the repeatedly declared goal of the central government and its two important agencies, the Finance Commission and Planning Commission to do away with the regional economic differences. The states that experienced low economic development under the British rule continued to be ranked low in the post independence India. The richer states managed to receive more industrial license, even though the right to distribute industrial licenses rested with the Central government. During 1951–71, around 80 per cent of the licences approved for new industries went to Maharashtra, Gujarat, West Bengal, Tamil Nadu, Haryana, and Delhi. Around one third of the new projects were located in the Bombay-Thana complex.[93] The regional disparities could not be resolved through the central mechanism of resource transfers and industrial planning. The goals of the Five Year Plans was to achieve regional balance by reducing the inter-state differences remained unattained, thus the 'results of planned

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[91] Karnail Singh, *A Complete Story of the Assam Rail Link Project* (Ministry of Railways: Government of India, 1951), p.1.

[92] *Ibid*.

[93] Ausaf Ahmed, "Regional pattern of industrial licensing," *Social Scientist*, Vol.2, No. 9 (1974), pp.14–15. The licensing policy which aimed at achieving regional balance at industrial development failed in the regional dimension. The market forces did play a significant role in the selection of location and the government lacked a strategy regarding balanced regional development.

development' have not been 'in consonance with the national objective.'[94] In an era when India was focusing on industrialisation of the country, the urge of Assam to develop as an industrial region started growing. The rhetoric that the centre neglects Assam, and therefore the economy of Assam had not been developing, grew up over the years. Analyst shows how the comparison of the index of economic development amongst the states or the distribution of industries reflected the 'underdevelopment' of the state. Reflecting upon this rhetoric, Harekrishna Deka, a literary critic of Assam argues that due to the 'distance from the centre' Assam became a non player at national politics and became victim of a political psychology which had failed to 'address micro-level inequalities and needs of a people living in a geopolitical unit away from the centre'.[95]

Petroleum, Nehruvian Development and Assam's Claim

God forbid that India should ever take to industrialism after the manner of the west…keeping the world in chains. If our nation took to similar economic exploitation, it would strip the world bare like locusts.

M.K. Gandhi[96]

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[94] M.M. Ansari, "Financing of the States' plans: A Perspective for Regional Development," *Economic and Political Weekly*, Vol.18, No.49 (1983), p.2077.

[95] Harekrishna Deka, "The Assamese Mind: Contours of a Landscape", *IIC Quartely*, Vol.32, No.2/3 (2005), p.191.

[96] M.K. Gandhi, "Discussion with a Capitalist," Young India, 1928 (December), *Collected Works of Mahatma Gandhi* (New Delhi: Publications division, 1958), p.243.

In the post WWII, the discourse of development in the world was projected as techno-bureaucratic project rather than a political move.[97] Nehru from the very beginning was convinced that the development economics was apolitical and the programme of industrialisation involves planning by experts on rational and scientific grounds. Nehru argued that the location of a refinery was a technical, financial and security question and not a political question. The demand of refinery in Assam by the people and their representatives challenged the apolitical notion of development without questioning the relation between industrialisation and development. The ruling elite in Assam accepted the Nehru's vision of development at the regional level and put the whole issue within the context of India's political economy and the Assam's persistent economic backwardness.

The political framework of the Nehru period was the developmental state, with the state at the centre of the wheel. The Indian state adopted a planned economy within the framework of a mixed economy for the rapid industrialisation of the country. The Indian state put emphasis on capital intensive heavy industries under the public sector, leaving the private sector 'to play a complementary role in the mixed economy'.[98] India received foreign aid between 1955–56 to 1965–66 to build the heavy industrial base in steel, chemicals, machines, cement, and the like. The central government pointed out

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[97] Kalyan Sanyal, *Rethinking Capitalist Development: Primitive Accumulation, Governmantality and Post-Colonial Capitalism* (New Delhi: Routledge 2007), p.156

[98] The model for economic development of India during the Nehru era was guided by P.C. Mahalanobis. The idea was to develop public sector industries in the field of metals, minerals, fuel, power, chemical industries, and machineries. Private sector was to limit itself to the consumer and intermediate goods sectors.

that for the overall development of the nation, it was essential to reduce the economic disparities among the provinces. Central government and its two integral organs, the Planning Commission and the Finance Commission have repeatedly declared that their goal is to achieve balanced regional development. The Finance Commission used the mechanism of resource transfer to the economically weak states to achieve the goal.

In such an economic policy the ruling elite in Assam found their demand as justifiable. The argument put forward by the ruling elite in Assam was that in a state controlled developmental economy, the government's policy regarding the location of the refinery should not completely be guided by commercial concern, but also by the developmental concern of Assam. Hareswar Goswami pointed out:

> Central Government cannot afford to be a Bania, having professed to build up a Welfare state. Even if in cash accountancy another place might bring a little more profit that will have to be sacrificed if the location of the refinery in Assam brings other perceptible benefit to this area.[99]

Till 1967 the Congress was dominating the political scene both at the centre and in the states.[100] During this period the provincial party units of the Congress party were able to assert a large degree of autonomy in relation to the central party. In such a context the Congress led government and party in Assam could also negotiate constantly with the central government regarding

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[99] Speech of Hareswar Goswami, ALAD, Vol. I, No.8 (1957), p.486.

[100] In the 1967 elections, Congress lost power in several states. The Congress vote dropped by almost 5per cent and while in previous parliament it managed 75 per cent of the states, it in1967 managed to win only 54 per cent.

the refinery. This was done through both within federal political principles and democratic movement. The Assam government went to that extent where Dabeswar Sarma, the Finance Minister of Assam, announced on 15 July 1956 that a refinery would be set up in Guwahati under the Assam state government with the help of French technological support.[101] Sarma further contended that the state government would not ask the centre for funds, but would ask to buy share of the refinery.[102] The state government's demand was further strengthened by the popular demand of the people.

Before 1967, the competition and bargaining took place within the Congress party. After the election of 1967, the competition went beyond the party's internal control giving rise to opposition parties and strengthened the role of the dissident Congressmen.[103] Morris-Jones terms it as the emergence of a 'market polity' in India. The centre-state relations became even more competitive. Even under the best circumstances, centre-state relations were marked with strains. The conflicts tend to increase as more and more states witnessed the growth of regional political parties. C.N. Annadurai, founder of the Dravida Munnetra Kazhagam (DMK) asked for a restructuring of the Indian federal system back in 1967, where the centre would enjoy powers relating to defence, foreign affairs, interstate communication, and currency leaving all the residual powers with the states and the federal and the state governments would be completely independent of each other in their respective

[101] *Natun Asomiya*, 13 July 1957.

[102] *Natun Asomiya*, 16 July 1957.

[103] Morris-Jones, *Politics Mainly India* (Bombay: Orient Longman, 1978), p.154.

spheres. Annadurai was not the voice in wilderness, and the Communist Party of India, Marxist CPI (M) also raised the issue during 1967–69. The government of Tamil Nadu commissioned and published the Rajamannar Report which was one of the earliest to deal with such issue.[104] In Assam also contemporary Communist leaders like Phani Bora raised such issues in the floor of the Assembly. He argued that the rights of the states and the relationship between the state and the centre on the issue of finance need to be discussed and transformed.[105] Critiquing the federal structure of India, Gaurisankar Bhattacharya argued that a strong centre is recommended only if the states are equally strong. The centralisation of power has resulted in increasingly harnessing power and resources at the cost of the constituent states. The 'irrational' division of resources has circumscribed autonomy of the states and has curtailed the 'initiative and manoeuvrability of the Finance Minister of the state'.[106] Bhattacharya criticising the growth of a strong centre wrote:

> …the central government by its executive order has created an all powerful colossus –the Planning Commission…Planning has superseded the federation and the country is functioning in more and more in a unitary system…Even the state plans are to be prepared in the light of

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[104] The Rejamannar Committee Report was the first such report published by state government which was highly critical of the centre –state relation. Both Tamil Nadu and West Bengal focused on politicising the issue of centre state relations both within and outside the states. For details, see Assema Sinha, *The Regional Roots of Developmental Politics in India: A Divided Leviathan* (Bloomington: Indiana University Press, 2005), p.126.

[105] *Dainik Asom*, 15 March 1969.

[106] ALAD, Vol. I, No. 16, 1975.

> the particular targets suggested in the draft plan prepared by the Planning Commission… [107]

Bhattarcharya recommended widening up the tax base of the states so that their autonomy could not be curtailed and that there should be special provisions of legitimate share for states like Assam of the income from tea and oil. He further argues that the public borrowing programmes of the central government and the states should be coordinated and regulated as the centre and the advanced and the rich states like Gujarat, Maharashtra and West Bengal could float large scale loans without much difficulty. Advocating decentralisation which was to Bhattacharya important for sustaining multiculturalism in India, wrote:

> Healthy regionalism and recognition of legitimate needs and aspirations of the multicultural peoples of India is the positive basis for all India unity. Reduction of states to the position of political non-entity generates frustrations, bitterness and negative regionalism. Strong states are not contrary but complementary to the strength of the centre.[108]

The refinery movements in Assam can also be located in the inherent contradiction of unitary federalism in relation to large central projects or trans-regional projects whose implementation have been hindered by the democratic process. As the institution of planning was located outside the representative politics, the planning could be used as 'a positive instrument for resolving conflict', with the universal goal of the planning, that is, the welfare of the

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[107] Gaurisankar Bhattacharya, *Assam: An Epitome of India* (Guwahati: Nava Diganta, 1999), p.70.

[108] *Ibid*., pp.52–53..

people of the nation.[109] The conflict between the whole and the part (the conflict can be class conflict, centre-unit conflict) continued even after rigorous planning. The refinery movements of Assam reflect the conflict between the centre and the unit over a programme of a planned capitalist development.

In the nationalist discourse it was argued that the Industrial Revolution in England and the large scale machine based production resulted in India's backwardness and poverty. However, immediately after the independence, India embarked upon rapid industrialisation through planning.[110] The post-colonial state attempted to separate the rhetoric of industrialisation from the nationalist politics by projecting the planning institution as apolitical which is committed towards rationality, science and progress.

Nehru argued that it was not industrialisation which was responsible for India's backwardness. It was the colonial context of industrialisation which was responsible as the dispossessed masses were never rehabilitated. Nehru was convinced that in the post colonial India the dispossessed masses could be rehabilitated and thus, the masses would equally enjoy the benefits of industrialisation. Nehru's vision was challenged by Gandhi as he argued that industrialisation irrespective of its context would dispossess the toiling masses. It was Nehru's vision that was accepted in the post-colonial India and the eradication of poverty and underdevelopment came to be associated with industrialisation through active state interventions. The formation of the planning as a body of experts and its activity as one of technical evaluation of

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[109] Partha Chatterjee, "Development Planning and the Indian State," in *State and Politics in India*, ed. Partha Chatterjee (New Delhi: OUP 1998), p.283.

[110] *Ibid.*

policies became an instrument to resolve the political debate. It was in such established vision of modernisation that Assamese leaders too aspire for industrialisation. The model of development imagined and initiated by Nehru was not questioned by the leaders of the refinery movements and even by the leaders of AASU during the Assam Movement. The fundamental problem raised by the leaders was the uneven distribution of the Nehruvian model of development. The linguistic reorganisation of states and frequent remapping of the nation could hardly resolve the local aspirations for improvement and progress. The central government lacked enterprise in responding to economic, social, and cultural injustice and failed to 'institute a truly representative system of regionally equitable governance'.[111]

India after independence adopted distinctive forms of federalism, in which 'state and national politics have been intertwined' and the balance of powers between the centre and states has 'undergone significant changes over time'.[112] As pointed out by Rudolph and Rudolph federalism in India compared to other federal systems has to deal with 'continuous negotiations' regarding the centre-state relations.[113] The federal structure accepted by the Indian state has been biased towards the centre. Though the growing shift towards

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[111] Jayeeta Sharma, *Empire's Garden: Assam and the Making of India* (New Delhi: Permanent Black, 2012), p.239.

[112] Paul R. Brass, introduction to *Routledge Handbook of South Asian Politics: India, Pakistan, Bangladesh, Sri Lanka, and Nepal* (New York: Routledge, 2010), p.7.

[113] Lloyd I. Rudolph and Susanne Hoeber Rudolph, "The Old and the New federalism in independent India," in *Routledge Handbook of South Asian Politics: India, Pakistan, Bangladesh, Sri Lanka and Nepal*, ed. Paul R Brass (New York: Routledge, 2010), p.147.

pluralism, regionalism and decentralisation has undermined the role of the centre, yet the centre has retained significant power to influence the politics of the states. The centre has significant command over the vast resources due to its continued dominance over revenue collection. As a result, the centre plays significant role in distribution of funds and sponsoring developmental projects in the states. The relationship between centre-state depends on negotiations, bargaining power and the 'relative political weight of particular states in national politics'.[114] The bargaining process between the states and the centre till 1967 was within the framework of the Congress party. The differences between the states and the centre over various policies were resolved like a 'family quarrel'.[115] The linguistic reorganisation of the southern states and the Bombay province during 1950s and 1960s was carried out through 'mediation and arbitration between the contending linguistic-cultural forces'.[116] However, by the 1980s, the southern states and Punjab started demanding for greater autonomy and in the case of Punjab, the demand took a violent turn. The then Prime Minister, Indira Gandhi appointed R.S. Sarkaria, Supreme Court Justice to enquire into the centre-state relations. The Sarkaria Commission looked at the issues like financial dependence of the states on the centre, the role of the governor and president, and the appointment of the judges of the high courts by the centre. The commission recommended a strong centre 'to preserve the unity and integrity of the country' and to enhance 'cooperative federalism'. The

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[114] Paul R Brass, Introduction to Routledge Handbook of South Asian Politics, p.8.

[115] Robert L. Hardgrave Jr. and Stanley A. Kochanek, *India: Government and Politics in a Developing Nation* (Boston: Wadsworth Publishing, 1999), p.150.

[116] Paul R. Brass, *The Cambridge History of India: The Politics of India since Independence* (New Delhi: Foundation Books, second edition 1994), p.174.

Indian state has been responding to the demands for greater autonomy and separate statehood along the lines of language, ethnicity, tribe and distinct culture without addressing the issue of federal relation between the states and the centre in a comprehensive manner.[117] The response to the challenges faced by the nation after the 1980s was either dealt with heavy military force or by creating alliances with collaborationist lobbies. The autocratic methods used by the centre to deal with the centre-state relations and to regionally based movements like that of the AASU is reflected from the fact that the government used armed forces and other coercive measures and resorted to President's rule to subdue democratic dissent.[118]

The distribution of power between the centre and the state under the federal structure adopted by the post colonial Indian state had been questioned by the members from Assam in the Constituent Assembly.[119] Echoing the sentiment Kuladhar Chaliha argued that:

> If you suspect the provinces and take greater powers for the centre it will only lead to undesirable results. You are doing something which will have a disintegrating effect and will accentuate differences instead of solving them. If you take too much of powers for the centre the province will try to break away from you.[120]

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[117] Hardgrave Jr. and Kochanek, *India: Government and Politics in a Developing Nation*, p.154.

[118] T.V. Sathyamurthy, "Impact of Centre-State Relations on Indian Politics,"p.258.

[119] Girin Phukan, *Assam: Attitude Towards Federalism* (New Delhi: Sterling Publishers Pvt Ltd, 1984), p.83.

[120] Quoted from Phukan, *Assam: Attitude*, p.84.

The members from Assam represented the sentiment of the Assamese elite that put emphasis on a federation in which the power of the centre would be limited and the units should be accorded maximum possible autonomy.[121] The limited financial autonomy of the states has been an issue of contention and it was raised by the Assamese elites. In 1949 The *Assam Tribune*, argued that Assam's financial position became so precarious that she could not afford any institution or scheme which could bring about cultural and economic advancement of the province'.[122] Even about the residuary powers of the centre, *The Assam Tribune* reported that:

> The present tendency on the part of the Constituent Assembly is to rob the provinces of autonomy as far as can be done. The first resolution of the Constituent Assembly defined the status of the federating units and wanted to leave the residuary powers with them. It is true that the resolution was adopted as a concession to Muslim league demand and in the changed political circumstances; residuary powers are to be left to the centre so that we may have a strong Union Government. But it should be borne in mind that India is going to have a federation and not a unitary type of government. It cannot be denied that India presents very few characteristics of homogeneity and cannot therefore, be integrated simply by a stroke of pen or show of hands of the majority.[123]

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[121] *Ibid*. *The Assam Tribune* called the division of power between the centre and states as 'unbalanced'. *The Assam Tribune*, 20 June 1949.

[122] *The Assam Tribune*, 24 December 1949. In such context Rohini Kumar Choudhury demanded that 'economic and social planning of a province or a state must be left entirely to the state legislature itself' in Constituent Assembly Debates, Vol IX, p.951.

[123] *The Assam Tribune*, 6 December 1948. On the similar lines Omeo kumar Das argued that 'I feel today that in our anxiety to strengthen the centre we may be

The voice raised by the Assamese elite, however, could not influence the centre and the Indian state adopted a 'quasi federal' constitutional arrangement. With a sense of despair, Congressman Rohini Kumar Chaudhury lamented:

> We have nearly come to the end of these List I and II, and what do we find? What we find is that the position of the states is no longer states or provinces but they have been reduced to the position of Municipal and other local bodies.[124]

Mahanta points out that the challenges posed by the states to the Indian are the result of the application of 'colonial state system with its monolithic credo and unitary administrative structure on the deeply divided multicultural society'.[125] If the federal structure of Indian state would have provided the provinces with greater economic autonomy then probably the continuous mainstream Assamese discourse of centre's indifference towards Assam would have taken a different nature. We can see that in the pre-independent Assam, particularly in the late nineteenth century and the early twentieth century, the Assamese nationalists blame themselves for their backwardness. Kamalakanta Bhattacharya (1855–36), leading literati of Assam and the president of the *Assam Sahitya Sabha*, 1921, representing the nineteenth century Assamese nationalistic views on Assam's backwardness argued that it was the laziness,

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adopting the policy of strengthening the centre at the cost of the provinces. But we should not weaken the provinces' in Constituent Assembly Debates, Vol. V, p. 100.

[124] Constituent Assembly Debates, Vol IX, p.951.

[125] Nani Gopal Mahanta, *Confronting the State: ULFA's Quest for Sovereignty* (New Delhi: Sage, 2013), p.291. According to Mahanta, Assam had to struggle against the Indian state for issues like resource control, protection of identity and citizenship, and economic development. Such apathetic attitude along with divisive policies had given birth to militant group like the ULFA. *Ibid*., p.296.

lack of entrepreneurship and the indifference on the part of the Assamese educated class to spread their knowledge in the vernacular language had contributed towards Assam's backwardness.[126] Jyotiprasad Agarwala or Ambikagiri Roychowdhuri in different ways imagined a nation of which Assam is a part and the rhetoric of indifference and neglect was not part of the narrative on the relation of Assam with the rest of India. The narrativisation of the rhetoric of neglect has been both enabling as it helps in articulating the problems of the region and obstructive, as it has become almost a frozen knowledge making it difficult to go beyond it.[127]

The period after India's independence witnessed growing regional aspirations in other parts of the country. The failure of the promises made by the Congress party of rapid industrialisation and reduction of regional disparities was 'successfully used by all the opposition groups, radical and conservative, regional and communal, to disintegrate the policies for democratic socialist reforms'.[128] The linguistic movement by the Telegu speakers for the autonomy of Andhra country and the movement for unified state of Maharastra with Bombay as its capital were other strong movements of 1950s leading to the redrawing of the country against the will of Nehru.[129] The

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[126] Bhattacharya, K., "AsomiyaJati Kiyo Tal Pora? (Why is the Asomiyajati backward?)," in *Kamalakanta Bhattacharya Rachnawali*, ed. P. Goswami (Guwahati: Assam Praksan Parisad, 2007), p.128

[127] Nandana Dutta, "Narrative Agency and Thinking about Conflicts," in *Beyond Counter-Insurgency*, ed. Sanjib Baruah (New Delhi: OUP, 2011), p.128.

[128] Francine R. Frankel, *India's Political Economy, 1947-2004* (New Delhi: OUP, 2nd edition, 2005), p.203.

[129] Ramachandra Guha, *India After Gandhi: The History of the World's Largest Democracy* (New Delhi: Picador, 2007), pp.180–200.

methods used in those movements including the refinery movement in Assam were similar in nature – petitions, representations, street marches, strikes and fasts. The challenges to the unitary federal nation also came from the tribal movements like those of Naga and the Jharkhand movement. All those movements had their specific contexts and nature, yet they attempted to negotiate with the federal government for their provincial pride.

Chapter Six

Conclusion

The expulsion of the Burmese from Assam after the Anglo-Burmese war in 1825 and the subsequent peace treaty in 1826 marked the political annexation of Assam by the EIC. This resulted in economic and political restructuring of the region. Once the political control was established, the Company concentrated on the transformation of the area, its land and other resources, into a productive area in the capitalist sense. Subsequently, the presence of the EIC civil and military officials increased in the region. The EIC in its attempt to reopen trade with Burma and China and also to find out safer routes for the movement of troops to Ava, asked its officials to make journeys along the Brahmaputra to Irrawaddy. It in turn generated new 'knowledge' about the region. Market economy started penetrating and by mid nineteenth century Assam was integrated with the global market. The process of capitalist form of exploitation and control was accelerated. Even before the commencement of the peace treaty in 1826, Wilcox was patronised by the Asiatic Society of Bengal to survey this frontier region in 1825 and the wild tea plants were discovered by Robert Bruce in 1823. The potentiality of the area was already developing before its final annexation. The discovery of tea and subsequent plantations soon proved to fulfil the imperial imagination of a region having endless profit. Though the name Assam is synonymous to tea in popular discourse both in colonial and post-independence period, the region has experienced exploration and exploitation of other resources like timber, jute, rubber, coal, and petroleum. Apart from the plantation economy and coal

mining, the region was also the first in the British Empire to develop an oil industry though modest in size. This thesis was an attempt to look into the history of the development of the industry and its political fallout in the subsequent decades.

The thesis argued that in the first half of the nineteenth century the exploration and exploitation of natural resources in Assam was largely a concern of individuals and private companies. The colonial government took an active interest in such endeavours only by the second half of the nineteenth century. The second Chapter of the thesis studied the significant role played by science in mapping of the frontier region. The amateur surveys soon made the way for professional and systematic surveys of the area. The Chapter argued that those surveys facilitated the colonial state in transforming the 'wilderness' of the region into a productive land. In its move towards generating colonial knowledge of the province the GSI conducted a number of studies which helped in mapping various mineral resources of the region. The Chapter also pointed out how Assam became part of the colonial knowledge structure known as 'network research' in which the company officials working in Assam provided the scientists in London with the data collected through various surveys. The thesis has shown, like similar works in the field, that apart from the utilitarian aspect of science, the imperialist project was also driven by the values of the Enlightenment that unfolded in the eighteenth century.[1] The

[1] Enlightenment values emphasised on reason over religious dogmatism. It was the faith that reason and rationality would enable the human mind not only to escape from nature and but also to control and order nature had provided the ideological justice to the large scale reordering of nature in the colonies. See William M. Adams and Martin

colonial government believed that while it had enriched the metro pole, it also took the burden of civilising both people and nature in the colonies. Both people and nature became the subject of conquest and control. Science, fulfilling the economic purpose of the colonial state, also became the instrument of rationalising nature. The colonial science in Assam, as discussed in the Chapter 2, by the nineteenth century was to reorder the 'underdeveloped', 'unmanaged', and 'underexploited' nature in the region. And in this case, the natural science like geology played an extremely important role in classifying and mapping the nature of the region. Classification and naming of the landscape was an essential part of the colonial control.[2] In the nineteenth century, a small section of the Assamese intelligentsia, being trained in contemporary enlightenment values, kept faith in rational utilisation of land and other resources. Anandaram Dhekial Phukan (1829–59) believed that the agriculture yield could be increased by clearing forest. He wrote, 'The time when Assam will turn into garden in place of jungle; when ships will replace small boats on the river; …Let, my Lord, that time come soon'.[3]

Mulligan, introduction *Decolonizing Nature: Strategies for Conservation in a Post – colonial Era* (U.K.: Earthscan Publications Ltd, 2003), p.3.

[2] Surveys, maps, and census 'objectified' people and the geo-body of the region. The 'objectification' was not merely describing colonized objects, but it was a process of 'enumerating, calibrating, or reinventing pre colonial fuzzy ideas of space and culture into consciously rational ends.' See David Vumlallian Zou and M. Satish Kumar, "Mapping a Colonial Borderland: Objectifying the Geo – Body of India's Northeast," *The Journal of Asian Studies*, Vol.70, No.01 (2011), p.144.

[3]Anandaram Dhekial Phukan, "Englandor Biboran," ('A Description of England') *Orunodoi*, 2 (April 1847). Anandaram also believed that nature must be brought under

The Charter of 1833 abolished the monopoly right of the EIC which benefited private European traders. They could now hold land on a long term lease outside the Presidency areas. This in turn facilitated the growth of colonial plantation economy in Assam. In 1838, the Wasteland Grant Rules were formulated to attract European planters in Assam. The British tea planters began to invest enormously in tea plantations. The Assam Company was granted around 33,665 acres of land under the Wasteland Grant. The accumulation of vast land by tea planters under the wasteland grant rule adversely affected poor peasants by hindering further expansion of cultivation.[4] Since 1840, Assam was experiencing an increasing rate of capital investment and by 1860, it became one of the prime areas of foreign investment.

The economy of Assam revolved around the tea industry, even though coal and oil industry developed in the nineteenth century. While the British government was making effort to explore and exploit coal for steam boats and for the running of the tea factories, the explorers also came across with the seepages of oil from 1825 onwards. However, as discussed in the Chapter 3, the attempts to develop an oil industry in the area began only by the mid nineteenth century. The amateur surveys of the early decades of the nineteenth century gave way to more scientific and professional mapping of the resources of the province that aided the development of the oil industry by the late nineteenth century. This coincides with the proliferation of oil industry in other

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human control; his ideas on control of the river system of Assam became important than clearance of forests.

[4] Arupjyoti Saikia, "Landlords, Tenants and Agrarian Relations: Revisiting a Peasant Uprising in Colonial Assam," *Studies in History*, Vol.26, No.2 (2010), p.178.

parts of the world and the driving force behind this boom was the increasing demand for kerosene. The decision of the British government to shift to oil as fuel in its war ships further provided impetus to the growth of oil industry in the British Empire.

The commercial success of oil boring by the ARTC from the late nineteenth century was followed by the formation of the AOC. Chapter 3 has made an attempt to reconstruct the history of those early enterprises that came forward to make a fortune in a new industry. The first lease for the exploration of oil goes back to 1854, when there was hardly any defined rule for leasing out land for such purpose. Thus, the only condition imposed was not to interfere with the government's elephant catching projects. In this context the Chapter has brought into notice the difference among company officials regarding the nature of such lease. Colonel Hopkinson, Chief Commissioner of Assam and Cecil Beadon, Lieutenant Governor of Bengal, had different approach to the issue of leasing out land for mining purpose.

In Chapter 3, the thesis has also dealt with the contest over natural resource among various agents. Quite often the lands leased out for oil exploration were located in the forest lands. This led to the conflict between the Forest Department and the Revenue Department. The forests lands by the end of the nineteenth century were classified and the Forest Department aggressively moved on to bring more land under its control.[5] The Forest Department was not prepared to part with the revenue from the forest resources and, therefore, it asked the government to impose tax on timbers cut by the

[5] For details, see Arupjyoti Saikia, *Forest and Ecological History of Assam, 1826–2000* (New Delhi: OUP, 2011).

lessees for mining purposes. The sharing of royalty was another area where we find conflict between the colonial state and the companies. The Chapter 3 while studying the various companies and syndicates that were involved in developing oil industry in Assam has looked at such conflicting issues. Assam supplied one third of petroleum in India by the last quarter of the twentieth century.

In British India, colonial Assam was first to explore, produce and refine oil. It is in this background that, I have attempted to examine the history of the AOC in Chapter 4 of the thesis. The formation of the company and subsequent refinery at Digboi was preceded by a number of attempts to make a fortune in the oil industry by managing agencies about which I had discussed in Chapter 3. Even after the success of the AOC, the speculators, tea planters and even Marwari entrepreneurs came forward in the beginning of the twentieth century to make profit or to diversify capital in the new sector. However, all such attempts were not successful and the only venture that survived was the AOC. The Company came into existence in 1899 due to the effort of the ARTC. Though the AOC was a European venture, it made a room for the Marwari traders to get involved in the sector. Chapter 4 has shown that the retailing of the end products of the Company was done by the Marwari entrepreneurs and their chain of network. Like in jute and coal industry, the Marwari firm, SRCB was responsible for the retailing of oil business.

In Chapter 4, I have attempted to provide a comprehensive story of the AOC. The initial marketing strategy and its amalgamation with the BOC has been discussed in the chapter. The amalgamation led to subsequent modernisation of the Digboi refinery in terms of technology and infrastructure.

Digboi soon became the symbol of the Briitish accomplishment. However, the town and its planning demonstrated the colonial spatial segregation and racial differences. Such segregation was followed in the housing settlement of the labourers. The labourers mostly came outside from the province and were heterogeneous group which even working under the same company tried to maintain their 'primordial' ties in negotiation with the new environment.

After the 1930s, the AOC witnessed the nationalist influence over its labour force that broke into a prolonged struggle against the authority. The strike organised by the labour union in 1937 was repressed by the management in a violent manner. Taking advantage of the WWII situation, the British government in India not only declared the refinery area as protected area, but also arrested and deported the leaders and members of the union. The labour movement however had an impact in and around Digboi which resulted in labour strikes at various tea gardens.

After independence, oil was placed under public sector and the Ministry of Petroleum and Natural Gas was created by the GOI. As a result, the AOC had to face the nationalisation process of the oil industry by the Indian government. After the discovery of Naharkatiya oil field in 1953, the GOI initially formed a rupee company with the BOC to work out the new field. However, the GOI set up the refineries under public sector with the help of Rumania and Soviet Union.

After 1947, while every state of India was focusing on economic development, the economy of Assam was slowly strangulating and the overall

growth kept moving down.[6] The per capita income for India during 1950 –51 to 1958–60 increased by 20 per cent whereas in Assam for the same period it increased only by 16 per cent. Goswami points out that the per capita income of Assam was higher than that of India by Rs. 50 in 1950–51, but by 1984–85 the per capita income of India was higher than Assam by Rs. 213.[7] The disruption of traditional trade routes after partition and the growing 'isolationist mindset' of the leaders pointed towards the 'neglect' by the Indian state in causing economic underdevelopment of the region. The argument that India has not been sensitive towards the region still pre occupies the mainstream political discourse of the region. Immediately after independence the Indian state on the other hand was apprehensive of investing in Assam on large scale projects, due to the security reasons related to a borderland. The denial of the establishment of the first public sector refinery in Assam after the discovery of oil in Naharkatiya in eastern Assam in the post independence India by the centre was also due to the disapproval of the defence ministry for security reasons.[8] Chapter 5 while addressing the growth of the narrative of 'neglect'

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[6] The per capita income of India in 1948–49 prices increased to Rs.246 in 1950–51 and to Rs. 294 by 1958–59 and in 1960–61 it went up to Rs. 306. The per capita income for Assam at 1948-49 prices was Rs. 237 in 1950–51, Rs.276 in 1958–59 and Rs.271 in 1960–61. For details, see P.C. Goswami, *The Economic Development of Assam* (New Delhi: Kalyani Publishers, 1988), p.249.

[7] As compared to other states in India the picture of Assam was not satisfactory. At 1970–71, prices the per capita income of Assam in 1978–79 was Rs.572, while it was Rs.1298 in Punjab, Rs.739 in Karnataka and Rs. 877 in Gujarat. *Ibid*., p.257.

[8] Such an approach still continues as reflected from a petition of a student from Assam to the prime minister questioning the statement made in an NCERT Class X Geography textbook. The seventh Chapter of the text book says, 'there is vast potential tourism in the north eastern states…but due to strategic reasons these have

and 'indifference', attempts to deal with the question of federal relation between the centre and the state of Assam.

There was no major geographical reordering of Assam due to partition. However, Assam overnight became a strategically vulnerable region of the Indian nation as over ninety percent of its boarders came to face foreign nations. The partition turned the region into a landlocked area. The physical disruption of traditional communications perhaps also contributed to isolationist attitude of the people. The issues that haunted the middle class of Assam in the post independence India were centred on immigration, land, identity and the economic development of the region that included the control of recurring flood and infrastructural development. While demanding for mega state sponsored projects, the Assamese leaders hardly paid attention to the ecological impact and displacement of both nature and people as a result of such mega projects. Against such circumstances, the leaders of Assam engaged themselves in mobilising people to demand large state projects. I have referred to the refinery movements as point of reference in Chapter 5.While the movements remained non violent, it raised various issues in the public sphere. However, in the early1980s the nature of movement changed and natural resource like oil became a political weapon. The blockade of oil supply to the rest of India in the anti foreigner agitation of the 1980s was a new innovation in the post independence India. The blockade received international attention as

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not been encouraged so far'. The Ministry of Tourism, GOI ordered to remove the 'careless sentence' from the text book. Such 'carelessness' was part of a wider perception about north eastern region that had developed after partition. *The Telegraph*, 6 February 2014.

reflected from the report stating that 'the stopping of oil supplies was the most important and damaging of the sanctions applied by the student agitators in their long struggle against the central government'.[9] The ULFA further complicates the issue of development in Assam by arguing that the Indian state has been exploiting Assam in a colonial manner.

Chapter 5 argued that the path to progress in Assam as imagined by the leaders hardly differed from Nehru's vision. India following Nehru adopted the Soviet model of development determined by a strong presence of the state in the economy of the country. Nehru believed that industrialisation backed by the advancement of science and technology would lead the country to progress. The leaders of Assam too accepted Nehru's vision of progress. Immediately after the independence the vision of the leaders of Assam was shaped by a notion of development of the region through large scale industrialisation and infrastructural development. The songs of Bhupen Hazarika, one of the most influential figures of contemporary m reflects the 'modernisation' paradigm of the 1960s. He is also an important figure due to his pan Indian appeal. While writing poems on various issues, few of his writings demonstrate Nehru's belief in science and technology to tame the nature for the upliftment and progress of the nation.[10] Hazarika, for instance recognises the authority of science in resolving the flood problem by embanking the rivers and that the rivers can serve the people once tamed by science and technology.

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[9] Assam Oil Resumes Flowing to All India, *The Times*, 30 January 1981.

[10] For the songs of Bhupen Hazarika, see Tarani Pathak and Manomati Pathak Dakua, *Bhupen Hazarikar Geet Samagrar Samu Bishleson* (Guwahati: Icon Publisher, 2009).

One of the questions that the thesis pursued was who should own natural resources – the state or the people? The question has become a major concern for the social activists and social scientists in the recent years. The Indian government claims that 'the State Government are the owner of minerals located within the boundary of the state concerned.'[11]In the case of 'major' minerals the state governments grant mining license or lease after the clearance from the central government and the states are entitled to royalties set by the central government. The growth oriented policies of the government has resulted in extraction of natural resources in an unprecedented manner, causing the most adverse impact on rural livelihoods, environment and ecology. The issue of ownership becomes complicated with two contradictory views. On the one hand, customary laws sanctions the claims of the community, clan, or individual land owner over the minerals as property, on the other hand, the dominant view supported by the existing law is that the minerals are the national property or assets of the government.[12]

The interlinked issue related to the ownership of natural resources is the growing tension between India's need to grow and the people who faced displacement as a result. The Vedenta movement of Orissa reveals that the people who consider their territory as sacred are not ready to be part of the State's development project. The Indian government rejected the plans of

[11] http://mines.nic.in, accessed on 20.02.2014 at 7.30 p.m.

[12] G. Bengt Karlsson, *Unruly Hills: Nature and Nation in India's Northeast* (Hyderabad: Orient Blackswan, 2011), p.181.

Vedenta, the London based mining group[13] to extract bauxite in the Niyamgiri hills in Orissa as for the Dongria Kondh the hill is sacred and the mining will affect their livelihood and ecology. The Indian government has accepted the rights of community participation in forests but the mining sector awaits such response. However, in the Sixth Scheduled areas the Constitution recognises the ownership of natural resources by the community in the sense that tribal land is non transferable to a non-tribal. Under the Scheduled areas land, forest and other natural resources are under the control of the community as compared to the other states where the forests and the mineral resources belong to the state. However, the control of the community in the Scheduled areas is not straightforward and the study of Meghalaya by Karlsson reveals that the 'capital and state restructuring of the hill societies has rendered communities relatively powerless to control the local resource base.'[14] The process of internal capital accumulation gave rise to affluent indigenous elite that comes to control the resources rather than the community.

The political economy of the extraction of mineral resources reflects the dominant paradigm of 'modernisation'. In such a view the extraction of mineral resources becomes an essential element of 'progress' and development. In

[13] Vedanta signed a MoU with the Government of Orissa in 2003 to set up an alumina refinery and a coal thermal plant at Lanjigarh in Kalahandi. The Company got environmental clearance and built the refinery in 2006. The Company wanted to exploit bauxite at the Niyamgiri hills and was supported by the state government. The *adivasi* rose against the company attracting the attention of international organisations and media. In 2010, the tribe won the battle as the GOI blocked Vedenta expanding further. Kartik C. Dash and Kishor C. Samal, "New Mega Projects in Orissa: Protests by potential displaced persons," *Social Change*, Vol.38, No.4 (2008), pp.634 – 638.

[14] Karlsson, *Unruly Hills*, p.309.

such a discourse the community that opposes to become part of such modernisation project is labelled as 'primitive' in a negative sense. Such an understanding of the 'tribal' tends to isolate them by creating a pristine place for them. In many instances the people who had to alienate their land for such projects the compensation received is not satisfactory leading to protest for adequate compensation. The amount of compensation provided by the state also depends on the nature of the property right over land. A study of an abandoned site of ONGC at Suffery in Sibsagar District of Assam reveals that the people did not receive compensation for land as they had *eksonia* right (annual right) over land. Anu Kalandi, a resident of the area reported that they received compensation for the trees, bamboos and ponds and compensation for agrarian *fasal* for a year.[15] As the ONGC could not find any oil there, it was a loss of agricultural land and also aspirations of people to get jobs in the project. An abandoned site has to be restored to its original form. However, in this particular site no restoration process has started and the pits digged for stocking water, chemicals and other fluids were not removed. During the rainy season there may be overflow of the polluted water which would result in poisoning of drinking water and water of wells, ponds in nearby areas. It would also effect rice cultivation as apprehended by the people. On the other hand, at Mahmora rehabilitation of land was done by arranging fisheries for the people who lost their land.

The sharing of revenue between the centre and the states has created even more contradiction between the centre and the state over the issue of ownership of natural resources. Assam continued to raise the issue. However, it

[15] Interview was conducted at Suffery in Sibsagar district on 22.02.2012.

is Nagaland which is taking radical step regarding the issue of sharing royalty with the centre. The Nagaland Government declared not to share any royalty on crude oil, natural gas and other minerals with the Centre and that all income from crude oil, natural gas and minerals will accrue entirely to the State. Neiphiu Rio, the Chief Minister of Nagaland announced that a "new formula" was being worked out for the exploration and exploitation of oil, natural gas and other minerals.[16] According to Nagaland's customary laws, there is collective ownership of land. The Article 371 A of the Constitution recognises this particular customary law. It was on this constitutional arrangement, Nagaland could insist that the traditional mode of collective ownership demands a different approach to the sources below the land.

At the global context the issue of community management of resources for sustainable development along with minimising environmental degradation and displacement of people has focused on the participation of local communities. People's movements have to face the stiff opposition from the resource extracting regimes and the private enterprises. Ken Saro Wiwa (1941–95)[17] as the President of the Movement for the Survival of the Ogoni People (MOSOP) led a nonviolent campaign against environmental degradation of Ogoniland in Nigeria by the operations of the multinational petroleum industry,

[16] *The Telegraph,* 28 July 2004.

[17] Ken Saro Wiwa was a Nigerian author, television producer, environmental activist, and winner of the Right Livelihood Award and the Goldman Environmental Prize. He was a member of the Ogoni people, an ethnic minority in Nigeria.

specially the Royal Dutch Shell Company.[18] At the peak of his non-violent campaign, Saro-Wiwa was arrested, and tried by a special military tribunal, and hanged in 1995 by the military government. His execution provoked international outrage and resulted in Nigeria's suspension from the Commonwealth of Nations for over three years.

The growing contest over natural resources among various claimants has raised a number of issues. In Assam, as discussed in the Chapter 5, the natural resource became part of the politics of regionalism. However, the community rights over various resources have not been a major concern of the Assamese nationalist leaders. It is only from the last few years the community right over land, forest, and water has been raised by organisations like the *Krishak Mukti Sangram Samity* (KMSS).[19] While discussing about community rights of indigenous people, one should also keep this in mind that the community itself is not a homogenous entity, and is divided into class, clan, generation, and gender lines. The issue of rights over natural resource can further create ethnic differences.

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[18] The oil exploration of the Niger delta by Shell has devastated the vast agrarian and marshy lands and turned them uninhabitable. The area has been experiencing acid rain and life expectancy has declined to an average of 45 years. For details, see Michael Wats, "Economies of Violence: More Oil, More Blood," in *Contested Grounds: Essays on Nature, Culture, and Power* edited by Amita Baviskar (New Delhi: OUP, 2008), p.108.

[19] For details, see Chandan Sharma, "Krishak Mukti Sangram Samity and its Struggle: The New Peasant Assertion in Assam," in *Social Forces and Politics in North East India* edited by A. Barua and S.Sengupta (Guwahati: DVS publishers, 2013), pp.130 – 176.

One of the crucial question not discussed in this thesis but has increasingly become important is the cumulative impact of the petroleum industry of Assam on the environment. The subject has been hardly studied, and information available is scattered. The adverse impact of petroleum exploration and production on environment is related to geophysical exploration, drilling of wells, refining of crude oil, wastewater generated during drilling, and the network of pipelines for transportation of crude and natural gases.[20] Despite limited understanding, opinions began to pour about the adverse impacts of oil industry on environment. For instance, *The Assam Tribune* candidly admitted that 'The oil exploration not only injure the plants, but also causes damage to the surface of rice fields by preventing oxygen supply into the soil, it also raises the temperature of the soil and water'.[21] There is also possibility of spreading of hydrocarbons to the nearby crop fields through seepage of oil along with running water. In oil contaminated soil, root system of plants are damaged resulting in crop failure.[22] Due to increase of oil content in soil, the intake of nutrients by rice decreases. Rice seedlings find it difficult to survive on oil-contaminated soil.[23] Around 6.5 hectares of paddy and other crops were affected due to leakage of pipelines in the Sibasagar

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[20] The World Conservation Union, *Oil Exploration in the Tropics: Guidelines for Environmental Protection* (IUCN: Cambridge, 1991), pp.7–8.

[21] B. Bharali, Oil Pollution and Rice Fields, Editorial, *The Assam Tribune,* 1 November 2009.

[22] *Ibid*.

[23] *Ibid*.

district.[24] Seepage through the pipeline had acquired serious proportion by the late twentieth century. The government admits such setbacks. For instance, Jitin Prasada, the Indian Minister of State for Petroleum and Natural Gas, claimed that "due to the old condition of the pipeline and installation and miscreant activities, leakage occurs which are promptly attended to and the spillage over land cleaned."[25]

Contaminants in the soil can pollute ground water as well as other forms of water resource by toxic components of crude oil and such pollution is dangerous to the aquatic life.[26] The major by-products of petroleum exploration include oil field brine, oil-bearing water and oil drill mud. The by- products require adequate treatment and safe disposal.[27] Further, petroleum industry effects the environment through emissions to air, discharge to water, and waste disposal. Case study of crude oil spill areas around Rudraagar and Lakua oil fields in the district of Sibasagar reveals that due to oil contamination the physico-chemical properties have changed significantly.[28] The changed

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[24] Crude spill hit crops in Sivasagar, Spl correspondent,*The Assam Tribune*, 12 March , 2010. The ONGC paid an amount of Rs.7.38 lakh to 140 affected farmers. According the 2009-10 data, the total net sown area in the Sibsagar district was 13, 68,222 hector. http://databank.nedfi.com/content/sibsagar-districts, accessed on 22.07.2013.

[25] *Ibid*.

[26] V.B.N.S. Madduri, *An Environmental Assessment of Oil and Gas Exploration*, Environmental Economics Research Committee.
http://irade.org/eerc/pdf/IPP_FR_Madduri.pdf accessed on 12.07.2013.

[27] *Ibid*., Chapter 2.

[28] D Barua et al, "Certain Physico-Chemical changes in the Soil brought about by Contamination of Crude Oil in Two Oil Fields of Assam, NE India," *European Journal of Experimental Biology*, Vol.1, No.3(2001),pp.154–161. The study has shown that the soil is darker in the contaminated area than the adjacent unpolluted

properties of the oil-contaminated soil are a threat to the habitats of micro flora and fauna and vegetation and create disorder in the nutrient cycling.[29] Similarly, a study conducted on contaminated crop field by refinery effluents near the Bongaigaon refinery and Petro-Chemical industry has revealed that the rice produced in the field were significantly shorter in height, lower shoot and root dry weight and lower grain weight as compared to the rice produced in non-contaminated soil.[30]

Besides seepage of oil, the other major factor of environmental degradation is gas flaring.[31] The two major oil companies working in Assam, the OIL and the ONGC have been flaring up a significant portion of the natural gas in the oil fields since their inceptions.[32] About 25 per cent of the total

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areas and the moisture content is also comparatively low making the surface of the soil drier. The capacity of water retention by the oil contaminated soil is low and such soil is more acidic. The percentage of organic carbon in the affected area was found eight times higher than the unaffected area.

[29] *Ibid.*, p.160.

[30] D. Konwar and D.K. Jha, "Response of Rice (Oryza sativa L.) to Contamination of Soil with Refinery Effluent under Natural Condition," *Assam University Journal of Science &Technology: Biological and Environmental Sciences*, Vol.5, No.1 (2010), pp.14-22. The effluents of BRP are released to a small river, Tunia through the pollutants reach to the paddy fields.

[31]During the extraction and production of crude oil either from onshore or offshore oil wells, raw natural gas is also produced to the surface. If there are no pipelines and other gas transportation infrastructure or sometimes for safety reasons, a large quantity of such gas is flared up as waste.

[32] Homeswar Kalita, "National Wastage of Natural gas in Assam Oil Fields: Oil India Ltd. Vs Ongcl, The Environmental Issues," *Global Journal of Human Social Science*, Vol.12, No.2 (2012), p.42.

natural gas produced in Assam is being flared up or destroyed at the sources.[33] Gas flaring is a hazard to human health and it also significantly contributes to the anthropogenic emissions of carbon dioxide as shown in Appendix 8.[34] With the advancement in the geophysical science, the exploration of oil has reached a new dimension. The OIL proposed to conduct seismic survey on the riverbed of the Brahmaputra river in search of hydrocarbon. Accordingly, the OIL in 2006 hired a Kazakhstan based geophysical firm. However, the Company had to suspend its plan due to the opposition pressure from various groups which strongly put forward the cause of the endangered river dolphins.[35] The open cast coal mining in the Margherita-Ledo area in eastern Assam has affected the environment of the neighbouring area.[36] The haphazard discharge of harmful affluent from the open pits contaminates the soil and joins the streams running

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[33] *Ibid*. Kalita has conducted a field survey in the SOLA Reserve Forest, Sibsagar district to study the impact of gas flaring by ONGCL. The result found reveals how the biotic community has been threatened because of gas flaring in general and to *muga* silkworm in particular.

[34] The quantity of gas flared in the last century cannot be ascertained due to the lack of available records. However, we have record available for the twenty first century which provides us with data on the quantity of gas flared. The table makes it easier to infer that the quantity of gas flaring had been significant. That the flaring of gas in the north eastern region was more has also been pointed out by the planning commission. http://planningcommission.nic.in/plans/planrel/fiveyr/7th/vol2/7v2ch1.html, accessed on 12.02.2013.

[35]*The Telegraph*, 11 November 2009.

[36] A Report on Ambient Air Quality, Water/ Waste Water Analysis & Noise Level Measurement at North Eastern Coalfields, Coal India Ltd., Margherita. The damage to environment due to open cast mining includes damages to the landscape and topography, unplanned dumping of waste, loss of topsoil due to the damage of topography, also can lead to health hazard due to storage of water in abandoned quarries. http://www.neccoal.co.in/CIL-Oct_Dec_2010.pdf, accessed on 21 .07.2013

through the villages to reach the river Buridehing causing water pollution. Open cast coal mining damages the landscape and topography.

Guha and Gadgil's *Ecology and Equity* has clearly shown the miseries of 'ecological refugee' due to the iron triangle of beneficiaries, administrators and decision makers.[37] The real beneficiaries are only one sixth of the population and they are enjoying the benefits at the cost of natural resources, environment and 'ecosystem people'. The movements questioning the rights of people over natural resources often tries to break this iron triangle and demands for effective decentralisation and empowerment of local people by recognising their rights. In case of Assam we hardly find movements by the local people questioning the impact of the petroleum industry on the environment. There may be a variety of factors at work against this apathy of people. One factor may be the lack of scientific awareness among the people regarding the impact on environment. However, there are instances of people reporting about the decreasing yield of rice atleast for few years.[38] Krishna Tipomia , Chengilimora Gaon, Mahmora in Sibsagar district in the eastern Assam, who lost around 7–8 *bigha* of land to a failed venture, said that he and other people of the village gave away their land with a hope of securing permanent jobs as well as a better facilities in terms of infrastructural development of the village.

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[37]Madhav Gadgil and Ramchandra Guha, "Ecology and Equity," in *The Use and Abuse of Nature*, ed. Madhav Gadgil and Ramchandra Guha (Delhi: OUP, 2000), pp. 34–35.

[38] While visiting two abandoned sites at Suffery and Mahmora, in Sibsagar district, people informed about the failure of rice production and also about the pollution of water resources.

The study of the impact of the petroleum industry and other mining industries on the environment of Assam has been awaiting research from historians. The subject matter of the thesis, however, has not taken up the environmental issue which requires far intense and in depth research. To study the history of a particular resource only from a utilitarian perspective limits the various 'roles' that a resource plays in cultural politics of a region. The thesis while attempting to place petroleum of Assam in the political economy of colonial and post colonial period concludes raising contemporary debates over natural resources. The relationships between natural resources with economy, territory, identity, and politics of exclusion are not static and produced and reproduced by various factors.

Appendix 1

Biographical Notes on Key Personalities

Bhupen Hazarika: One of the most influential figures in post independence cultural life of Assam in general and music in particular. He had a pan Indian appeal. The lyrics of his songs often reflect the contemporary socio-economic aspirations of the people of Assam. Thus, his songs provide us with valuable source for the study of popular sentiments of post colonial Assam.

Bishnuram Medhi: Became the Chief Minister of Assam in 1950 and governor of Madras in 1957. In 1967 he went uncontested to the ALA and remained a member till 1972. Though, Medhi did not support the mass movement for the establishment of a refinery in Assam, yet he was instrumental in putting pressure on the GOI to take the cause of Assam.

C.A. Bruce: Military officer, who commanded a division of gun boats in the first Anglo-Burmese war during the period between 1826 and 1840. Bruce has been largely associated with the findings of wild tea plants in Assam and was subsequently placed in charge of experimental tea plantations.

Captain Bigge: Served as a Principal Assistant, Nagaon. As a committee to investigate coal beds of India was formed in 1838, Bigge along with other officials was placed in Assam to investigate of coal beds of Assam. While looking for coal, he also came across petroleum springs in eastern Assam.

Cecil Beadon: Served as Lieutenant Governor of Bengal from 1862–66. Beadon was instrumental in leasing out land without any delay on liberal terms to entrepreneurs in order to develop coal and mineral oil industry in Assam.

David Scott: Appointed as the Agent to the Governor General, North East Frontier from 1826–31. He was the first colonial administrator of Assam. Unlike his successor F. Jenkins, Scott encouraged Assamese peasants to increase production of indigenous crops such as opium, mulberry, and *muga* silk. He focused on the economic development of the region on the basis of local resources and skills.

E.T. Dalton: He served as Principal Assistant, Lakhimpur. Dalton along with S.F. Hannay investigated the auriferous deposits in eastern deposits of Assam in 1855.

Francis Jenkins: The Commissioner of Assam and Agent to the Governor General for the North Eastern frontier of India during the period between 1834 and 1861. Jenkins was instrumental in transforming the Brahmaputra valley into a commercially productive land. He not only initiated the process of waste land grants to Europeans for tea plantation, but also an active observer of other mineral resources. In 1835, Jenkins prepared a comprehensive report of the region emphasising on the political geography.

Gaurisankar Bhattacharya: A member of the Assam Legislative Assembly for a long period from 1952–78. He was the leader of the opposition of the Assembly. He critically looked at the federal structure of Indian polity and stood for the cause of greater provincial autonomy.

Gaustav Mann: He was a German officer having extensive knowledge of the forests of Burma. Between 1868 and 1869, Mann conducted an extensive survey of the forests of Assam and prepared the first provincial forest report of Assam. He was instrumental in mapping and codifying forest resources of Assam. He also asserted the right of the Forest Department over revenue on the lands leased out for petroleum exploration.

H.B. Medlicott: Joined as the Deputy Superintendent of the Geological Survey of India and became its Director in 1876. He conducted geological survey of Assam in 1864 at the insistence of Cecil Beadon to map the coal beds of the area. He also recognised the commercial possibility of petroleum industry in Assam and recommended experimental boring.

Hareswar Goswami: He became the speaker of the ALA in1967. He was a prominent leader of the refinery movement, language movement and the movement for the transfer of the capital of Assam from Shillong to Guwahati.

Hem Baruah: Was a member of the Parliament of India during 1957–72. He was mostly a member of the opposition. He had a great oratory skill that used to mesmerise his listeners. His parliamentary speeches were marked by

linguistic excellence and loaded information related to the concerned subject. He was a prominent leader of the refinery movement of Assam.

Henry Cotton: He served as Chief Commissioner of Assam from 1897–02. He was one of the few officials who questioned the planters' oppression in the tea gardens of Assam. He urged for an increase of wage of the tea garden labourers in 1902, which did not become applicable due to the tea lobby. He was also instrumental in putting pressure on the GOI to sanction the formation of the AOC by the ARTC in 1899.

Henry Hopkinson: Appointed as Commissioner of Assam from 1861–74. Unlike Beadon, Hopkinson was not in favour of granting land in an arbitrary manner and was against monopolistic control over resources by private entrepreneurs.

K.D. Malaviya: He was the Union Minister of Petroleum and Natural Gas. In post independence India, Malaviya played a significant role in laying the foundation of an independent oil policy for India. He strongly advocated the nationalisation of oil industry in India and for the purpose of developing a national institute to ensure India's self reliance in energy sector he initiated the foundation of the ONGC in 1956.

Lieutenant R. Wilcox: An army man, who conducted a survey of the Brahmaputa valley under the patronage of the Asiatic Society of Bengal in 1825. He while surveying the source of the river Brahmaputra has given a

detailed account of the topography and geography of the region. He has been credited with recording the existence of coal and petroleum in Assam for the first time.

S.F. Hannay: Appointed as the commandant of the Assam Light Infantry Battalion. Hannay was one of the significant contributors towards the growth of colonial knowledge of the region in the first half of the nineteenth century. Having geological knowledge, Hannay studied about various minerals of Assam, such as coal, petroleum, gold and iron. He was well placed in the colonial knowledge structure known as 'research network' and regularly submitted information on various minerals to F. Jenkins.

William Griffith: He was a medical doctor and botanist. Griffith was a member of the scientific mission in Assam and accompanied S.F. Hannay in his journey to Ava in 1836. He officially examined the tea leafs of Assam at the instruction of the East India Company and developed a strategy to cultivate tea in Assam.

Appendix 2

The production of refined products of the Digboi Refinery, 1904-1908(in gallons)

Products	1904	1905	1906	1907	1908
Petrol	13,844	20,880	22,245	48,309	68,493
Jute batching oil	15,978	49,203	2,60,644	2,85,006	4,06,868
Kerosene	14,45,046	10,33,558	15,98,450	14,81,625	15,13,566
Sundry Oils	93,438	91,333	1,12,303	1,32,590	1,37,167
	Ibs.	Ibs.	Ibs.	Ibs.	Ibs.
Wax & Candles	13,70,067	12,97,088	16,03,063	16,36,063	16,83,072

Source: E.H. Pascoe, "The Petroleum Occurrences of Assam and Bengal,"*Memoirs of Geological Survey of India*, Vol. 40 (1912), p.301.

Appendix 3

Profit Earned by the Assam Oil Company (in Pound), 1903-1910.

Year	Profit in Pound
1903	18,960
1904	15,010
1905	10,008
1906	24,652
1907	26,326
1908	25,912
1909	12,435
1910	12,860

Source: Collected from the volumes of *The Economist* and *The Times* for the relevant years.

Appendix 4

Dividends distributed amongst the shareholders by the Assam Oil Company (in parentage)

Year	Ordinary Share
1903	5
1904	3.33
1908	5
1909	5
1911	3 ¾
1912	3 ¾
1913	3 ¾
1916	6
1917	8
1918	8
1919	8

Source: Data has been collected from the volumes of *The Economist* and *The Times* for the relevant years.

Appendix 5

Production of Oil by the Assam Oil Company, 1898-99 – 1915-16

Year	Production in Gallons
1898-99	555,204
1899-1900	616,275
1901-02	631,571
1902-03	1,756,759
1903-04	2,528,785
1906-07	2,897,990
1907-08	3,156,665
1908-09	3,243,110
1910-11	3,280,750
1911-12	3,565,163
1912-13	4,388,531
1914-15	4,688,547
1915-16	4,550,150

Source: The data has been collected from the volumes of *The Economist* and *The Times* for the relevant years.

Appendix 6

Petroleum Crude Production (in Lakh Tonne)

Year	Assam	India
1971	35.4	71.8
1975	41.9	82.8
1976	42.9	86.6
1977	45.1	101.9
1978	40.8	112.7
1979	45.7	128.4
1980	10.6	49.0

Source: *Economic Survey of Assam, 1981-82*, Directorate of Economics and Statistics, Government of Assam, Assam Secretariat Library, Guwahati.

Appendix 7

Revenue from Petroleum Received by the State

Year	Revenue Received (Rs.)
1909-10	18,404
1911-12	19,879
1932-33	4,95,192
1933-34	4,81,143
1926-27	2,10,134
1929-30	3,06,366
1930-31	3,96,206
1931-32	4,85,335

Source: *Report on the Administration of Assam* (relevant years), ASA**.**

Appendix 8

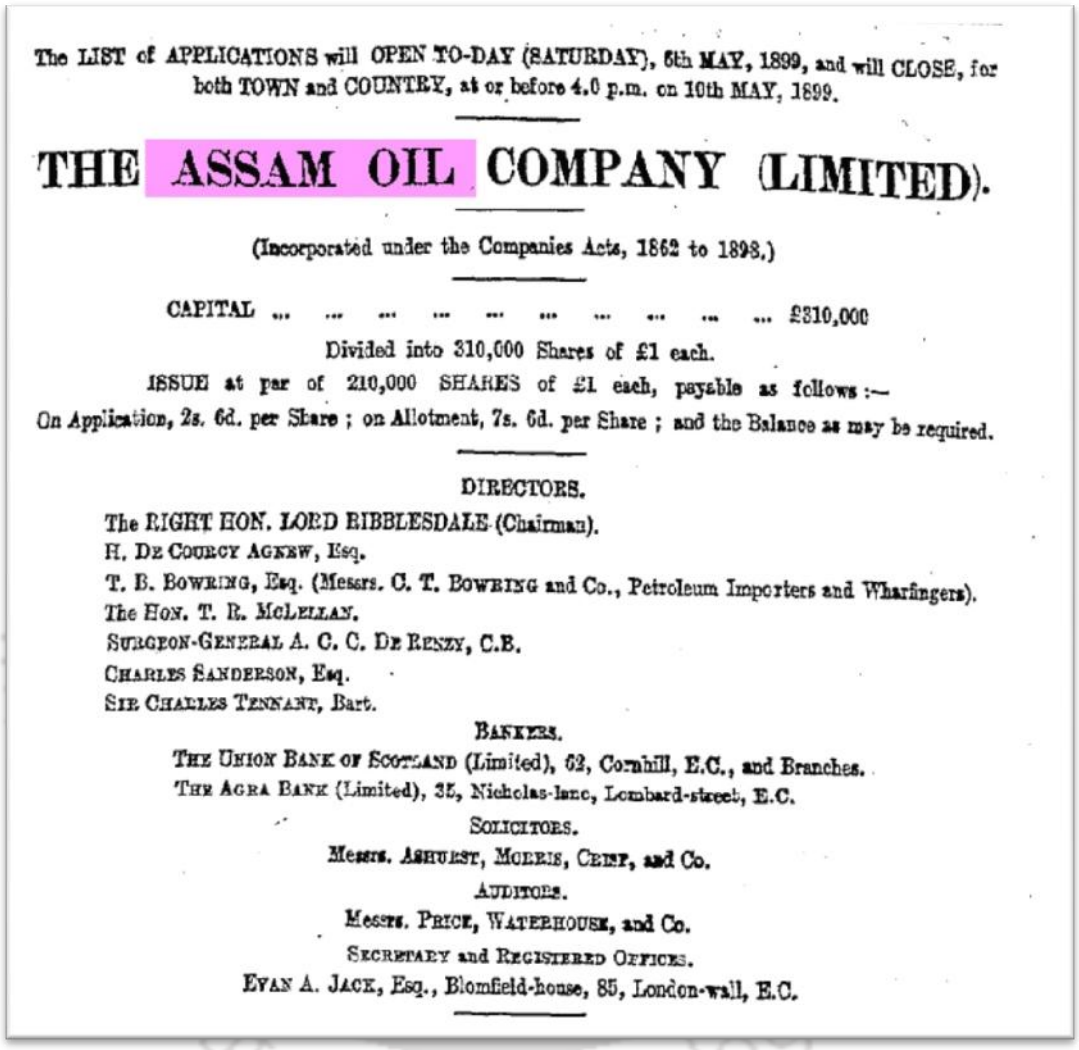
Flaring of Gas as against Gas used for Petroleum Mining Operations (1999-2000 – 2008-2009)

Year	Gross Production	Gas flared	Percentage of Gas flared over Gross Production	Gas used for petroleum mining operation
1999-2000	2126.06	202.57	9.53	469.9
2000-2001	2199.34	186.76	8.49	468.67
2001-2002	1991.91	143.47	7.2	451.39
2002-2003	2045.33	151.91	7.43	458.82
2003-2004	2201.9	172.23	7.82	458.86
2004-2005	2249.08	202.35	9	455.89
2005-2006	2407.47	168.01	6.98	455.61
2006-2007	2523.61	206.53	8.18	434.96
2007-2008	2598.9	197.9	7.61	458.4
2008-2009	2573.23	207.29	8.05	429.33

Source: Directorate of Geology and Mining, Assam.

Figure 1

Advertisement of the AOC, 1899



The LIST of APPLICATIONS will OPEN TO-DAY (SATURDAY), 6th MAY, 1899, and will CLOSE, for both TOWN and COUNTRY, at or before 4.0 p.m. on 10th MAY, 1899.

THE ASSAM OIL COMPANY (LIMITED).

(Incorporated under the Companies Acts, 1862 to 1898.)

CAPITAL £310,000

Divided into 310,000 Shares of £1 each.

ISSUE at par of 210,000 SHARES of £1 each, payable as follows:—

On Application, 2s. 6d. per Share; on Allotment, 7s. 6d. per Share; and the Balance as may be required.

DIRECTORS.

The RIGHT HON. LORD RIBBLESDALE (Chairman).
H. DE COURCY AGNEW, Esq.
T. B. BOWRING, Esq. (Messrs. C. T. BOWRING and Co., Petroleum Importers and Wharfingers).
The HON. T. R. MCLELLAN.
SURGEON-GENERAL A. C. C. DE RENZY, C.B.
CHARLES SANDERSON, Esq.
SIR CHARLES TENNANT, Bart.

BANKERS.

THE UNION BANK OF SCOTLAND (Limited), 62, Cornhill, E.C., and Branches.
THE AGRA BANK (Limited), 35, Nicholas-lane, Lombard-street, E.C.

SOLICITORS.

Messrs. ASHURST, MORRIS, CRISP, and Co.

AUDITORS.

Messrs. PRICE, WATERHOUSE, and Co.

SECRETARY and REGISTERED OFFICES.

EVAN A. JACK, Esq., Blomfield-house, 85, London-wall, E.C.

Source: *The Times*, 6 May 1899.

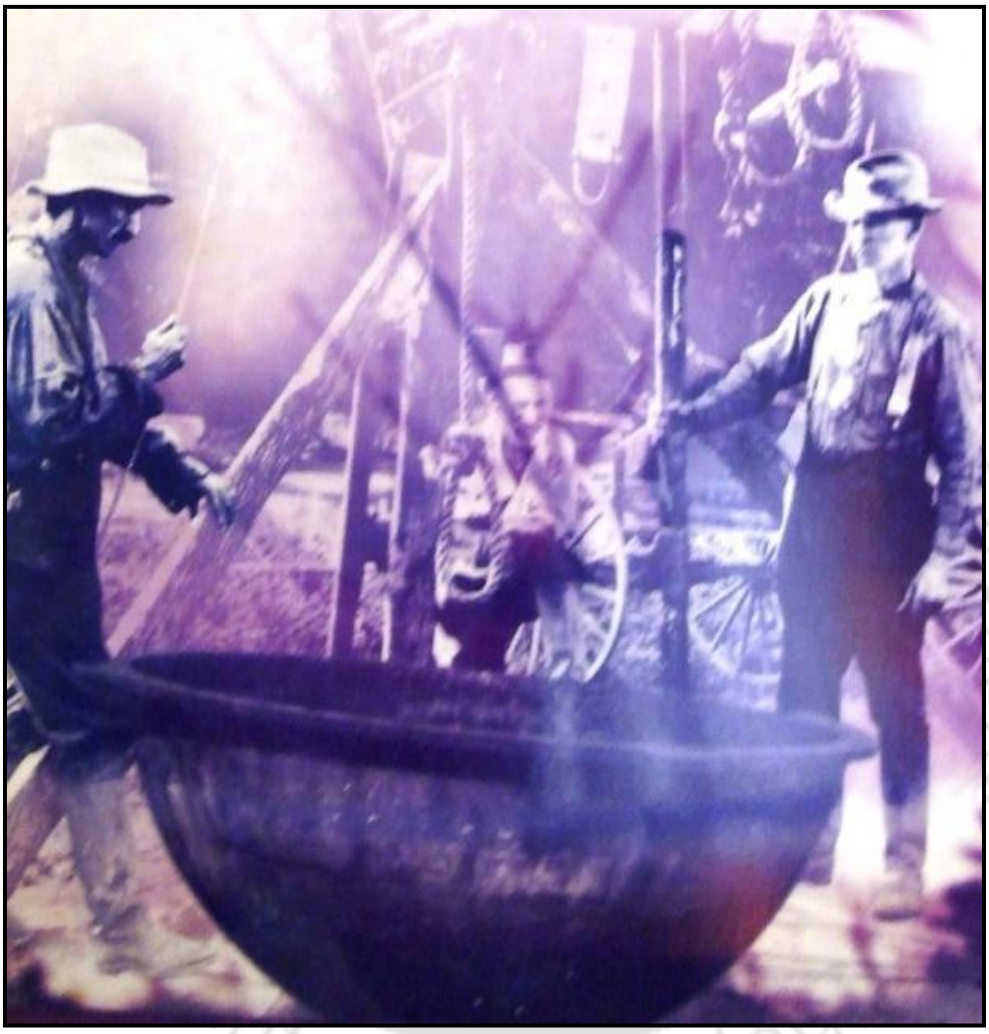
Figure 2

Lower portion of one of the 'stills' used to treat crude oil

Source: S.N. Visvanath and Dilip Kumar Das, *The Luminous Arc: Digboi's Passage through 100 years* (New Delhi: Corporate Communications Indian Oil Corporation Ltd.). This photograph is from the 1890s. This part of the still was recovered at the Digboi oil field and installed for display at the entrance of the Digboi refinery. The measurement of this part is nine feet in diameter and four in depth.

Figure 3

The Simple Method of Oil Refining



Source: S.N. Visvanath and Dilip Kumar Das, *The Luminous Arc: Digboi's Passage through 100 years* (New Delhi: Corporate Communications Indian Oil Corporation Ltd.).

Figure 4

The Well of Goodenough, 1866

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Source: S.N. Visvanath and Dilip Kumar Das, *The Luminous Arc: Digboi's Passage through 100 years* (New Delhi: Corporate Communications Indian Oil Corporation Ltd.).

Figure 5

Operations in Digboi Oil field, 1906

Source: S.N. Visvanath and Dilip Kumar Das, *The Luminous Arc: Digboi's Passage through 100 years* (New Delhi: Corporate Communications Indian Oil Corporation Ltd.).

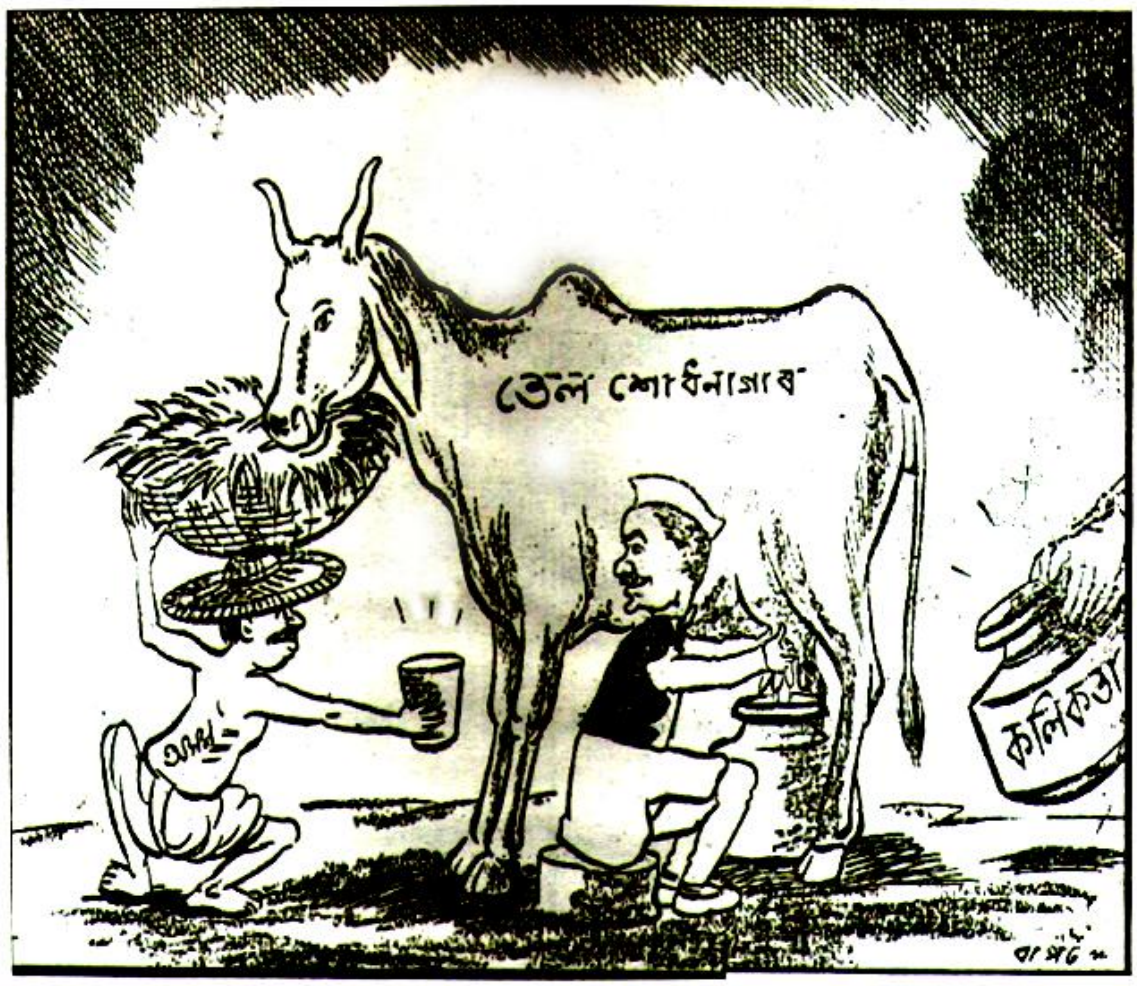
Figure 6

Supervision of Oil Wells in Distant and Remote Locations was carried out using helicopters

Source: S.N. Visvanath and Dilip Kumar Das, *The Luminous Arc: Digboi's Passage through 100 years* (New Delhi: Corporate Communications Indian Oil Corporation Ltd.).

Figure 7

Cartoon representing how India is exploiting Assam's Oil



Source: *Assam Baani*, 11 August 1956.

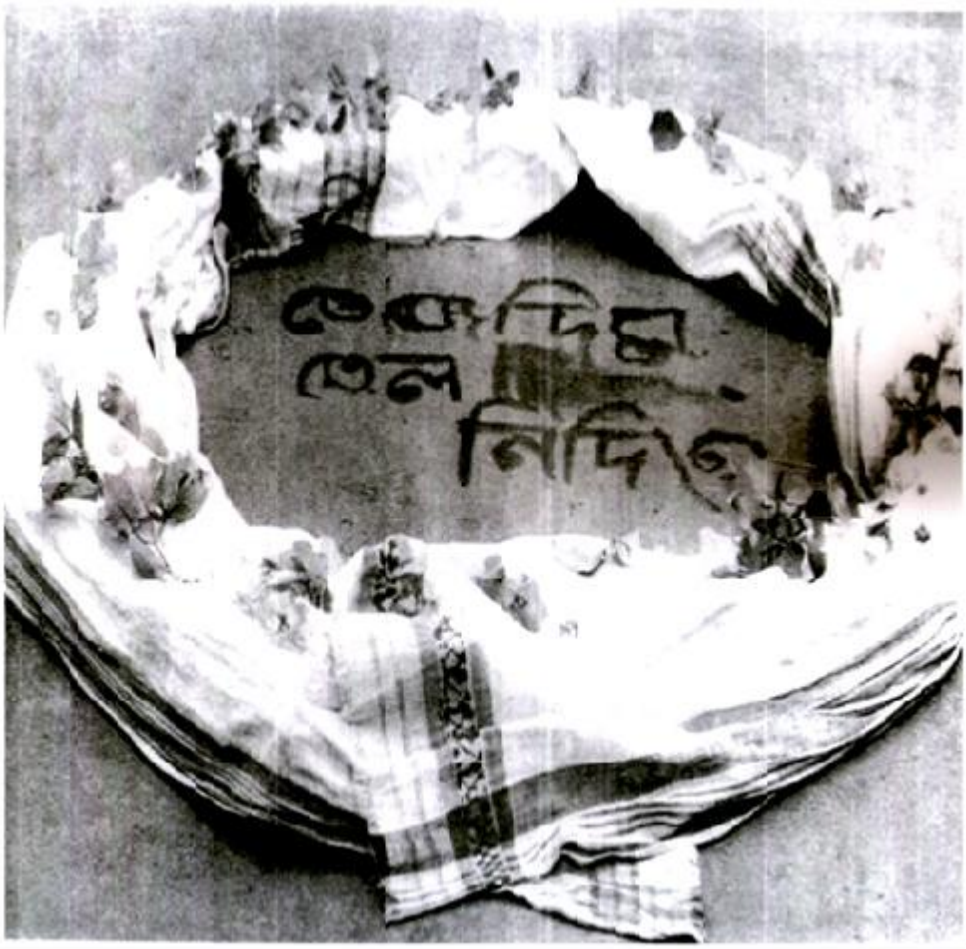
Figure No 8

Cartoon Satirises the sharing of Assam's Oil with Bihar

Source: *Assam Baani*, 13 December1957

Figure 9

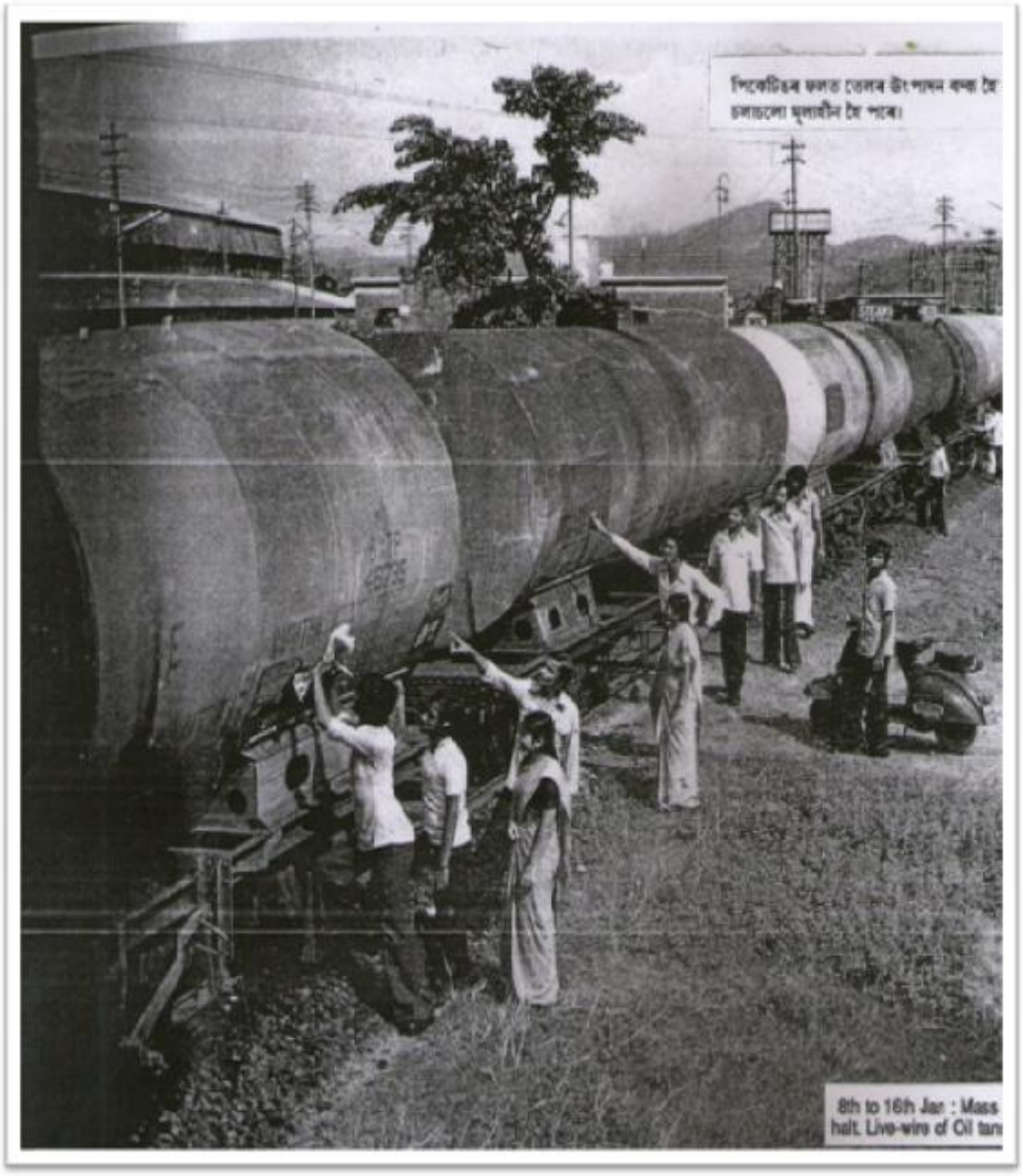
We Will Give Blood, But Not Oil



Source: *Best Of Assam Movement: A Pictorial Assam* (Assam: Publication Board, 1985).

Figure 10

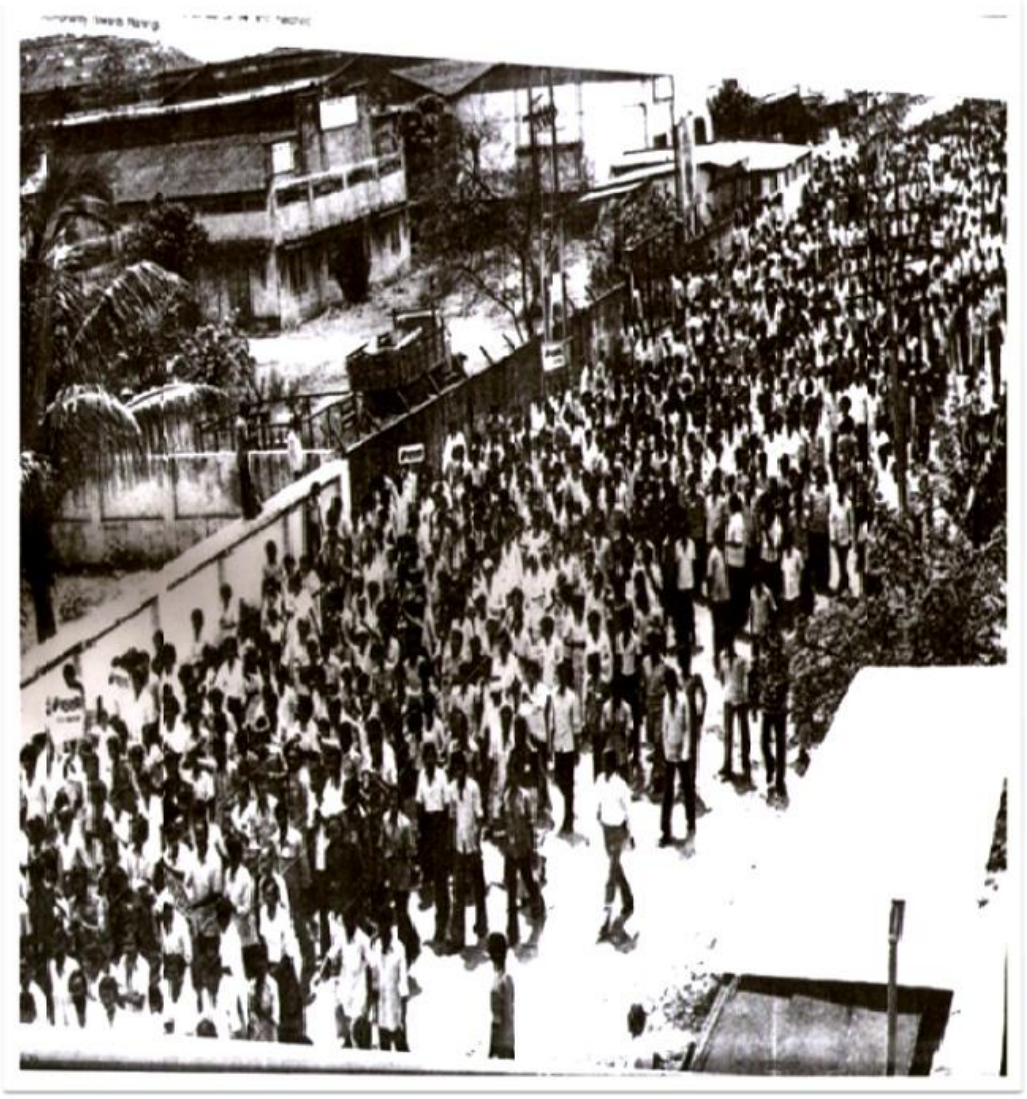
Blockade of Oil Transportation



Source: *Best Of Assam Movement: A Pictorial Assam* (Assam: Publication Board, 1985

Figure 11

Protest Rally to Narengi, Guwahati



Source: *Best Of Assam Movement: A Pictorial Assam* (Assam: Publication Board, 1985).

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