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350**

**BEYOND PHILANTHROPY: THE
ROCKEFELLER FOUNDATION'S
PUBLIC HEALTH INTERVENTION
IN THIRUVITHAMKOOR, 1929-1939**

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**BEYOND PHILANTHROPY: THE ROCKEFELLER
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The paper forms a part of a larger study on mortality decline in Thiruvithamkoor. An earlier version of this was presented at the T.N.Krishnan memorial seminar held at the Centre for Development Studies under a different title. Thanks are due to the participants in the seminar, particularly the late Professor P.G.K Panikar and K.T.Rammohan. I am also thankful to D.Narayana, P.K. Michael Tharakan, K.Navaneetham, Praveena Kodoth, K.N.Harilal, Achin Chakraborty, P.R.Gopinathan Nair, K.P.Kannan and K.N.Raj for going through the earlier version. I also acknowledge the cooperation of the staff of the Kerala State Archives at Trivandrum and the librarian and staff of the State Legislature Library, Trivandrum, without whose help this paper would not have materialised.

ABSTRACT

This paper examines the public health intervention of the Rockefeller Foundation, one of the major 'philanthropic' organisations in the world during the twentieth century, in the erstwhile princely state of Thiruvithamkoor, which currently constitutes a part of Kerala state in India. It discusses the specific historical context of the intervention, the methods of intervention and their outcomes. It is argued that the Foundation's interests in Thiruvithamkoor went beyond its avowed objective of philanthropy. Thiruvithamkoor provided a fertile ground to the Foundation to be used as a 'tropical observatory's for research on diseases on which it had already been preoccupied. It is also pointed out that the activities of the Foundation became critical in the institutionalisation of public health in Thiruvithamkoor and in helping the region in controlling and finally eradicating some of the diseases at a later date.

Key words: Rockefeller Foundation, public health, Thiruvithamkoor

JEL Classification : I 18

Introduction

Persistence of communicable and preventable diseases in many parts of the less developed regions across the globe has been a matter of international concern. Often it is used as a source for legitimizing international interventions; but at the same time, it conceals the objectives and the specific political, social, economic and scientific contexts of these interventions.

This paper examines the public health intervention of the Rockefeller Foundation, one of the major ‘philanthropic’ organisations of the twentieth century, in Thiruvithamkoor (*Travancore*), which constitutes a part of the present Kerala State in India. The paper discusses the specific historical context of the intervention, the methods of intervention and the public responses. It will be argued that the Foundation’s objectives in promoting public health in Thiruvithamkoor went beyond its avowed objective of philanthropy. While the Foundation’s concern for public health sprang from the needs of north-American capital, Thiruvithamkoor provided the Foundation a fertile ground which could be used as a ‘tropical observatory’ for research on diseases on which it had already been preoccupied.

The paper begins with a discussion of the broad historical background that led to the Rockefeller Foundation’s health intervention in Thiruvithamkoor. Subsequently we discuss the institutionalisation of public health in the region and the major public health programmes

taken up under the advice and direction of the Foundation representative. In the penultimate section, we discuss the public response to the programmes and the last section concludes the discussion.

The Background

Thiruvithamkoor was situated in the southwest extremity of the Indian Peninsula. With a total geographic area of 7091 square miles, it was the third largest among the princely states in India, ruled indirectly by the British through the local Maharajas. Thiruvithamkoor was flanked by the Arabian Sea on the west and by the Indian Ocean on the south. The Western Ghats formed its eastern boundary and on its north lay the princely state of Cochin.

The geographical positioning provided a bulwark against the import of diseases into the region from outside. At the same time, its connections with the outside world through trade and pilgrim movements made Thiruvithamkoor susceptible to import of diseases from outside. Besides, diseases of an endemic nature ravaged the region periodically. The concept of prevention of diseases was rather unknown till the beginning of the eighteenth century and what the indigenous therapeutic system suggested was to protect the individual against diseases by strengthening his resistance rather than preventing the occurrence of the disease at the community level.

The first major public health intervention in Thiruvithamkoor, as in the rest of India, was vaccination against smallpox. Though vaccination was introduced into Thiruvithamkoor in 1813, it was only in the 1860s that measures were taken to extend it to the general population. By the beginning of the twentieth century, Thiruvithamkoor had 64 vaccinators employed under the government, including six women; and a significant proportion of its population, especially in the younger age groups, had been vaccinated against smallpox.

But small pox was only one of the communicable diseases in Thiruvithamkoor. Dr. Ross, the Durbar physician wrote in his annual report for 1870:

‘Travancore is afflicted with a high rate of mortality arising from zymotic or preventable diseases. The occurrence of these is due to an almost total absence of all sanitary precautions or observances both as regards the state and as regards the individual’¹.

While prevention of these diseases through medical intervention had not yet come out, the role of sanitation in controlling many of them had been recognised. The Royal Commission appointed to inquire into the health of the troops in India (1859), which paved the way for the appointment of Sanitary Commissioners in the Presidencies noted: ‘Apart from the question of humanity, the introduction of an efficient system of hygiene in India is of essential importance to the interests of the empire’². But it was only in 1895 that a Sanitary Commissioner was appointed in Thiruvithamkoor; and two years later the Thiruvithamkoor government passed its first Epidemic Regulation Act³. It was no wonder that the appointment came in the midst of a severe cholera epidemic that killed, in the course of 1894-95, more than 18000 persons, the largest ever reported mortality due to the disease in Thiruvithamkoor. By 1897-98, Thiruvithamkoor was said to have opened 39 conservancy stations and employed 544 persons for public healthcare, including 389 attending to sanitation work⁴.

These measures were not sufficient to control the incidence of epidemics. With the opening up of the frontier parts of the state for commercial cultivation and the consequent movement of men and materials over larger geographical areas, it became easier for a disease to assume epidemic proportions. Not only did the scourge of traditional epidemic diseases remain unchallenged, but new ones also appeared.

This was particularly the case with Malaria, which accompanied the construction of large-scale irrigation canals, road building and the widespread opening up of large forest areas for cultivation. By the beginning of the twentieth century, Malaria became the single largest cause of hospital treatment in Thiruvithamkoor; Out of the 6,23,643 patients treated in the medical institutions in Thiruvithamkoor in 1903-04, Malarial fevers accounted for the largest number (79,947)⁵.

The pathogens of many of these diseases had been identified and isolated by the beginning of the twentieth century and there was greater understanding that most of them might be prevented through public health interventions. The discoveries of Pasteur, Koch and Klebes had espoused the idea that diseases can be controlled by means of destroying the causative germs. In Travancore, this knowledge about the possibility of prevention was handed down to the population through the educational system. By the beginning of the twentieth century, Thiruvithamkoor had a wide system of educational institutions, thanks to the efforts of the local government and the Christian missionaries from the second decade of the nineteenth century⁶. One out of every 16 persons in the population in 1900-01 was enrolled as a student in a recognized school. By 1930-31, the figure rose to 1:9⁷.

Deep public concern began to emerge from the beginning of the twentieth century seeking government intervention in preventing diseases. For instance, in 1914, Parayil Varkey Tharakan, a native of Shertallai, submitted a memorial to the government praying for enquiry into elephantiasis in his native taluk⁸. Letters and telegrams sent to the Dewan from the affected areas during epidemics prayed for effective intervention⁹. Subsequently, resolutions were brought before the Town Improvement Committees¹⁰ and the *Travancore* Legislative Council drawing attention to the prevalence of communicable diseases and urging

the government 'to fight out the diseases both by preventive and curative measures, utilising the most up-to-date methods available' ¹¹.

The government responded to these demands in 1921 by appointing a medical entomologist to study the 'diseases peculiar to Travancore' and to suggest measures to control them and by opening a medical research laboratory. Towards the close of the year, a programme was undertaken for health education and for studying the incidence of *elephantiasis*, malaria, hookworm and leprosy. Nevertheless, the measure did not become very popular nor were they comprehensive enough to control epidemics¹².

The high mortality from cholera reported in 1929, next only to what was reported in 1895, brought the government to a quandary. Already in 1925, demands had been placed before the Legislative Council for immediate government intervention to control water-borne diseases¹³. Consequently, the Sanitary Commissioner had submitted 'a scheme for the maintenance of public health in the state' in 1925, 'emphasizing on health education, rural sanitation, the need for good water supply and the introduction of compulsory vaccination in the rural areas'. Nevertheless, these recommendations did not make any material improvement in the situation. In the midst of the criticisms leveled against the government by the press and the legislature, the *Dewan* declared in the 24th session of the *Srimoolam Popular Assembly*, the Lower House of the State's bicameral legislature, the government's decision to 'a thorough overhauling of the Sanitary Department in order to create a modern Public Health Department in the state with the advice and co-operation of the Rockefeller Foundation'¹⁴.

The Rockefeller Concern for Public Health

Born out of the fortunes of the U.S oil giant, Standard Oil Co., the Rockefeller Foundation's concern for public health sprang initially from

the interests of Northern capital in the politically disturbed southern U.S.A¹⁵. In 1909, they founded the Rockefeller Sanitary Commission for the eradication of hookworm disease from the South where hookworm and malaria affected labour productivity in the farms and the mills. Simultaneously, the National Sanitary Commission was projected to begin to spread anti-hookworm activities to other countries. On June 13, 1913, the National Health Commission was created with the purpose of eradicating hookworm from the United States. The National Commission was soon replaced by an International Commission, spreading the Foundation's activities to wider geographical regions, particularly the tropics in Asia and Latin America.

The geographical expansion of the Foundation's activities was partially born out of the growing U.S trade interests. In fact, the connection between Rockefeller philanthropy and U.S trade interests was explained by Gates, the chief lieutenant of the Rockefellers and one of the chief officers of the Foundation, in a letter to John.D.Rockefeller. Advocating a \$ 1,00,000 donation to an organisation of congregational missions in 1905, Gates wrote:

'Quite apart from the question of persons converted, the more commercial results of missionary effort to our own land is worth... a thousand-fold every year of what is spent on missions...Missionary enterprise, viewed solely from a commercial standpoint is immensely profitable. From the point of view of means of subsistence for Americans, our import trade, traceable mainly to the channels of intercourse opened up by missionaries, is enormous. Imports from heathen lands furnish as cheaply with many of the luxuries of life and not a few of the comforts, and with many things, indeed, which we now regard as necessities... Our imports are balanced by our exports to the same countries of American manufactures. Our export trade is growing by leaps and bounds. Such

growth would have been utterly impossible, but for the commercial conquest of foreign lands under the lead of the missionary endeavor. What a boon to home industry and manufacture' ¹⁶

From the beginning of the twentieth century, and especially from the First World War period, the share of Europe in U.S trade had fallen steadily and this was compensated by the increasing share of the tropics, especially Asia. For instance, the share of Europe in U.S' imports and exports fell from 51.3 percent and 72.3 percent respectively during 1901-05 to 30.1 percent and 52.7 percent during 1921-25; the share of Asia, which was only 15.4 percent and 5.3 percent in imports and exports respectively during 1901-05 rose to 28.7 percent and 11.3 percent during 1921-25¹⁷. While the prevalence of disease was detrimental to the growth of trade, trade with a disease- prone area carried with it the disease-causing germs.

But trade provided only one of the reasons for the expansion of Foundation's activities. Equally important was the American military and diplomatic interest¹⁸. As Dr.Paul Russel, one of the malaria experts of the Foundation put it later: ' a malaria eradication programme is a dramatic undertaking that would penetrate into the homes of people and would benefit the U.S politically and financially'¹⁹. The spread of health activities to far-fetched areas was sought to provide, even when the trade interests were not immediate, locations that could be used as tropical observatories where research on diseases as varied as hookworm, yaws, yellow fever, malaria, filariasis and plague, could be carried out with much ease. In fact, in Travancore the Foundation representatives saw a better observatory than elsewhere.

Towards Institutionalisation of Public Health in Thiruvithamkoor

The Foundation had spread its operations into India immediately after the First World War. It was instrumental in the founding of the all-

India school of Hygiene and Public health in Calcutta²⁰ and from 1919, it had undertaken a campaign against hookworm disease in the Madras Presidency. In 1927, on the request of the Mysore government, the Foundation carried out a public health survey; subsequently it lent the services of a public health consultant and a sanitary engineer and set up malaria field stations²¹.

In February 1928, the government of Thiruvithamkoor requested the Foundation to extend their help in 'organising a public health department on modern lines'. Immediately before that Dr.Heiser, the Foundation's international health division's director for the East, Dr.Kendrick, the Foundation's representative in Madras, and Dr.Jacocks, a public health expert and the Foundation's representative in Ceylon visited Thiruvithamkoor at the request of the government. After 'a topographical survey of the region and discussions with the medical officers', they were 'personally satisfied that there was ample scope for extending the activities of the Foundation to the state'²². Already the medical entomologist appointed by the Thiruvithamkoor government during 1921-23, had prepared a list of prominent diseases in the region and this was in perfect conformity with the diseases on which the Foundation had already been interested and working elsewhere. Moreover, the Foundation representatives found Thiruvithamkoor with its high rate of literacy, wide circulation of newspapers, network of hospitals and trained medical personnel, as the most suited for public health work.²³

Thiruvithamkoor had, in 1928, 30 hospitals, 38 dispensaries, 18 grant in aid medical institutions and 14 mission hospitals that dispensed western medical care²⁴. Besides dispensing medicine, they also conducted vaccination against small pox. Moreover, the laboratory established in 1921 had been producing vaccines against typhoid,

smallpox and cholera and conducting various tests for diagnostic purposes. In 1928, Punjab and Burma also had requested the Foundation to help them set up public health organisations. But the Foundation turned down the application of Punjab²⁵. The reason for the rejection of Punjab's request is not clear; however, Punjab lagged behind the other two regions in terms of literacy and the educational standard of the population. In 1931, Burma had a literacy rate of 36.8 percent, and Travancore of 28.9 percent, while for Punjab it was as low as 6.3 percent. For the Foundation, this was significant 'since literacy was essential not only for disseminating their ideas on public health, but also for finding out suitable hands to run the public health programmes'²⁶.

'At the instance of the Foundation representatives' Thiruvithamkoor government wrote to the president of the Foundation on 1st June 1928 to lend the services of two of its experts, one in public health and the other in sanitary engineering, to Travancore²⁷. In March 1929, the Foundation deputed Dr. Jacocks, a public health expert, who had been the Foundation's representative in Ceylon, to Thiruvithamkoor, but turned down the request for an expert in sanitary engineering. Immediately before his arrival in Trivandrum, Dr. Jacocks had communicated with the Thiruvithamkoor government 'on a tentative programme of public health work to be worked at the joint expenses of the government and the foundation'²⁸. His suggestions were for the codification of a public health law, the provision of fellowships for training in public health, public health education, survey and treatment of the hookworm disease, malaria and filariasis surveys, sanitary engineering and sanitation.

On his arrival in Trivandrum, Dr. Jacocks was granted 'the status and position of the head of a major department in the state with the designation 'Honorary Adviser, Public Health''. And, the Government of

Thiruvithamkoor formed a three- member Medical Board to assist him in formulating a public health plan²⁹. Subsequently, Dr.Jacocks submitted a 'revised' public health programme for implementation in Thiruvithamkoor. But the programme differed from the proposal he had sent earlier. The codification of a public health law and sanitation and sanitary engineering, which were included in the earlier set of proposals, did not find their place in the new scheme³⁰. The project again underwent alteration, as Dr.Jacocks proposed a new scheme of public health on 25th October 1929 by including the idea of a health unit scheme and maternity and child welfare work³¹ and Thiruvithamkoor's Legislative Council voted a sum of Rs.60, 000/- for its implementation in 1929³².

The institutionalisation of the Foundation's public health scheme needed the formation of a public health department and the development of infrastructure to suit the public health package³³. A temporary department, headed by Dr.Jacocks, to handle the new public health scheme was formed in 1929. It was made permanent in 1934 and Dr.Jacocks was its director till his departure from the state in 1935. The already existing Sanitary Department, which had been functioning from 1896, handling vaccination against small pox and addressing questions of sanitation, sweeping and road scavenging³⁴ in the conservancy stations and the capital town, was allowed to continue till 1934 when it was amalgamated with the new public health department. The laboratory, which had existed since 1921, was expanded with entomological, hookworm and bacteriology sections, and the medical personnel in the state were redeployed to make sure that there was sufficient hands to implement the public health programme; in cases in which the number of medical and public health personnel were insufficient, new hands were trained in the laboratory and the health unit.

All these were done under the advice of the Foundation representative. In 1929, the Foundation deputed two of Thiruvithamkoor

doctors for training in Johns Hopkins at Baltimore. The Foundation met the expenditure of one, that of the other being borne by the Thiruvithamkoor government. On return, one of them became the director of public health in 1935, a position, which had been earlier occupied by the Foundation representative. The other was entrusted with the health unit programme at Neyyatinkara. Later the Foundation provided fellowships for four doctors from Thiruvithamkoor for training in their different centres abroad. This gave the Foundation the space for institutionalising their philosophy of health and medicine in Thiruvithamkoor. Even after the foundation representative left Thiruvithamkoor, public health department in Thiruvithamkoor was headed by a person trained by the Foundation and the public health activities were modeled along the lines of the Rockefeller programmes.

The Hookworm Campaign

The first thing that caught the eyes of the Foundation in Thiruvithamkoor was the hookworm disease. The Foundation had already expanded its hookworm studies into the plantations in Ceylon³⁵ and had started its search into the possibility of controlling the disease with the use of drugs. A study made in 1921 in Thiruvananthapuram had put the incidence of the disease at 63 percent and a general survey to assess the incidence of the disease across the state was considered an important necessity before control measures were adopted. A statewide survey was begun under the direct supervision of the Foundation representative on the 6 February 1930, which revealed an average incidence of 93.2 percent.

What was conspicuous in the Foundation's activity was not the incidence of the disease, but the methods to combat it. Initially, the efficacy of the drug on the local population had to be ascertained. At the central prison, thirty long-term prisoners representing 13 occupations

and 16 different taluks were selected at random for the purpose. Two courses of test treatment were administered on them with a mixture of oil of *chenopodium* and *carbon tetrachloride*. Faecal and blood samples of these 'human guinea pigs' were taken before and after treatment to assess the results³⁶.

To the foundation representative it was clear that the control of the disease would be possible only through long-term measures. The host of the disease was transmitted through human excreta and entered the body from the contaminated soil through the bare foot. But, 'permanent control required a long time to accomplish and, in the mean time temporary control was possible by instituting mass treatments at periodic intervals'³⁷.

The treatment programme was extended³⁸ to the general population across the state from March 3, 1931. It took the forms of a campaign, as if in a war-field. Handbills, wall posters and newspaper notifications were used to advertise the treatment. The local revenue authorities arranged lantern lectures in the evening, preceding the day of treatment and supplied specimen tins to those gathered. Faecal samples before and after treatment were taken for examination and the results recorded to assess the effect of the drug³⁹.

The campaigns attracted large masses 'and met with a good response from the people'⁴⁰. One indicator was that out of Rs. 50406 spent on public health in Thiruvithamkoor during 1930-31, Rs.18115 (36%) was on hookworm survey and treatment. The large proportion of the population on whom the drugs were experimented was proof enough of the success of the Foundation programme. Between March 1931 and January 1932, when the campaign was suspended under orders of the government, 1,71,223 persons had undergone treatment⁴¹.

The overwhelming interest of the Foundation in the campaign was so obvious that it gave financial support to revive the programme in 1933⁴². The foundation representative claimed that the average incidence of the disease was reduced as a result of the treatment campaign from 93 percent to 63 percent. But the operations were continued, extending them to the plantations, where the disease was said to have reduced labour productivity significantly. Till 1934, when the treatment campaign was finally stopped, an additional 1,00,110 persons had undergone treatment. The total number of persons treated came to barely 5.33 percent of the state's population, but the Foundation decided to withdraw the treatment campaign, because by this time the effect of the drug had undergone sufficient experimentation for its adoption elsewhere.

In Search of the Entomology of Filariasis, Malaria and Plague

The basic philosophy that the Foundation sought to advance in Thiruvithamkoor related to its entomological approach in controlling diseases. The mosquito vector had given enough trouble to the Foundation not only in Thiruvithamkoor, but also in other parts of the world where it had been working. By this time, it was proven that not all the mosquito varieties were dangerous to the human being; identifying the causative vector and destroying their environment provided the key to the Foundation's activity in controlling diseases.

The initial attempt of the Foundation was to identify the incidence of filariasis across the state. The reasoning was that any enquiry relating to the disease should start from the identification of areas where the incidence of the disease was high and the attack against the disease should start specifically from these areas. In July 1930, an investigation into the incidence of filariasis was taken up in Trivandrum and in the other places in the state where the disease had taken deep roots through an examination of night peripheral blood samples.

By this time, the causative vector of filariasis had been known. But the living environment and bionomics of the vector varied across regions and even within the same region. The enquiries of the public health personnel under the guidance of the foundation representative showed that in Trivandrum the disease was spread by *W.Bancrofti*, transmitted by *Culex Fatigans* which multiplied in the masonry drains and their out-falls; and, contrary to the popular belief, ponds, rice fields and swamps were not responsible for the output of the species, which preferred to breed in dirty water with heavy sullage contamination⁴³. In Shertala and Ambalapuzha taluks the disease, was *F.Malayi*, 'a new species first described by S.L Brug from the Dutch East Indies' and spread by the *Mansonioides* (*Mansonia Annuliferus Theob*) which preferred to breed in the water plant, '*pistia*'⁴⁴

Once the causative vector and its bionomics were understood, the attempt of the Foundation representative turned to methods of destroying the mosquito at its source. Thus, in Trivandrum it included the clearing of the breeding places through oiling and the construction of soakage pits. In Shertala and Ambalapuzha, the method was to remove the *pistia* to make the environment unsuitable for mosquito breeding.

In 1933, an experiment for the destruction of *pistia* by means of slaked lime was carried out, but it was observed that the lime killed the *pistia*, but after two months fresh *pistia* started to grow from the old stems which were not killed.⁴⁵ A programme to remove *pistia*, in an area of about twenty square miles was started in 1934. The effectiveness of the clearance, as a means of *mansonioides* control, was tested by time catches within the cleared zone and catches in the area outside the zone and also by measuring the incidence of infection among mosquitoes collected from the area of operation as compared with the infection among mosquitoes caught from the areas outside it.

During 1934-35, control stations were established to measure the efficacy of *pistia* removal by examination of mosquitoes and of human blood smear for the presence of microfilaria. In April 1937 night blood test of 174 children- 87 from within the controlled area and 87 from outside 'well removed from the area of control' - was conducted under the direct supervision of the Foundation representative. The results showed that *pistia* clearance had a positive effect on controlling the mansonioides. In the controlled area, there was only one child, 3 and a half years old, who had microfilaria in its night blood specimen. In 71 children, of less than two years of age, there was no infection in the controlled zone, while 19.6 percent of children in the nearby comparison area were found to have *F. malayi* infection in their night blood samples⁴⁶.

The search of the Rockefeller Foundation for disease vector and attempts to control the vector were not limited to filariasis only. The construction of the inter-oceanic Panama Canal had brought General William Gorgas from Cuba to fight yellow fever and malaria in 1904. Malaria had, by this time, become a major malady in many countries, including the southern United States. Based on the experience drawn, the Foundation was able to appreciate the magnitude of the malaria problem, especially in terms of its economic impact. Drawing its experience from Trinidad, the Foundation noted, '...that the economic efficiency of the labour force in the area where the International Health Commission has been developing its project, had enjoyed an increase of more than twenty percent, measured in terms of effective man hours, during one year's time'. In addition, 'the economic results that could be expected would justify great expenditures'⁴⁷. The Foundation's annual report in 1915 outlined the disease's general state, the importance of combating it and the tactics that the Foundation was predisposed to use to control it.⁴⁸ In about 1920, the Foundation decided to expand its operational area of experimentation and study of the malaria problem to

the other parts of the world⁴⁹; efforts were focussed on sanitary engineering and the utilization of chemical agents such as Paris Green. By 1926, the main thrust of the Foundation's operations had been on researching the ecological factors peculiar to the anopheles mosquito⁵⁰.

In 1931, the Foundation representative started his investigations into the incidence of malaria in Thiruvithamkoor by examining children under twelve years of age for enlarged spleen, blood films and a study of the mosquito fauna⁵¹. The disease was seen to be present throughout the hill bases, which had been opened up for plantations. All the three varieties *p.vivax*, *p.falciparum* and *p.malariae* were found to prevail, but the relative rate of incidence varied from locality to locality⁵².

Malaria was seen by the Honorary Adviser as 'a highly specialised public health problem and methods of control vary in the different localities in the same country and even in the same district'⁵³. In 1932, the public health department opened its first field station in one of the endemic areas to study 'the spleen rate, fever rate, parasite rate, anopheles breeding, infectivity, atmospheric temperature, humidity and rainfall as also the interaction of the different factors'⁵⁴. Adult mosquitoes were collected, dissected and examined, under the direction of the Foundation representative, to observe the seasonal incidence of the different species of anopheles and the extent of their infection⁵⁵.

At the same time as the Foundation had been proceeding with entomological inquiries and the incidence of malaria, Thiruvithamkoor was affected by a severe outbreak of the disease in 1934-35. Apparently, the disease was imported into Thiruvithamkoor from Ceylon where it had killed about 80000 persons in the space of seven months. 'Starting from the endemic centres of malaria located at the foot hills the disease soon began to spread to other areas' and by the end of the year the disease spread to all parts of Thiruvithamkoor. The epidemic was said to

be 'the first of its kind in Thiruvithamkoor' and the chief factor in its spread had been suitable meteorological conditions favoring very rapid breeding of anopheline mosquito. Other factors were a chronic malaria affected population from the endemic homes in search of food, and a non-resistant population in the plains below, weakened by two successive failures of crops into a ready prey for any infection. The excessive drought dried up the riverbeds and caused the formation of stagnant pools of water all along the streams and rivers and infective species of anopheline mosquitoes multiplied rapidly in these pools and formed the link necessary for the epidemic outbreak⁵⁶

The spread of the disease across Thiruvithamkoor provided the Foundation representative an opportunity to strengthen their inquiries into the entomology of malaria. The Assistant Surgeon on epidemiological duty and the Entomological Assistant were directed by the foundation representative to carry out a survey of the mosquito breeding places in some of the affected areas and to collect and examine samples of mosquitoes and larvae with a view to incriminate the exact species of mosquitoes transmitting the infection. These investigations showed thirteen varieties of anopheles prevalent in the area of infection, but only two of them were responsible for transmitting malaria: *A. Fluviatilis* and *A. Varuna*; the first one bred exclusively in running water and thrived in direct sunlight, and the second multiplied almost exclusively in wells⁵⁷.

Once the vector was identified, the Foundation turned its attention to controlling it. In south Thiruvithamkoor, where *A. Varuna* was seen as a potent carrier of malaria, experiments were made with larvicidal fish varieties. The stocking of *Gambusia* in wells once in two months was expected to form a 'valuable adjuvant to other anti-malaria operations and served to reduce the density of dangerous anophelines below the

requisite incidence for malaria transmission'. During 1938-39, 118 wells were stocked with *Gambusia* at the rate of ten fish per well in two villages and a fish hatchery was opened for breeding the fish variety.

By this time, the Foundation had expanded their malaria investigations into larger parts of India. To *Guindi* in Madras where the Foundation had established its central malaria laboratory and head quarters; to *Pattukottai* in *Tanjore* where it had opened its chief malaria field station; to *Ennore* near Madras where the foundation's malariologists had been busy with the relationship between anopheles breeding and *casuarina* cultivation; Mysore, where 'valuable experiments on rural malaria control through cheap methods were being conducted'; to the tea estates and foothills of Assam 'where malaria control is in operation on an elaborate scale'; to Bengal where 'interesting and valuable studies on malaria are being conducted'; to several stations along the *Bengal -Nagpur* railway 'where malaria is kept under check by the intensive control measures undertaken by the railway authorities; and to *Wynad* where the Government of Madras, the Malaria Institute of India and the Ross Institute had been conjointly tackling the malaria problem in the foothills of the district. In all these places, the chief investigation of the Foundation related to the breeding of anopheles mosquito and the methods to control the anopheles to a minimum safety index⁵⁸.

During 1939-40, intensive malaria control through anti-mosquito measures was started in 12 villages of the Neyyatinkara taluk with spleen rates ranging from 22 to 100. The total area of operation was 15 square miles. The actual control operations included anti-adult measures and anti-larval measures. The first consisted of weekly spraying of the interior of the habitations with a mixture of *pyrocyde* and kerosene. Anti-larval measures consisted of dusting the margins of the streams with the

chemical *Paris Green*, oiling the river streams with a mixture of *Crephol* and crude oil, canalising of streams, vegetation clearance, leveling, and filling and stocking wells with larvivorous fish. More than two thousand wells were stocked with fish, the total number of fish introduced being 40,600. The results were found 'promising' since the larvae and adults of carrier species in the control locality were considerably reduced.

But the mosquito skipped all measures of control; the attempts to attack the anopheles in their natural habitats affected only the epidermis of malaria. The disease again took to an epidemic form in 1945, with its sources of origin unchanged. The destruction of the mosquito at its source operated only in a small area and did not go beyond the stage of experimentation.

The Foundation's search for vector control in Thiruvithamkoor was extended to rats and rat fleas in 1932. By this time animal plague prevailed over vast tracts, including the western United States, extending from the Pacific to North Dakota, which had become a permanent endemic area⁵⁹. The role of the rodent in communicating the disease had been known and methods to control plague through inoculation had been developed. What was not certain was the incidence of the *Cheopis* rate in different varieties of rats, their seasonal variation and the means to control the flea population. Inoculation provided only partial protection and the prevention of plague was a matter of rodent control. From the 1920s methods to control rats 'through the cheapest method' had become one of the principal concerns of the Rockefeller Foundation.

In 1932, following the attack of plague in the tea plantations in Devikulam, the Foundation's honorary adviser ordered an enquiry into the *Cheopis* incidence along the foothills of Thiruvithamkoor. Already the Foundation had been busy with rat flea surveys in Ceylon and the survey in Thiruvithamkoor was designed 'on similar lines'⁶⁰. The studies

showed that ‘the climatic conditions in the plains of Travancore are not unfavourable to *Cheopis* invasion’⁶¹ and ‘the mist and the cool climate in the tea estates favoured the growth of *X.Cheopis*’; in some of the estates 27 percent of the fleas collected were *X.Cheopis*⁶². Fumigation of rat burrows, storehouses and goods that passed through with *cyanide gas* were the principal prescriptions of the Foundation for rodent control; in 1932 alone as many as 73,698 burrows were treated with the deadly gas.

The spread of plague from the neighbouring territories of Cochin to Alleppey in 1936 provided the Foundation representative an opportunity to continue with the rodent studies. The Foundation representative suggested, much to the harassment of trade⁶³, the stoppage of all trade at Alleppey as a means of controlling the disease. But the government considered the proposal as ‘suicidal since it would divert all the trade from Alleppey’, the principal port town of Thiruvithamkoor to the port of Cochin. Instead the government suggested, with the concurrence of the Foundation representative, mass inoculation, fumigation of the goods that passed through and de-ratting of the canal boats and launches and even declared a financial reward for those who killed the rat population⁶⁴. The public health officials, under the direction and supervision of the Foundation representative, started a detailed survey of rats and fleas ‘with a view to study the influence of climatic changes and seasonal variation on the rat and flea population, breeding season of rats and fleas and variations of flea index according to hosts’⁶⁵.

The inquiries on rats and rat fleas were extended, in the aftermath of the epidemic outbreak, to the rest of Thiruvithamkoor to identify areas of ‘potential danger’. Periodical cynogasing was adopted in all places where the presence of *X.Cheopis* was suspected. Already the efficacy of the method was being experimented by the Foundation

through controlled experiments in their principal plague research station at Cumbum Valley in the Madras presidency, jointly financed by the governments of Madras and Thiruvithamkoor⁶⁶. In 1937, the foundation claimed that ‘the value of periodic *cynogasing* of rat holes in godowns and other centres of rat population, in checking outbreaks of plague has been amply demonstrated at Alleppey’⁶⁷. Nevertheless, the rat fleas survived the control measures and, in 1940, the disease appeared not only in Alleppey but also in Quilon, another important trading centre of Thiruvithamkoor⁶⁸.

The incidence and etiology of malaria, filariasis and plague formed the central concern of the Foundation in Thiruvithamkoor. This concern was reflected in field studies, laboratory research and model control demonstrations. Contrary to its general indifference in financing the health programme in Thiruvithamkoor, the Foundation even contributed a sum of Rs. 5403 towards medical entomology in 1933, ‘in the light of the inability of the government to pay the salaries of the subordinates in the section due to the Depression’⁶⁹. ‘The unswerving spirit’ of the Foundation, as noted by its 1926 Annual Report was ‘to stimulate progress, bring about experimentation, demonstrate new methods and increase efficiency’⁷⁰. Thiruvithamkoor provided the Rockefeller Foundation a suitable place for making experimentation and supplied the Foundation with valuable information, not only on the etiology of diseases which it was predisposed to control but also on the means to contain them at the lowest possible cost.

The Neyyatinkara Health Unit

Thiruvithamkoor was seen by the Foundation as an area for putting on trial the ideas in which it had already been interested. Already the idea of the health unit, as a means for ‘providing the rural community, facilities for protection from diseases and for promotion of health’, was

being experimented by the Foundation's public health experts in many parts of the world, where they had been functioning⁷¹. In 1929, it was incorporated into the health package that the Foundation representative suggested for Thiruvithamkoor.

For choosing an 'appropriate' location for the health unit, the Foundation representative laid down specific criteria, and after considering the alternatives, Neyyatinkara a semi-urban area, not far from Trivandrum, was chosen in 1931. The initial coverage of the health unit was 28 square miles with a population of 39580, but was raised in 1933 to 40 square miles and 73000 population, 'to maintain a definite standard as followed by health units elsewhere'⁷²

The functions of the Health Unit, as laid down by the Foundation representative were diverse to include diagnosis and treatment of infectious diseases, midwifery services, school medical inspection, food and milk inspection, vaccination against small pox and typhoid, treatment of hookworm and malaria and study of epidemic diseases, supervision of latrine construction and collection of vital statistics⁷³. However, the Foundation representative was not keen on getting all these programmes implemented and some of them were never implemented at all.

Only in midwifery services and school medical inspection did the health unit make progress. Midwives and public health nurses trained in the health unit area and in the Rockefeller Foundation-guided health units in Ceylon, paid home-visits, registered pregnant women and attended to deliveries. One midwife was appointed for each revenue village. The total number of deliveries that received qualified midwifery attention in the health unit area in 1931, the year of its commencement was only 19, whereas 38 percent of the births in 1939 were attended to by qualified midwives. The maternal mortality rate per thousand live

births came down to an average of 3.98 in 1937-1940 from 8.94 during 1931-1934, the first three years of the existence of the health unit⁷⁴.

The Neyyatinkara Health Unit provided the Foundation ample scope for carrying out their studies on diseases, their propagation and control. Even the school medical inspection provided the Foundation a platform not only to have information on the health conditions in the region, but also a satisfactory sample to experiment their inquiries on diseases. Students were examined regularly for enlarged spleen and for hookworm and were administered drugs and nowhere could the Foundation get a better sample than this that could be monitored regularly.

Though the initial sanction to the health unit was only temporary, the Foundation representative was committed to its continuation. It was the only venture in Thiruvithamkoor for which the Foundation gave financial support. In 1935, the government suggested the establishment of a new health unit at Shertala by using some of the personnel already employed in Neyyatinkara. But the Foundation opposed it by all force and even threatened to withdraw its financial support to the programme. The Foundation, however, expressed its willingness to provide 50 % of the finance 'if the government was willing to start a new unit at Shertala', without affecting the staff strength of the Neyyatinkara unit⁷⁵. The Neyyatinkara Unit had become, by this time, a model for demonstration and a status symbol of the Rockefeller operations in Thiruvithamkoor and the Foundation was not prepared to make any alteration in its size, staff strength or programmes.

Creating Awareness and Co-operation: The Health Education Programme

The philosophy that the Foundation advanced in Thiruvithamkoor had been clear from the beginning: that diseases are caused by external agents and these agents should be destroyed at their

point of origin if the diseases are to be controlled. The activities of the Foundation needed the co-operation of the public not only to propagate this philosophy, but also to help them in their attempt to control the vectors. 'To attain complete success', the Foundation representative noted in 1930, 'it is necessary to have whole-hearted support and co-operation of the people in general, in addition to that received from the government'⁷⁶.

Public health education teams constituted the agency for spreading the ideology that the Foundation and its representative sought to advance and for sensitizing the people on health issues. The health education teams were used, initially, to mobilize support for the Foundation's programmes on hookworm, malaria and filariasis. The teams traveled with the hookworm survey parties and the public health personnel deputed to study filariasis and malaria. They gave lectures, distributed pamphlets and exhibited 'magic lanterns', slides and cinemas. The Health Propaganda Van was fitted with microphone, gramophone, amplifier, loudspeaker and cinema projectors and, taken on their own, was capable of attracting large masses⁷⁷.

The pamphlets issued by the health survey teams touched upon diverse aspects of public health. The subjects were in conformity with the Foundation's programmes; initially, they covered hookworm disease, the dangers from mosquitoes and filariasis⁷⁸. Later, the titles were expanded to accommodate the programmes that the Foundation sought to introduce and the diseases which they began to confront. In 1932, the health education pamphlets covered twenty-five titles as varied as hookworm, malaria, small pox, typhoid, dysentery, tuberculosis and plague⁷⁹.

The public health programmes were described by the Foundation and its representative as 'campaigns' and its success depended on the

efficacy with which the message that the Foundation sought to convey was carried to the common man in their homes, factories and farms. Nevertheless, the methods that the Rockefeller Foundation employed in Thiruvithamkoor were not unique. What the Foundation intended for was uniformity in their research programmes. In 1931, it sent Thiruvithamkoor's health education officer to Ceylon to study the possibility of copying the health education programme that the Foundation had been implementing in that country. However, the Foundation could make deep inroads into the public through the health education methods, thanks to the high level of social development in the region. The annual attendance to the health education lectures ranged from seventy-five thousands to three hundred thousands and as many as 23,800 copies of health pamphlets were issued annually. But more significant than these numbers, was the fact that nearly thirty percent of the population in Thiruvithamkoor was able to read the pamphlets, news paper articles and other health literature issued.

Responses and Reactions

The educational campaigns, as much as of the vector control programmes, of the Foundation were carried on in close co-operation with community organisations, schoolteachers, students and trade unions. The Foundation came to Thiruvithamkoor at the request of the local government, which acted in response to the pressure from the people, the press and the legislature, and at a time when social conflicts in the region had begun to take a new turn. The community-based organisations of the 'low' castes, the Muslims and the Christians had been preparing, by that time, for their agitation against the government for more civic rights, responsible government and for representation in the State's Legislature. Already these organisations had been instrumental in achieving to the 'low' castes access to educational institutions and medical establishments and in spearheading the demand

for education. When the Foundation embarked on the health education programme, in 1929, and thereafter, the health education teams were invited by these organisations for delivering lectures⁸⁰. The number of invitations went up in the ensuing years and the health education teams were able to cater to these demands ‘only as far as possible’⁸¹.

The extent of cooperation became so obvious that the removal of the water plant, ‘pistia’ as a means of filariasis vector control in Shertala was undertaken with the help of local people, students and social organisations. Again, in 1936, when Alleppey was affected by the plague epidemic, the Travancore Labour Association, led by the nascent communist movement, assured the government the ‘willingness to help through their men and their publications’. They issued ten thousand copies of a pamphlet, dealing with the different aspects of the disease and ‘asking the people to report rat falls to the public health authorities immediately on such occurrence’⁸².

This does not mean, however, that the Thiruvithamkoor society had been a blind ally to the programmes of the Rockefeller Foundation. The proceedings of the *Sri Chitra State Council* and the local press were rampant with criticisms against the Foundation and its representative. The Foundation representative was criticised for ‘interfering in the administrative work of the department’ and for ‘meddling with the creation of and filling up of appointments in the public health department’. ‘While in Mysore, Madras and Ceylon, the representative of the Rockefeller Foundation is only an agent of the Foundation, in Travancore’, it was noted, ‘he is allowed to interfere in the administrative work of the Department’⁸³.

Though the Thiruvithamkoor government had appointed a three-member Medical Board to supervise Foundation’s programme, the function of the Board was soon restricted, at the insistence of the

Foundation representative, to 'administrative and disciplinary actions against the survey parties and the subordinate executive staff'. Even these limited powers of the Board were gradually taken over by the Foundation representative so that it ceased to function⁸⁴.

The people of Thiruvithamkoor watched the Foundation's activities with interest, but at the same time were critical of some of the programmes and priorities. The Foundation representative was seen by a local legislator to 'concentrate his energy on the health unit programme for which he is advising the government to spend large amounts of money' and 'implementing a programme which is not suited to the Indian conditions'⁸⁵. *Malayala Manorama*, the leading Malayalam newspaper, noted in 1931:

'A Health Unit involves an expenditure of more than Rs.20, 000/-. Dr.Jacock's proposal is that 64 similar health units should be established in the whole state. This would require an expenditure of about 12 lakhs of rupees. Government should have to spend at least 50 lakhs of rupees annually if Dr.Jacock's scheme should be put into effect. Even the American government which stands today as the most wealthy power has not ventured to work any scheme for such stupendous cost'⁸⁶.

In a similar vein, M.N.Parameswaran Pillai, the most ardent critic of the Foundation's activities in Thiruvithamkoor, observed before the State Legislative Council in 1933:

'...The Honorary Adviser has proposed a scheme to divide the whole state into a number of units and government will have to spend something like Rs.40000 or Rs.50000 for each unit. I think it will be a terrible waste of public money, especially at this time of the Depression'⁸⁷.

The government itself conceded in 1934 that 'the usefulness of the Neyyatinkara Health Unit to the public is not commensurate with

the money spent on it'⁸⁸. When demand for opening more health units was placed by some of the Council members the government responded by stating it to be 'not within the province of practical politics'⁸⁹, and averred that 'without spending large amounts of money similar good things can be done in other places without instituting health units'⁹⁰.

However, the proposal to open a health unit at Shertala in 1935 by downsizing the Neyyatinkara health unit brought the Foundation into direct conflict with the Thiruvithamkoor government. The next year the Foundation decided to stop all financial help to the Neyyatinkara Health Unit⁹¹.

The very same time as the Foundation's relationship with the Thiruvithamkoor government was getting strained over the issue of the health unit, the simultaneous attack of malaria, cholera and plague in an epidemic form brought the Foundation to the midst of severe criticism. In fact, the Foundation was invited to Thiruvithamkoor in the context of the previous cholera epidemic and by the middle of the 1930s, typhoid had been declared a notified disease. Little had been done by the Foundation representative to prevent these and other water-borne diseases, except the inoculation of close contacts and chlorinating of water-supplies in the affected areas during each outbreak of cholera and typhoid and the opening of a water supply scheme for Trivandrum (of which the work was begun two years before the arrival of the Foundation representative). However, the inefficiency of inoculation against cholera in protecting the individuals against the disease had been pointed out by Thiruvithamkoor's Sanitary Commissioner during the epidemic of 1927-29⁹². Pointing to the lack of any permanent measures on controlling cholera, the Public Health Director wrote during the time of the cholera epidemic in 1935-36, which killed more than 6500 persons in the course of one year, of the little progress made with regard to 'suitable water

supplies rendered free from infection’ and that ‘ until a complete and state-wide supply of protected water supply is taken up cholera control will continue to be a race between infection and inoculation’⁹³

In the midst of the criticisms, Thiruvithamkoo government requested the Foundation, in 1938, for a fellowship for training in public health to one of its physicians, in response to the invitation of application for fellowships by the Foundation from Indian states and provinces. But the Foundation refused to send even the application form⁹⁴, and, in 1939, declared its decision to transfer the Foundation representative in Thiruvithamkoo, Dr.W.C. Sweet, to Delhi. Nevertheless, by this time, the Second World War had begun and the Foundation’s efforts were directed towards supporting the U.S war operations. Moreover, the Foundation’s focus itself had begun to undergo change by this time - from public health to medical care⁹⁵. No wonder, the Foundation gave the combined state of Thiruvithamkoo- Cochin its assistance later in building the first medical college in the region⁹⁶

Conclusion

The Rockefeller Foundation’s public health intervention in Thiruvithamkoo went beyond its avowed philanthropic objectives. In identifying the vectors of specific diseases, in searching for the environmental factors relating to their multiplication, in trying out methods to control them and in testing the efficacy of the drugs against particular diseases, the Foundation was guided by its own research agenda. While the prime objective in inviting the Foundation to Thiruvithamkoo arose from the heavy burden of waterborne diseases, particularly cholera, no significant attempt was made to control the occurrence of these diseases, though not to eradicate them. This inaction was evident right from the beginning. Though the initial agreement of the Foundation had been for lending the service of a public health

expert and a sanitary engineer into Thiruvithamkoor, the Foundation had sent only the former. Further, in awarding the fellowship scheme, though one of the two initial fellowships, as per the agreement between the Thiruvithamkoor government, had been meant for training in public health, the actual training to the person selected was channeled by the Foundation on its pet theme of the health unit. For one thing, the causative germs of most of water-borne diseases, particularly cholera, had become well-identified by the time the Foundation reached Thiruvithamkoor and methods to combat them had become well established so that they required little further research and for another, waterborne diseases had ceased to be a problem in most of the developed world, including the United States of America.

The international activities of the Foundation in public health sprang from the needs of the north American capital – the need to raise labour productivity as well as to expand markets to the far and the near. Within this paradigm, the overarching interest of the Foundation in Thiruvithamkoor was on research on particular diseases, which it was predisposed to combat in the light of their effects on labour productivity and profits. In doing so, Thiruvithamkoor provided the Foundation a good observatory where researches on these diseases could be done with efficacy. The State administration provided the funds and the necessary personnel and granted all facilities that the Foundation asked for. The Foundation's commitments were limited to one third of the expenditure of the Neyyatinkara Health Unit and the expenditure towards fellowships, besides the service of its health expert, and only one person from the Foundation worked in Thiruvithamkoor at a time.

The social fabric of Thiruvithamkoor provided the Foundation the space for negotiating its policies. Already, Thiruvithamkoor's society had made significant progress in creating popular awareness

and, the social reform movements that swept the state in the beginning of the twentieth century had been instrumental in demanding health care services as a matter of people's right⁹⁷. This provided the Foundation the critical support for implementing many of the programmes. But the popular participation extended not only to the implementation of the public health programmes but also to its critique, finally creating the ground for the Foundation's withdrawal from its public health intervention in Thiruvithamkoor.

Nevertheless, the Foundation's major contribution to Thiruvithamkoor perhaps lay in the institutionalisation of public health. The search for the causative vectors, their intensity over the different localities and bionomics became critical in controlling and finally eradicating some of the diseases later. The activities initiated under the advice of the Foundation representative were continued even after the Foundation representative left Thiruvithamkoor. A public health survey conducted in 1948⁹⁸ showed remarkable success in reducing filariasis and malaria and Kerala became the first state in India to eradicate endemic malaria in 1965. Though the eradication of the disease came in the context of broad based economic and social changes, it cannot be refuted that at least a part of the State was able to identify the most vulnerable regions where the control measures should focus.

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NOTES

- 1 Government of Travancore, Report on the Administration of Travancore, for the year 1870-71, Trivandrum, 1872, p.66
- 2 Quoted by Radhika Ramasubban, Imperial Health in British India, 1857-1900, in Roy Mac Leod and Milton Lewis (editors), Disease, Medicine and Empire, Routledge, London, 1988, p. 41.
- 3 The Regulation, issued in the midst of the large scale plague mortality in the Bombay Presidency, provided for improving sanitary conditions in the places of human crowding and for imposing quarantine at the sea ports, besides establishing plague observation stations on the Travancore borders. See, Cover File Number 2691, 1897, Kerala State Archives, Trivandrum
- 4 Government of Travancore, Report on the Administration of Travancore, for the year 1896-97, Trivandrum, 1898.
- 5 V. Nagam Aiya, The Travancore State Manual, 1906, Volume 2, Trivandrum,p.504, p.543
- 6 For educational developments in Kerala, see, P.R.Gopinathan Nair, Primary Education, Population Growth and Socio-Economic Change, A Comparative Study With Particular Reference to Kerala, Allied Publishers, New Delhi, 1981, P.R. Gopinathan Nair, Universalisation of Primary Education in Kerala, in P.R.Panchmukhi (editor), Studies in Educational Reforms in India, Volume 2, Educational Reforms at Different Levels, Himalaya Publishing House, New Delhi, 1981 and P.K.Michael Tharakan, Socio- Economic Factors in Educational Development, The case of Nineteenth Century Travancore, Economic and Political Weekly, November 10 and November 17, 1984.
- 7 Robin Jeffrey, Politics, Women and Well-Being, How Kerala Became a Model, Macmillan, London, 1989, p.454
- 8 File Number VII-13,General,1916, Kerala State Archives, Trivandrum
- 9 See, File VII-8, General, 1918, Kerala State Archives, Trivandrum
- 10 File Number VII-35, 1919, General, Kerala State Archives, Trivandrum
- 11 Government of Travancore, Travancore Legislative Council Proceedings, 1923, Trivandrum, Volume.3, p.139

- 12 The member of the Legislative Council from Shertala put the popular feeling about the work of the medical entomologist in 1923: ‘ I am not unaware of the fact that one supernumerary in the medical department has been sent to Shertala for associating himself with mosquitoes and is examining them. He has given chloroform to mosquitoes and is examining them. But no beneficial result has yet been found’. Government of Travancore, Travancore Legislative Council Proceedings, 1924, volume 5, Trivandrum, 1925, pp.763-767.
- 13 Government of Travancore, The Travancore Legislative Council Proceedings, 1925, volume 7, Trivandrum, 1926, p. 157, p.807.
- 14 File Number 1477 of 1928, General, Kerala State Archives, Trivandrum
- 15 Saul Franco-Agudelo, The Rockefeller Foundation’s Antimalarial Program in Latin America: Donating or Dominating, *International Journal of Health Services*, Volume 13, Number 1, 1983, pp. 51-67; E. Richard Brown, *Rockefeller Medicine Men, Medicine and Capitalism in America*, University of California Press, Berkeley, 1979.
- 16 Quoted in Richard. E. Brown, cited in note number 15, p.123.
- 17 Lance. E Davis, Jonathan R.T Hughes and Duncan M Mc’dongall, *American Economic History, The Development of a National Economy*, Richard D Irwin Inc., Homewood Illinois, 1969, pp.312-14.
- 18 See, Saul Franco-Agudelo, cited in note 15, Harry Cleaver, *Malaria and the Political Economy of Public Health*, *International Journal of Health Services*, Volume 7, Number 4, 1977 and Armando Solorzano, *Sowing the Seeds of Neo-Imperialism: The Rockefeller Foundation’s Yellow Fever Campaign in Mexico*, *International Journal of Health Services*, Volume 22, Number 3, 1992.
- 19 Quoted in Harry Cleaver, cited in note number 18, p.572
- 20 File Number 551 of 1932, L.G.A, Kerala State Archives, Trivandrum
- 21 Koji Kawashima, *Missionaries and a Hindu State, Travancore, 1858-1936*, Oxford University Press, Delhi, 1998, p.122-124.
- 22 File Number 338 of 1930, L.G.A, Kerala State Archives, Trivandrum
- 23 R.F, Travancore, *Notes on Public Health and Allied Subjects in Travancore*, Received from Dr. Kendrick, June 25, 1928, cited in Ariane Yechouron, A

History of Public Health and Medicine in Kerala, Unpublished thesis presented to the Committee on History and Science for the requirement of the degree of Bachelor of Arts, Harvard University, Cambridge, Massachusetts, pp. 44-45

- 24 File Number 90 of 1932, L.G.B, Kerala State Archives, Trivandrum
- 25 Koji, 1998, cited in note number 21, p.124
- 26 As one officer of the Foundation put it, Thiruvithamkooor 'could serve as the centre for Malaria officers and Sanitary engineers' for its operations in 'the rest of the far east and for training the nurses for the whole of India. See, Yechouron, 1980, cited in note number 23, pp.44-45. Already the effect of literacy on training medical personnel was obvious. The Government of Thiruvithamkooor had started classes to train medical subordinates and midwives as early as 1869 and had instituted scholarships for studying medicine at the Madras Medical College and Tanjore Medical School from the turn of the twentieth century. Both men and women were trained as hospital assistants, compounders, vaccinators and doctors to man the government hospitals. By 1927, Thiruvithamkooor had 137 doctors in the government medical institutions, of whom 17 were women. Besides this, were the medical subordinates trained by the Medical Missionaries. The London Missionary Society had opened a centre for training hospital assistants as early as 1869 and all their branch hospitals were trained by the medical men trained in the Medical School attached to their Central hospital at *Neyyoor*. Subsequently, in 1899, the Protestant Missionaries of the Salvation Army also opened a medical school to train hospital assistants and medical subordinates for their medical work among the low castes in Thiruvithamkooor. See, M. Kabir and T.N. Krishnan, *Social Intermediation and Health Change, Lessons from Kerala*, in Monica Das Gupta, Lincoln C Chen and T.N.Krishnan (editors), *Health, Poverty and Development in India*, Oxford University Press, Delhi, 1996, pp. 239-269.
- 27 File Number 1477 of 1928, General, Kerala State Archives, Trivandrum
- 28 File Number 338 of 1930, L.G.A, Kerala State Archives, Trivandrum
- 29 The powers of the Medical Board were subsequently reduced and were restricted to the exercise of administrative and disciplinary action against the survey parties and the subordinate executive staff and the government expressed its willingness even to transfer these powers to the Foundation

- representative. See, letter from the Chief Secretary to Dr.Jacocks, dt.30 October, 1929, File Number 1762 of 1929, General, Kerala State Archives, Trivandrum
- 30 D.O Number 2536, dated 4-9-1929, in file number 1762 of 1929, General, Kerala State Archives, Trivandrum.
- 31 A suggested programme of public health work for 1105 by Dr.Jacocks, dt.25th October, 1929, file number 1762 of 1929, General, Kerala State Archives, Trivandrum
- 32 File Number 165 of 1930, Ph, L.G.A, Kerala State Archives, Trivandrum
- 33 Notes, File Number 1762 of 1929, General, Kerala State Archives, Trivandrum
- 34 'Sweeping and Road Scavenging alone are taken up now in the conservancy stations'. Government of Travancore, Administration Report of the Sanitary Commissioner Travancore, 1107 M.E, 1931-32 A.D, Trivandrum, 1933, p.31
- 35 File Number 1415 of 1930, General, Kerala State Archives, Trivandrum
- 36 Government of Travancore, Annual Report of the Honorary Adviser, Public Health, Travancore, for 1105 M.E, 1929-30, Trivandrum, 1931, p.4
- 37 Government of Travancore, Administration Report of the Honorary Adviser, Public Health, Travancore for 1106 M.E, 1930-31, Trivandrum, 1932, p.8
- 38 File Number 255 of 1933, L.G.A, Public Health, Kerala State Archives, Trivandrum
- 39 Government of Travancore, cited in note number 37, p.3
- 40 Government of Travancore, cited in note number 37, p.3
- 41 Government of Travancore, cited in note number 34, p.3
- 42 Dr. Jacocks to the Chief Secretary, dt.14 February, File Number 255 of 1933, L.G.A, P.H, Kerala State Archives, Trivandrum
- 43 Government of Travancore, cited in note number 41, p.22.
- 44 Government of Travancore, cited in note number 41, Pp.22- 24

- 45 Government of Travancore, Administration Report of the Public Health Department, Travancore for the year 1109 M.E, 1933-34, Trivandrum, 1935, p 39.
- 46 Government of Travancore, Administration Report of the Public Health Department of Thiruvithamkoo, for 1112 M.E, 1936-37, Trivandrum, 1938, p.53
- 47 The Rockefeller Foundation, Annual Report, 1915, p.16, cited in Agudelo, cited in note number 15, p.55
- 48 See, Augudelo, cited in note 15, 1983
- 49 Within a short time, the Foundation's research reached the sugar plantations in Puerto Rica and Argentina, the Dominican Republic and the rice growing regions of Mexico. See, Agudelo, cited in note number 15, p.56
- 50 Rockefeller Foundation, Annual Report, 1926, quoted in Agudelo, cited in note number 15, p.61.
- 51 Government of Travancore, cited in note number 41, p.23
- 52 For instance, in Thodupuzha and in the plantation zones all the three varieties were found to prevail, the most dominant being p.vivax and, in sharp contrast, p.malariae infection was the most common in south Travancore. See, Government of Travancore, cited in note number 41, p.23
- 53 File Number 338 of 1930 L.G.A, Letter by Dr.Jacocks to the Thiruvithamkoo government from his Ceylon camp, Kerala State Archives, Trivandrum
- 54 Government of Travancore, cited in note number 41, p.23
- 55 Government of Travancore, Annual Report of the Public Health Department, Travancore for 1108 M.E, 1932-33, Trivandrum, 1934, p.29
- 56 Government of Travancore, The Administration Report of the Public Health Department, for 1110 M.E, 1934-35, Trivandrum, 1936, p. 20
- 57 Government of Travancore, cited in note number 56, p.39
- 58 Government of Travancore, Report on the Administration of the Public Health Department, Travancore for the Year 1114 M.E, 1938-39, Trivandrum, 1940, p. 35

- 59 Van Nostrand and Company, Van Nostrand's Scientific Encyclopedia, Fourth Edition, 1968, Princeton, New Jersey, p, 1359
- 60 File Number 45 of 1935, Dr. Hirst's visit to Travancore, L.G.A, Kerala State Archives
- 61 File Number 45 of 1935, cited in note number 60
- 62 File Number 838 of 1938, L.G.B, P.H, Kerala State Archives, Trivandrum
- 63 See, File Number 303 of 1939, L.G.B, Public Health, Kerala State Archives, Trivandrum.
- 64 File Number 303 of 1939, cited in note number 63,. Also see, Government of Travancore, Report on the Administration of the Public Health Department, Travancore, for the Year 1111 M.E, 1935-36, Trivandrum, 1937, p.35
- 65 Government of Travancore, Administration Report of the Public Health Department, Travancore, for the Year 1113M.E, 1937-38, Trivandrum, 1939, p.18.
- 66 Government of Travancore, cited in note number 65, p.33. Also see, Government of Travancore, Administration Report of the Public Health Department, Travancore, for the year 1109 M.E, 1933-34, p.34.
- 67 Government of Travancore, cited in note number 65, p.33
- 68 File Number 530 of 1940, L.G.B, P.H, Kerala State Archives, Trivandrum
- 69 File Number 1056 of 1933, L.G.A; File Number 255 of 1933, L.G.A, P.H, Letter from Dr.Jacocks to the Chief Secretary, .February 14 1933, Kerala State Archives, Trivandrum
- 70 Rockefeller Foundation, Annual Report, 1926, p.14, quoted in Agudelo, cited in note number 15, p.62.
- 71 Government of Travancore, Annual Report of the Honorary Adviser, Public Health, for the Year 1106 M.E, 1930-31, Trivandrum, 1932, p.7
- 72 Government of Travancore, Administration Report of the Public Health Department, for the Year 1109 M.E, 1933-34, Trivandrum, 1935, p.1.
- 73 File Number 966 of 1931, L.G.B, Kerala State Archives, Trivandrum
- 74 File Number 334 of 1943, L.G.B, P.H, Kerala State Archives, Trivandrum

- 75 Government of Travancore, The Travancore Sri Mulam Popular Assembly Proceedings, Volume IX, 1937, p.1062
- 76 Government of Travancore, Administration Report of the Honorary Adviser, Public Health, Travancore for 1106 M.E, 1930-31, Trivandrum 1932, p.8
- 77 'Its appearance at the scheduled lecture centres allures huge concourses of people, especially in villages and festival areas'. T.K.Velu Pillai, The Travancore State Manual, Volume III, 1996, Government of Kerala, p.810.
- 78 Government of Travancore, Annual Report of the Honorary Adviser, Public Health, Travancore for the Year 1105 M.E, 1929-30, Trivandrum, 1931, p.6
- 79 Government of Travancore, Annual Report of the Honorary Adviser, Public Health, Travancore for the Year 1107 M.E, 1931-32, Trivandrum 1933, p.2
- 80 Government of Travancore, Annual Report of the Honorary Adviser, Public Health, Travancore, for the Year 1105 M.E, 1929-30, Trivandrum, 1931, p.5
- 81 Government of Travancore, cited in note number 79, p. 2
- 82 File Number 303 of 1939, L.G.B, P.H, Kerala State Archives, Trivandrum
- 83 Government of Travancore, The Travancore Sri Chitra State Council Proceedings, 1933, volume 1, Trivandrum, 1934, p.288, Speech by M.N.Parameswaran Pillai.
- 84 R.O.C Number 6813 of 1929, General, Letter from the Chief Secretary to Dr.Jacocks, dated 30October, 1929, File Number 1762 of 1929, General, Kerala State Archives, Trivandrum.
- 85 Government of Travancore, cited in note number 83.
- 86 Malayala Manorama, Editorial, dated 30 September, 1932, quoted by Ariane Yechouron, cited in note number 23,.p.57
- 87 Government of Travancore, cited in note number 83, p.288.
- 88 Government of Travancore, The Travancore Sri Chitra State Council Proceedings, 1934, volume 3, Trivandrum, 1935, p.529.
- 89 Government of Travancore, The Travancore Sri Chitra State Council Proceedings, 1933, volume 1, Trivandrum 1934, p.327.

- 90 Government of Travancore, cited in note number 88, p.529.
- 91 Government of Travancore, Administration Report of the Public Health Department, Travancore, for the year 1113 M.E, 1937-38, Trivandrum, 1939, p.1
- 92 'It was very disappointing to note that the protection afforded by inoculation was very little or almost nil, as several persons who had received more than one inoculation fell victims to the disease'. Government of Travancore, The Thirty-fourth Annual Report of the Sanitary Commissioner, Travancore, 1104 M.E, 1928-29, Trivandrum, 1929, p. 22
- 93 File Number 762 of 1936, L.G.B, Kerala State Archives, Trivandrum.
- 94 File Number 222 of 1938, L.G.B, Public Health, Kerala State Archives, Trivandrum
- 95 Agudelo, cited in note number 15, p. 63
- 96 See, the plaque at the main gate of the Trivandrum Medical College.
- 97 Kabir.M.and T.N.Krishnan, Social Intermediation and Health Change, Lessons from Kerala, in Monica Dasgupta, Lincoln C Chen and T.N.Krishnan (editors), Health, Poverty and Development in India, Oxford University Press, Delhi, 1996.
- 98 Government of Travancore, Report of the Public Health Survey, 1947, Annual Report of the Public Health Department, Travancore, 1947-48, Trivandrum, 1948, pp.77-78

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