ANTI-MALARIA CAMPAIGNS IN URBAN ZANZIBAR, 1913-1945

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Colonial states in Africa began implementing measures to stop malaria in the late nineteenth century. Malaria had spread widely during the process of colonial conquest and occupation in these countries, accelerated by the extension of the colonial economy, the introduction of transport infrastructures, and urbanization. Colonial states initiated measures to curb malaria mainly in order to safeguard the welfare of the European colonial populations, but fear of the effect the disease could have on the available pool of African labour was another strong motivation for white administrators, settlers and medical officers to combat its spread. This paper examines the colonial government’s responses to malaria in urban Zanzibar between 1913 and 1945. In Zanzibar, like in many British colonies in Africa, the malaria control programmes focused more on sanitary and environmental engineering due to the lack of persistent insecticide until after 1945 with the adoption of DDT. The colonial government in Zanzibar initiated preventive measures which focused on the distribution of medicines and the elimination and killing of malaria mosquitoes. The urban planning programmes and sanitation measures were simultaneously introduced in that period. My main emphasize here is the role played by the Colonial Office (CO) in London in these campaigns.

Studies of anti-malaria programmes in colonial India and Africa have been done by several medical historians. Raymond Dumett, working on imperial British history, draws attention to the researches into malaria conducted from the late 1800s onwards by Patrick Manson, Ronald Ross and Robert Koch which influenced British anti-malaria policies in Africa.¹ Philip Curtin in ‘Medical Knowledge and Urban Planning in Colonial Tropical Africa’ illustrates British responses to malaria in its colonies in Africa. Curtin shows that in many colonial cities European and Africa residential quarters were segregated from one another on the recommendation of Ronald Ross (1857-1932), who also insisted on a

direct attack on the malarial mosquitoes’ breeding areas. According to Curtin, Ross “was much impressed by the segregationist argument; his previous experience in India convinced him that the cantonment policy worked”.\(^2\) John Cell also argues that segregation policies were implemented in West Africa from the late nineteenth century had originated in India. The Royal Commission on Army Sanitation was founded in 1858 in India and it proposed the separation between cantonments and civilian surroundings. Cell argues that “it is in the context of this general debate on malaria, with its emphasis on attacking the disease in the Indian population at large, that the advocacy of segregation by the Royal Society’s expedition to West Africa must be seen”.\(^3\)

Other scholars such as Randall Packard and Sheldon Watts have focused on the ways the colonial economy transformed malaria in Africa and India. One factor that hastened the spread of the disease was the introduction of irrigation systems and a cash crop economy. Sheldon Watts examines British-funded irrigation projects in relation to high malaria incidences and British attitudes towards malaria prevention in the Punjab from 1897 onwards.\(^4\) Randall Packard looks at the history of malaria epidemics in colonial Swaziland in the 1930s and 1940s. He links the epidemics with the underdevelopment of rural areas, subordination of Swazi economic interests to the local European settlers’ capital and the proletarization of Swazi labour.\(^5\)

A number of studies have discussed popular responses to imposed anti-malaria campaigns during the colonial era in Africa. Thevan Harry, in ‘Anti-Malarial Campaigns and African Opposition in Natal and Zululand, 1928-1938’ outlines measures that were employed to curb malaria in the region and the responses of the people to these programmes.\(^6\) Aran MacKinnon has connected the malaria epidemics that erupted in


\(^6\) Thevan Harry, ‘Anti-Malarial Campaigns and African Opposition in Natal and Zululand, 1928-1938’ (BA Honours, History Department, University of Natal, Durban, 1993). For the information on the anti-
Natal and Zululand in 1932 with the colonial economy. He argues that the expansion of white commercial sugar farming and the introduction of irrigation systems between 1918 and 1929 multiplied mosquito breeding sites. There was considerable resistance to malaria control measures from the Zulu population.  

R. Mansell Prothero observes that, in spite of the use of insecticides and drugs in the eradication of malaria, the introduction of migrant labourers from the mainland of Tanganyika to Zanzibar from the early twentieth century onwards extended the spread of the disease. He also shows that it was impossible to restrict migration to the islands because of the presence of bays and inlets suitable for landing purposes.  

David Clyde concentrated on the anti-malarial works during the German and British rule in Tanganyika and Zanzibar.  

Ibrahim Sundiata, a historian of slavery in Africa and America, examines the possibility that malaria caused the death of a large number of Omani Arab plantation owners in Zanzibar. He looks at the medical reports from the early 1920 to show how the health of the Arab children and adults was affected by malaria. Abdalla Mkumbukwa observes that anti-malaria campaigns in Zanzibar focussed on controlling rather than eradicating the disease. This paper builds on these works and extends them in that it analyses the contribution of the colonial health policies in the control of malaria. The archival sources concerning public health facilities and services in colonial urban Zanzibar are numerous. The Annual Reports of the Health Department supply detailed information concerning the anti-malarial measures that were instituted during colonial period.

**Malaria in Urban Zanzibar**

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Malaria is an ancient disease, present for the whole of human history in many parts of the world. The term malaria originates from medieval Italian, *mala aria* (bad air) and the disease was formerly called ague or marsh fever due to its association with swamps. Beginning in the early nineteenth century, many attempts were made to understand its etiology. While working in Constantine, Algeria in 1880, Alphonse Laveran, a French army doctor discovered the malaria pathogen from one of his patients. He demonstrated that the malaria parasite, to which he gave the name *plasmodium*, went through several stages of development in the human bloodstream before causing the illness. In 1890s, two Italian bacteriologists, Ettore Marchiafava and Angelo Celli, identified three species of malaria parasites, *Plasmodium vivax*, *P. falciparum* and *P. malariae*, correlating them with three types of fever: benign tertian, quartan and malignant tertian.\textsuperscript{11} Investigation of the role of anopheles mosquitoes in spreading malaria confirmed earlier work done by the British physician, Patrick Manson, on the role played by mosquitoes in the transmission of filariasis which causes elephantiasis.

In 1896 and 1897, while working in Calcutta, India, Ronald Ross proved the role of the anopheles mosquitoes in the transmission of malaria. In 1898 Ross established further that a *Culex* mosquito transmitted malaria from diseased to healthy birds by inoculation. Raymond Dumett explains that “acceptance of the mosquito theory not only revolutionized the study of tropical disease”, but also endowed “tropical sanitation with scientific status as a means of malaria prevention”.\textsuperscript{12} In 1899, as a professor of tropical medicine at the Liverpool School of Tropical Medicine, Ross went to Sierra Leone in order to identify the breeding habits of the anopheles mosquito and to devise methods for destroying anopheles breeding sites. He found that the *Anopheles gambiae* (then called *Anopheles costalis*) vector of falciparum malaria bred in small puddles, ditches and potholes and *A. funestus*, vector of vivax malaria bred mainly in clear placid water near the banks of streams.\textsuperscript{13}

\textsuperscript{12} Dumett, ‘The Campaign against Malaria’, p. 164.
\textsuperscript{13} Harrison, *Mosquitoes, Malaria and Man*, pp. 124-125.
The results of Ross’s field expedition in Sierra Leone were well received by the medical and health authorities in Zanzibar. Several articles on Ross’s works were published in various issues of the *Zanzibar Gazette*. Additionally, further information on malaria preventative measures proposed by Patrick Manson also appeared in the *Zanzibar Gazette*. The earliest state initiatives in controlling malaria in Zanzibar were carried out by Dr. Alfred Spurrier, the Director of Health Services. In 1900, Dr. Spurrier found the presence of malaria mosquito breeding areas in the town at Kiungani, Migombani and at the top swamp of Mr. Holmwood’s plot, *shamba*. Also, he found mosquito larvae in the disused stone water tank at Forodhani, near the *Baytil Sahil* Palace. The Kiungani and Migombani areas as we shall see later in this paper began to receive attention in 1908. The stone water tank was demolished immediately in 1900.

A few years later, Dr. W. Mansfield-Aders, a graduate from the London School of Hygiene and Tropical Medicine who specialized in entomology was appointed to work as an entomologist at the Department of Health in Zanzibar. He conducted several surveys of mosquitoes and insects in Zanzibar. In 1917, for instance, he recorded that *Anopheles funestus* bred in flooded rice-fields in the suburbs and in rural areas. In 1926, Dr. Mansfield-Aders conducted further research and identified six species of the anopheles mosquito in Unguja and Pemba islands: *Anopheles costalis*, *Anopheles funestus*, *Anopheles mauritianus*, *Anopheles maculpalpis*, *Anopheles squamosus*, and *Anopheles longipalpis*. He reported that *Anopheles costalis* was the major vector of malaria while *Anopheles funestus* played a secondary role. He published his findings in 1927 in the *Transactions of the Royal Society of Tropical Medicine and Hygiene*.

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14 Zanzibar National Archives (ZNA) BA 104, *Zanzibar Gazette*: 16 September 1898; 14 December 1898; 21 December 1898; 28 December 1898; 4 January 1899; 25 January 1899; 1 February 1899; 5 February 1899; 6 September 1899; 25 October 1899; 24 January 1900; 14 February 1900; 21 February 1900; 28 March 1900; 18 April 1900; 25 April 1900; 16 May 1900; 23 May 1900; 30 May 1900; 6 June 1900; 13 June 1900; 20 June 1900; 27 June 1900; 18 July 1900 and 18 October 1899.
15 ZNA BA 104/9, The *Zanzibar Gazette*, 7 February 1900, p. 5.
Dr. Mansfield-Aders also spotted *A. costalis* on large open swamps, shallows and backwaters of rivers, scattered across the islands. He observed that “*A. costalis* showed a great preference for borrow-pit, which was dug all over island for collecting water in the dry season, and pools between the heaped up beds of earth made by the people while planting maniocs, [cassava] and sweet-potatoes”.\(^{18}\) He reported that:

They have been found breeding in shallow depressions in coral rocks just above high-water mark. In the town, they have been detected ovipositing under various conditions, such as in hoof-prints of cattle, earthen jars, sailing boats, canoes, lighters, and in any receptacle containing water which when exposed to the sun may serve as a nursery.\(^ {19}\)

*A. funestus* were recorded in shallows at the sides of rivers, seepage water from hills, and the edges of swamps. Mansfield-Aders described “these larvae [as] are always found in shady areas and in water fully exposed to the sun”.\(^ {20}\) Both species of mosquito were reported to “enter houses, engorge themselves with the blood of the human inmates, and remain in a torpid condition until the late afternoon when they again become active”.\(^ {21}\)

Early twentieth century anti-malaria campaigns implicated six major areas in Zanzibar. As records from the Department of Medicine and Public Health and other administrative files from these two departments show, they included the reclamation of swampy ground and canalization of streams. Huts in the Stone Town area, in particular at Vuga, Shangani and Mjia Mpia, were also removed. Scattered cattle and goat pens in Stone Town were removed to Ng’ambo and later to the suburb areas. The Zanzibar colonial Government decided to extend a piped water supply through Stone Town to prevent the use of shallow wells. But wells continued to exist in Ng’ambo until 1960. The filling of natural depressions caused by quarrying works started from 1930. Quinine was distributed to many people in Zanzibar. The mosquito control programmes had targeted various species of anopheles through mosquito patrols. These measures were a response to the growing medical understanding that malaria was spread by mosquitoes. Between 1913 and 1945, the anti-malarial projects in Zanzibar were carried on through the advices and assistances from the Colonial Office (CO) in London. Professor Simpson, the Colonial Office

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\(^{19}\) Mansfield-Aders, ‘Notes on Malaria and Filariasis in the Zanzibar Protectorate’, p. 208.
\(^{21}\) Mansfield-Aders, ‘Notes on Malaria and Filariasis in the Zanzibar Protectorate’, p. 211.
advisor was influential in advising appropriate measures in controlling malaria. The Colonial Development Fund (CDF) sponsored some of these anti-malaria projects in Zanzibar.

The Anti-Malaria Brigade and Malaria Control Programmes

Between 1890 and 1963, Zanzibar was under the control of the British. Initially, on 1st November, 1890, the British had declared Zanzibar a British Protectorate. The British became responsible for the foreign affairs of Zanzibar, leaving the internal administration to the Omani Sultans. In reality, right from the beginning the British controlled all the affairs of Zanzibar. From the early twentieth century, all the government’s departments were under the British. This was formalized in 1913, when the Protectorate administration passed from the Foreign Office to Colonial Office.

The earliest effort in the campaign against malaria in Zanzibar was the establishment of the Mosquito Brigade Unit in 1907 under the directives from the Colonial Office. The Unit employed several workers to search for anopheline eggs and mosquitoes in houses, mosques and in burial sites. They also filled holes and sprayed insecticides on swamps and river banks. Before 1945, these programmes mainly targeted urban areas and other major towns where European officers were living. In Zanzibar, the activities of the anti-malaria mosquito brigades were described in the 1913 Annual Report:

The whole of town, west of the tidal creek was divided into four quarters. Each quarter was put in charge of a sub-inspector, whose duty is to visit every house, garden, ruin and compound in his district one day in each week, on the same day of the week and as nearly as possible at the same hour of the same day. This is so that the weekly visit may be looked for by the householder and that he may be in. It is of no avail for any persons to pretend that they are out, for the house is invariably visited again. Each sub-inspector has under him three Swahili ‘boys.’ Two of these carry a light ladder and the other a large tin of kerosene oil and a common garden watering pot. On arrival at a house the sub-inspector asks leave to enter. It must be mentioned that each inspector carries a written order from the Health Officer to enter the house... Apart from that, there is one many whose duty it is to inspect and report on the swampy, drains, etc., and
there is a ‘special gang’ of eighteen men, who are permanently employed in carrying out minor sanitary works, such as filling up holes and so on.\textsuperscript{22}

It was also reported that:

Should larvae have been found on any premises a sample of the water with the larvae is collected in a test tube, labelled, and brought back to the Health Office … The names of whose houses’ larvae have been found are entered in a card index. A ‘notice’ to abate the nuisance is served on the offender that evening. Should larvae be found again on that man’s premises within a period of twenty days he is summoned to court, and, if convicted, is fined.\textsuperscript{23}

With health campaign workers going from house to house, and laying charges against people on whose premises mosquito breeding sites were found, these health measures amounted to a radical intrusion by the colonial authorities into the lives of the town population.

In India, the use of Mosquito Brigade units in the suppression of malaria had started in the late nineteenth century. In 1897 Ronald Ross recommended the introduction of the brigade to fill water holes in Mian Mir in Punjab area, but the campaign failed to get under way because of insufficient funding.\textsuperscript{24} Gordon Harrison states that Ross also recommended the formation of mosquito brigades in Ismailia, Egypt, in 1902, to clear standing water and to cover or oil cess pits.\textsuperscript{25} In Ghana in 1900, the demonstration team led by Dr. M. Logan Taylor, a British medical doctor under directive from the Liverpool School of Tropical Medicine, began to instruct local sanitary officers in proper techniques in the eradication of mosquito breeding sites. However, according to Dumett, by 1910 “there [was] no evidence that large trained mosquito brigades of the sort envisaged by Ross were ever organized on a permanent or systematic basis”.\textsuperscript{26}

In 1901, the famous and influential American physician William Crawford Gorgas established anti-yellow fever brigades in Havana, Cuba during the Spanish American

\textsuperscript{22} ZNA BA 7/2, Public Health Report for the Year 1913, p. 44.
\textsuperscript{23} ZNA BA 7/2, Public Health Report for the Year 1913, p. 44.
\textsuperscript{24} Watts, ‘British Development Policies and Malaria in India 1897- 1929’, p. 158.
\textsuperscript{25} Harrison, Mosquitoes, Malaria and Man, pp. 161 and 169.
\textsuperscript{26} Dumett, ‘The Campaign against Malaria, p. 169.
War. According to Philip Curtin, “the success of American public health officers in combating yellow fever in Cuba and Panama helped raise false hopes for mosquito control in Africa”. In Tanganyika, the German authorities recruited a malaria control specialist who had formerly worked in the malaria and yellow fever eradication campaigns in Panama, but the project was abandoned with the outbreak of the First World War.

In 1913 the Zanzibar malaria eradication brigade paid house-to-house visits in urban and rural areas, and kerosene oil was applied to collections of water to preventing larvae from breeding. For water in ditches, automatic oilers were employed, using either drip cans or a ball of rags soaked in kerosene, as two of my informants explained to me. Kerosening of ditches and holes worked during the dry season but it was impossible to apply kerosene to flowing rain water. Some successes were nonetheless achieved through a combination of different preventive measures.

In West Africa in the early 1900s the idea of applying kerosene to breeding places had been resisted by Dr. W. Stephens and Dr. S. R. Christopher of the Royal Society of London. They observed that during the wet seasons mosquitoes bred on such a vast scale that it was impracticable to attempt to oil the water. In Zululand, the anti-larvae programme was also resisted by the local people who believed that it would lead to an increase of mosquitoes in their areas. MacKinnon records that:

In southern districts, where road networks were expanding rapidly, many Zulu refused to do antilarval work. They claimed that if they were thorough, either the mosquitoes would change their habitats and breed in different areas or new infected mosquitoes would arrive in motor cars.

Another strategy commonly adopted in the control of malaria mosquitoes in Zanzibar and elsewhere was through the introduction of tiny fishes to eat mosquito larva. In Zanzibar

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29 Interview with Mr. Simai Haji and Mr. Mohammed Ali, two retired health officers, at Mwembeladu and Jang’ombe on 1 August, 2007.
millions of fish (*Haplochilus playfairii*) were distributed by the Unit workers in ponds, fountains, mosque tanks and other places where water was kept permanently.\(^{32}\) In 1914, larvivorous fish (*Gambusia affinis*) were introduced into Zanzibar by Dr. W. Mansfield-Aders.\(^{33}\) In 1921, *gambusias* were also introduced by the US Bureau of Fisheries to Spain and later were shipped to Italy in 1924 during the anti-malaria campaigns. While, these fish were able to reduce the multiplication of larva they did not succeeded in eliminating them.\(^{34}\) According to Richard Tren, in South Africa it was the introduction in the early twentieth century of larvivorous fish (*Gambusia affinis*) in combination with various additional anti-malaria programmes which eventually succeeded in reducing malaria.\(^{35}\) Similarly, Aran MacKinnon demonstrates that it was rather a combination of methods that brought about the elimination of malaria in Natal and Zululand: “a combination of proper drainage in specific risk areas and ‘oiling’ standing water with kerosene or pyrethrum was effective in terms of reducing both mosquitoes and cost”.

In Zanzibar, the 1915 Annual Health Department Report states that the Anti-Malaria Brigade was introduced in Pemba Island. Swamps and cess-pits were kerosened at Wete, Chake, and Mkoani at Jambangome. The Zanzibar brigade workers also inspected dhows weekly, especially during monsoon seasons when several hundred dhows from Arabia, the Persian Gulf, Somalia and Lamu came to Zanzibar. The dhow inspection works also involved dhows which brought mangrove poles from the Rufiji Basin, the ecology of which made it a major habitat for mosquitoes.

The Anti-Malaria Brigade Unit was criticized by the urban populace who regarded themselves as ill-treated by the Unit’s staff. In 1938 an anonymous town resident (probably an Indian) wrote to the *Zanzibar Voice* to express his dislike of the brigade’s interference: mosquito searches often resulted in urban dwellers being fined up to fifty or hundred shillings, which was a great deal for the poor people.\(^{36}\) Dr. S.W.T. Lee, the

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\(^{32}\) ZNA BA 7/2, Public Health Report for the Year 1913, p. 43.

\(^{33}\) ZNA AJ 1/37, Anti-Malarial Measures in Zanzibar.

\(^{34}\) Harrison, *Mosquitoes, Malaria and Man*, p.186.


Director of the Health Services in a letter to the editor says that “mosquito searches only discover the offences; the Magistrate decides the fines. The cases are only taken into court after a warning notice has been previously served and breeding is found a second time”.  

In Natal and Zululand, Anti-Malaria Brigade Unit staffs were also not welcomed by many local people. On many occasions people refused to accept treatment from the brigade staff. Aran MacKinnon informs us that:

Near the coastal sugarcane estates, assistants Richard Tshabalala and George Dube claimed they could no longer carry out their work because of people’s hostility to the government. They reported that local Africans perceived the South African Department of Public Health’s (DPH) efforts to reduce mosquito larvae breeding areas by pouring slicks of paraffin into streams and water supplies as a white-settler means of ‘poisoning’ the Zulu in order to take their land and cattle.  

Nonetheless, the Brigade Unit continued to operate in Zanzibar until 1963 and beyond.

The Quininization of the Population

From the early 1900s, quinine tablets were distributed to officers at their work places, to school children in their schools and in urban and rural areas through local community heads and local leaders, the Masheha. Possibly the use of community leaders and the Masheha were meant to simplify the anti-malarial programmes. There were precedents elsewhere in the British Empire. For instance in Bengal, India, the distribution of anti-malaria tablets through Post Offices and Vaccination Departments had commenced in 1892. There too, ‘native’ doctors were used to supply the anti-malarial drugs. The state’s decision to use ‘native’ doctors in this role was prompted by Bengalese resistance,

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37 ZNA NW 23/2, Zanzibar Voice, 18 November, 1938, p. 3. See also ZNA AJ 28/7, Health Department: Comments and Observations.
in many cases, to public health campaigns.\textsuperscript{40} Up until the 1950s, in Dar es Salaam, Tanganyika, quinine tablets were sold at the Post Office.\textsuperscript{41}

The Director of Public Health Department wrote in the Annual Report of the Department of Health in 1913 that Headmasters, under directives from Medical Officers, distributed quinine to school children twice a week “in the form of the tannate [a salt of tannic acid] made up of chocolate coating”.\textsuperscript{42} Though, quinine was supplied in schools in major towns and in rural areas, the programme failed to reach its goal as it was found that the medicines caused trouble to empty stomachs. The Department of Health in cooperation with the Department of Education then decided to provide breakfast to school children, while schools decided to introduce vegetable gardens.\textsuperscript{43} From 1910 in Accra, Ghana, quinine with chocolate candy was also distributed in schools. As K. David Patterson shows, however, the programme was not successful as the chocolate did not obscure the bitterness of quinine. School truancies were noted especially on ‘quinine day.’ Students would apparently also throw away the medicine they received from their teachers. Despite all these problems the Department of Health in Ghana continued to deliver the drugs to school children.\textsuperscript{44}

In Zanzibar, from 1913, the Medical Officers of Health supplied quinine tablets at Police Line, Ziwani to European and local soldiers and their families twice weekly. Indian and Arab government staffs posted to rural areas at Mkokotoni and Chwaka were required to take quinine weekly.\textsuperscript{45} The state’s was plainly determined to see this policy carried out so as not to lose labourers. Officers who refused to take quinine were warned that they “[were] liable to receive no pay if they [were] absent from duty on account of an attack of malarial fever”.\textsuperscript{46} The archival records go no further on this point. Possibly the government servants were willing to obey orders.

\textsuperscript{41} Ferguson, ‘The Political Economy of Health and Medicine in Colonial Tanganyika’, p. 331.
\textsuperscript{42} ZNA 7/2, Public Health Department Report for the Year 1913, p. 43.
\textsuperscript{43} Interview with Mr. Ali Juma, a retired nurse at Kwahani on 27 July 2007.
\textsuperscript{44} K. David Patterson, \textit{Health in Colonial Ghana: Disease, Medicine, and Socio-Economic Change, 1900-1955} (Massachusetts: Crossroads Press, 1981), pp. 35-36.
\textsuperscript{45} ZNA BA 7/1, Medical and Sanitary Report for the Year 1913, p. 6.
\textsuperscript{46} ZNA BA 7/2, Public Health Department Report for the Year 1913, p. 43.
In 1913 the Assistant District Officer, through the Health Department’s officers, began to distribute quinine tablets in rural areas. The 1913 Annual Report of the Department of Health states that “a certain amount of sulphate of quinine in powder was sent to the Assistant District Officer at Mwera [a locality in South District] for distribution to Masheha”. Sundiata notes that this area posed a particular danger to the health of Omani immigrants there. The medication was sold one pice per packet of five grains. The Health Department also planned to distribute sulphate of quinine to other districts. The establishment of dispensaries in urban areas, suburbs and rural areas gave an added boost to the distribution of quinine and malaria treatment. By 1910 there were dispensaries at Mkokotoni in North District and at Chwaka in South District. By 1924, dispensaries and hospitals had been built in rural Unguja and Pemba, at Selem, Mbiji, Mahonda, Mangapwani, all in North District, at Kizimkazi in South District, on Unguja Island, and at Wete in Pemba. By 1938, Unguja had thirteen dispensaries and one general hospital in the urban area while Pemba had seven dispensaries and three general hospitals located at Wete, Chake and Mkoani.

Quinine supply programmes in Zanzibar like elsewhere in Africa faced many problems. Many people were not in a position to buy the drugs. As a result, local people continued to depend on their local medicines. People boiled Neem (azadirachta) leaves and bark to treat malaria. According to Mr. Ali Juma, these medicines became widely adopted and replaced quinine in urban and rural areas. Urban and rural Arabs continued to employ other familiar therapies such as cauterization in order to overcome swellings of the spleen. In 1920, one Medical Officer stated that many Arab children had “numerous round cicatrices over their upper abdomen and spleen region, due to the barbarous habit of cauterizing with hot copper coins to relieve the pain and swellings”. One Khalfan

47 ZNA 7/2, Public Health Department Report for the Year 1913, p. 43.
48 Sundiata, ‘Twentieth Century Reflections on Death in Zanzibar’, p. 51
49 ZNA 7/2, Public Health Department Report for the Year 1913, p. 43.
50 ZNA AJ 12/13, Medical Services Pemba and Zanzibar.
51 Interview with Mr. Ali Juma, a retired nurse, at Kwahani on 27 July 2007.
52 ZNA BA 7/7, Medical and Sanitary Report for the Year 1921, p. 34.
Said of Mwera confirmed to me that cauterization was not meant to cure malaria. It was used to reduce the swellings.  

Distribution of quinine in colonial Ghana faced similar problems. According to Patterson, “individuals benefited, especially those with some cash, education and access to distribution centres, but except for a relatively few elite Africans, the impact on the public was small, and the long-term results negligible”. In Natal and Zululand quinine tablets were distributed freely to school children but villagers often had to pay for them. Without money to buy the drugs people reportedly died; otherwise, as Aran MacKinnon explains:

Before Africans could receive quinine free of charge, they had to prove ‘indigent status’. In cases where they could afford to pay officials for it, they had to prove they could not get it at a ‘reasonable price’ elsewhere. This had the effect of the Zulu having to publicly profess poverty in order to receive medications.

MacKinnon further observes that “the majority of whites with good health and ready access to quinine suffered very little”. Quinine was however resisted by the Zulu people and their Indian neighbours because of its unpleasant effects. Local *Inyanga* doctors had considerable influence, telling people that quinine caused sterility and death. Zulu people refused to go to the government quinine depots to collect the drugs. The depots were established in 1929 at police stations, white-owned farms and stores, mission stations, and Native Affairs Department posts: locations which, according to MacKinnon, people associated with white domination.

Supplying quinine to colonial populations became a concern for colonial administrations in the early twentieth century, which had not hitherto been the case. The use of quinine was encouraged by the Colonial Office, which supported the malaria prevention approaches proposed by Patrick Manson. Manson believed that malaria would be

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53 Interview with Mr. Khalfan Said, a local practitioner, at Mwera on 1 August, 2007.
54 Patterson, *Health in Colonial Ghana*, p. 36.
57 MacKinnon, ‘Of Oxford Bags and Twirling Canes’, p. 82.
controlled by using mosquito screens, bed nets and regular quinine dosage. Ronald Ross, on the other hand, questioned the use of quinine as a preventive measure, arguing that it all it did was to suppress the disease. Ross prioritized drainage and the use of larvacides to eliminate mosquito breeding sites.\footnote{Dumett, ‘The Campaign against Malaria’, p. 165.} In the event, many countries in Africa, including Zanzibar, adopted a combination of both Manson’s and Ross’s preventive measures for malaria eradication. Beginning in 1904, the German administration in Tanganyika, German East Africa, adopted a combination of quinine medication and chemical destruction to destroy breeding sites. German physicians in Tanganyika were mostly not convinced that quinine would help to eliminate malaria, as claimed by Professor Koch, an influential German bacteriologist. Koch’s researches in Dar es Salaam in 1897 had led him to believe that smaller doses of quinine were effective in treating malaria.\footnote{Ann Beck, ‘Medicine and Society in Tanganyika, 1890-1930: A Historical Inquiry’, \textit{The American Philosophical Society}, 67, 3 (1977), pp. 15-16.}

In the second half of the 1940s, quinine was replaced by paludrine, another anti-malaria drugs in tablet form, manufactured in Europe.\footnote{ZNA AJ18/28, School Clinic, 1913-45, p. 63.} In Zanzibar, Government officials and their families were given a free issue of paludrine, which was also distributed in schools. These anti-malarial tablets helped to reduce death from malaria but not on the eradication of mosquitoes. The colonial government in Zanzibar used other methods in the elimination of mosquitoes that caused malaria. The next section looks at other methods that were employed to control malaria in urban Zanzibar.

**Simpson and Sanitary and Environmental Engineering measures**

From the early twentieth century, the Colonial Office assisted the anti-malarial programmes in Zanzibar and in other British colonies. In 1909, W. J. Ritchie Simpson, a British physician and a pioneer in tropical medicine, who worked as a health officer for Calcutta, India in 1890s and a founder of a Journal of Tropical Medicine in 1898 was instructed by the Colonial Office to visit West Africa to investigate on the sanitary condition. Afterwards, he proposed for the formation of the advisory committee to the Colonial Office to give expert advice on matter of tropical medicine and hygiene. The
Colonial Office assigned the task to him. In 1913, Professor Simpson, now an advisor of the Secretary of State for the Colonies on health matters, visited Zanzibar, Kenya and Uganda to investigate health condition in its colonies in East Africa and to propose measures to be taken to improve health condition of the “native” population, (Indians, Arabs and Africans). Simpson recommended to the Zanzibar authorities that they refill the Creek in order to stop epidemics; if this was done the open space created would create a neutral zone between Stone Town and Ng’ambo, and between the town and plantation-breeding anopheline mosquitoes.

The canalization of the Creek which separated Stone Town and Ng’ambo was proposed earlier by the medical and health authorities in Zanzibar. The lack of funds delayed the work. In the eyes of the Europeans who began visiting the town in the mid-nineteenth century, the Creek was more of ‘fetid lagoon’, with all the dirt and drainage pollution that ran into it from the town. In 1897 the colonial authorities attempted to build embankments around the Creek for the use of the town population. Rev. W. K. Firminger of the Universities’ Mission to Central Africa (UMCA), who was stationed in the town at that time, welcomed the decision to build the embankment. Informing William Trevars, Secretary of the UMCA, London, of the government’s intention to do this, Firminger declared that “we shall now have a very considerable frontage towards the creek, which if the Government carry out their intentions of making an embankment will become most valuable. It will improve the station greatly”.

The filling-in of the Creek was not undertaken immediately as the matter was somewhat controversial and became a matter of debate among medical officers in Zanzibar. In 1914, soon after the departure of Simpson, Dr. Curwen, the Principal Health Officer in Zanzibar wrote that “I think Professor Simpson is wrong in describing it [the Creek] as formerly being a breeding place for mosquitoes in the wet season; it was washed by salt water and too porous for rain water to lodge”. Also, the medical and health officers in

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64 Rhodes House Library (RHL), Mss. W. K. Firminger, Priest in Charge, Zanzibar, Box A1 VIII, p. 556.
Zanzibar decided not to fill the Creek for drainage purposes. It was reported that “its tidal waters served to daily remove much offensive drainage that was discharged into creek”. After much discussion it was decided in 1935 to fill the Creek for health and safety reasons. The new Director of Medical Services (DOMS), Dr. W. Leslie Webb, who had served in a medical post in Uganda before coming to Zanzibar, felt that it needed to be done. He regarded the Creek as a source of many diseases. The work of filling up was carried out by “putting refuse and a number of old flattened colas [concrete blocks] drums to form a sort of palisade at the base of the dump to keep the refuse in and to keep some of the water out”. The work started at the west side of Hollis Road abutting on the premises of Peera Champsidi. As late as 1956, refuse tipping continued at the southern part of the Creek above the Darajani Bridge. The photograph below shows the filling of the Creek at Darajani in 1943.

Source: ZNA AV23/153, The Creek and the Darajani Bridge

Town people born in the early 1930s still remember the existence of the Creek. People used the ferry when it was high tide and crossed by foot when the tide was out. Salama

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66 ZNA AJ 3/36, Creek Filling in Re of.
Ali who lived in the Vikokotoni neighbourhood remembers how the Creek was at that time. She recalls that people living nearby were disturbed by mosquitoes which bred near the bank. What her grandmother did was simply to close windows and doors of their house before sunset. She still remembers people’s concern about the Creek filling project. Some people were happy as mosquito breeding was stopped. But other people who used the Creek to earn money by ferrying passengers were not happy.

The work of blocking up the Creek caused a lot of strife. The refuse that was used to fill the Creek attracted flies which then bred in the area. In 1938, a Miss Gunn from the UMCA complained to the medical authorities in Zanzibar about the smell that was caused by rotten refuse. She reported that the smell caused her a sore throat. Indeed, the Indian National Association (INA) registered their disapproval by sending a petition to the Government. Rustom Sidhwa, the Town Council representative from the INA sent a petition to the Sanitary Board. However, the work of filling the Creek continued as planned, although it was only in 1961 that the work came to an end south of the Hollis Bridge. A large area of the Creek north of the bridge at Funguni near the sea still remained to be filled and this was done later after 1963. Generally, the reclamation work did a lot to restrain epidemics in the town. Nevertheless, it was rather a combination of several anti-malarial measures which halted malaria, typhoid and cholera.

In order to eliminate breeding of mosquitoes, town planning and improved housing scheme were suggested by Simpson. During his visit to Zanzibar, Simpson was impressed by the cleanliness of the town. He remarks that:

The general cleanliness of the streets as a whole is in striking contrast to that which exists in Mombasa and Nairobi. Many of the narrow streets and passages are paved, which prevents soakage into soil and permits of a more thorough cleansing than would otherwise be the case. The cesspools which receive the sewage and sullage [silt deposited by a current of water] water of the houses and the pipes leading to them are generally maintained

\[67\] Interview with Bi Salama Ali at Michenzani on 12 March, 2005.
\[68\] ZNA AJ 3/36, Creek Filling in Re of.
in a fairly good state of repair, and there are comparatively few of those offensive and unwholesome nuisances connected with dilapidated cesspools and pipes and filthy passages which are so common and so objectionable a feature in the narrow lanes and passages of Mombasa.\textsuperscript{71}

Simpson recommended wider spacing between buildings in the Stone Town area and the removal of thatch huts from Stone Town to Ng’ambo.

Medical scientists, as already noted, played an influential role in the sanitation and urban planning process in colonial Africa. In the late nineteenth century Ronald Ross had proposed residential segregation between Europeans and Africans in order to control malaria. Ross recommended residential housing with maximum ventilation.\textsuperscript{72} In Sierra Leone, ‘Hill Station’ was established in the main city, Freetown, as a location for new houses for Europeans.

Following Simpson’s visit, medical officers of health started to think how they could improve the town. They had the view that houses which were built by Indians and Africans were “unplanned and ill ventilated”, and sources of diseases such as malaria, bubonic plague and tuberculosis. In the Public Health Report of 1913, it was noted that:

The types of houses proposed by the local Indian architects are in general bad. The central rooms had no light or ventilation, except through the other two; and as regards the ground floor, the front room is usually the shop and is therefore closed at night. The excuse always made by the builder is that the middle room is meant as store room and not as a living room. But even if the plan is adhered to, the result is almost as bad as if the room were used as a living or a sleeping apartment, because, if it is used as a store, it soon becomes rat ridden and flea infested, and if as a sleeping or a living room, it is usually indescribably dirty, filthy and stuffy.\textsuperscript{73}

In 1913, the health authorities under a ‘Public Health Order’ decided to demolish the thatched houses that covered the southern and north-eastern part of the Stone Town, at Mji Mpya and Funguni. These areas were mostly occupied by poor Comorians, Indians, Arabs and Africans. Most of these houses were reported to be a reservoir of mosquitoes.

\textsuperscript{73} ZNA BA 7/2, Public Health Report for the Year 1913, p. 25.
that caused malaria. Major Dudley Sheridan Skelton, a Health Officer in the Public Health Department pronounced that:

In regard to Town planning, no *makuti* hut, or rather no hut built in the native fashion, which is without any sort of proper lighting or ventilation and with its ‘choos’ in the back kitchen, shall be allowed to remain within certain areas of the Township, because these dark houses are the hiding places and reservoir of all sorts of mosquitoes, whilst the cess-pits inside them are found to be the breeding places of both Culex and Stegomyia.\(^74\)

It was also reported that:

A previous Medical Officer of Health put it on record that the principal breeding places of our domestic varieties of mosquito were the ‘choo’ pits (open privy cesspits) which exist in practically every Asiatic, Arab and African house and hut, and that the protective oiling [kerosening] of these was an impossibility.\(^75\)

Dr. Curwen, the acting Principal Medical Officer disputed, however that local huts were a problem arguing that:

This term [slum] may certainly be applied to the many ramshackle structures favoured by the poorer British Indian residents and the old dwelling houses converted by them into unwholesome lodging houses, but to apply the term to native huts is a misuse of the term in the European sense.\(^76\)

The work of demolishing thatched huts within the Stone Town area was started in 1916. The Director of Health Department noted that “(u)seful work in acquiring open spaces by demolition of huts has been carried on, and a good scheme for acquiring and improving an area of the town as an European quarter has been evolved”.\(^77\)

But the poor people were not ready to move out of Stone Town. Force was used to make sure that they vacated the area and the government compensated them by giving them money to build new houses in the Ng’anbo areas. The open space created became a new European quarter, which differed in terms of style from other buildings in the Stone Town. Similarly, in Dar es Salaam in Tanganyika before the First World War, the

\(^74\) ZNA BA 7/2, Public Health Report for the Year 1913, p. 25.
\(^75\) ZNA BA 7/40, Annual Report on the Public Health Department for the Year 1916, p. 11.
\(^76\) ZNA AB 2/264, Acting Principal Medical Officer, Dr. Henry Curwen, Review of Simpson Report, 21 June, 1915.
\(^77\) ZNA BA 7/40, Annual Report on the Public Health Department for the Year 1916, p. 11.
German authorities, and later the British after the War, enforced racial patterns of segregation, with separate localities for Europeans, Indians and Africans.\textsuperscript{78} Zanzibar, however, as Curtin shows, “remained unsegregated in spite of government projects to separate African and European living quarters … [as it] remained a protectorate where the Sultan was still sovereign”.\textsuperscript{79}

From 1935, people living in Mkunazini and Kokoni in Stone Town were required to rebuild their houses or to move to Ng’amo. These areas were mainly occupied by low-class Arabs and Indians. At the same time, the colonial government decided that new houses had to be built in Ng’amo to replace the former thatched houses. The Provincial Commissioner wrote to the District Commissioner about how the government could assist in providing bricks for building houses in Ng’amo. But the project of rebuilding Ng’amo had to wait until 1946, when the colonial government supplied funds for the project. The introduction of the ‘Ten Years Development Plans’ from 1946 furthered the town planning programmes in British colonies in Africa.

To ensure that building and sanitation works were conducted smoothly, the Zanzibar Town Board was established in 1935, and it took over most of the functions of the Central Board of Health which had been involved in making recommendations for planning and sanitation.\textsuperscript{80} The “Town’s (Building) Rules, 1939” decree was promulgated to supervise and prevent poor construction.\textsuperscript{81}

In other areas, like Malindi near the harbour, which did not attract European dwellings, the plan was to build small new houses for public allocation. In 1938 the Medical Officer requested the government to build dwellings in the Malindi area to reduce congestion. These houses had to accommodate Hindu fishermen from Diu, Arabs from dhows during the dhow seasons, and casual members of the African or Arab floating population of Zanzibar, most of whom lived with their friends or in brothels. It was further proposed by

\textsuperscript{79} Curtin, ‘Medical Knowledge and Urban Planning in Colonial Tropical Africa’, p. 251.
\textsuperscript{80} ZNA AJ 2/13, Central Board of Health.
the Director of the Medical Services that a cheap housing scheme be built, or “a communal lodging house of the ‘doss house’ type where a man could get a bunk for a night and the use of a cooking fire”. But nothing was done to improve Malindi, owing once more to a lack of funds.

Town people were not happy about these planning rules and regulations. Although they sometimes received compensation, they could not afford to build new houses. In 1938, one of the town residents wrote to the *Zanzibar Voice* about what he regarded as intimidation by the colonial authorities. He complained that town residents felt they were being harassed by the Building Authority and the Medical Officers of Health in the application of these rules. But the complaints were to no avail: as Bissell shows, “the overwhelming majority of Zanzibaris lacked the means to fight the bureaucracy at its own game; faced by an official decision to tear down their huts and relocate elsewhere, they could either comply or risk being compelled by force”.

G. Andrew Myers, discussing the planning process in Zanzibar, explains that two separate Building Authorities (BAs) were established for Stone Town and for Ng’ambo. These were given authority to approve or disapprove the permits which were required to construct or repair houses. The Director of Public Works Department (PWD) was in charge of Stone Town’s building control measures, but the Medical Officer of Health (MOH) was the authority for Ng’ambo. I argue that Ng’ambo was considered an unhealthy area, to be put under the administration of the Health Officer, while Stone Town, where Europeans, rich Indians and Arabs mostly lived, could be left under the Public Works Department. Urban planning policies were intended to consolidate the categorization of people according to classes. The government – the medical and public

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82 ZNA AJ 9/11, Treatment of Congested and in sanitary areas in Zanzibar Town.
84 Bissell, ‘Conservation and the Colonial Past’, p. 256.
health officers – feared that congested and unventilated houses would endanger people’s health.

The colonial surge towards town planning practices affected development planning in all British colonies from about 1940. In 1943 the “Town’s (Native Locations) Rules” was introduced to minimize housing congestion in Ng’ambo. These rules stated that:

The Court shall give notice to the occupier of the native hut in respect of which such an order has been issued requiring him to move there from within… no compensation shall be paid by the Building Authority to the owner or occupier of any native hut in respect of the demolition thereof as aforesaid, and from the date of demolition order no rent shall be due or payable by or on behalf of the occupier in respect of such native hut.\(^{86}\)

In the same year, the colonial government in Zanzibar received grants amounted to £6000 from the Colonial Development Fund (CDF) for the improvement of housing and sanitary conditions in Zanzibar Town. The role of the CDF on the anti-malarial campaigns will be discussed below.

Alongside these interventions, ‘health education’ became part and parcel of the sanitary measures in Zanzibar Town in particular and of the islands in general. Health education films were screened, health-related topics were publicized, and museum exhibitions were mounted to alert people on the matter of diseases and health. In addition, throughout the 1930s and 1940s lectures on matters of housing were given by Zanzibar health and medical officers. Dr. S.W.T Lee, MOH from 1934 to 1938, played an active role in housing design and neighbourhood layout. His lectures also included health-related topics on diet, disease avoidance, and maternity and child welfare.\(^{87}\) Lee believed that “it is rather by personal talk, personal example … that education of the African has to proceed”\(^{88}\). In 1938 the Health Department organized a permanent exhibition at the


\(^{88}\) ZNA BA 7/14, Annual Report Department of Health, 1935, p. 49.
Zanzibar Museum. The exhibitions were aimed at imparting knowledge on better housing and making people aware of the idea of public health.  

**Colonial Development Fund (CDF)**

From the late 1920s, the anti malaria projects in Zanzibar were sponsored through the Colonial Development Funds. In 1929, Britain formed the Development and Welfare Act to reduce financial difficulties which delayed the economic development in her colonies. Funds were provided in order to increase productive capacity of the population in the colonies. According to Doyal and Pennell “the material significance of colonial assistance must be gauged in relation to the severe economic cutbacks which occurred in the colonies during the 1930 and the War which followed”.  

Ann Beck argues that “between 1929 and 1940, the Development Act did not live up to expectations. During the depression years, development planning was not given priority… The Act provided funds for loans and cash grants, but until the middle of the 1930s, fear of a repeat of another depression, rather than the confidence in the future ruled”.  

In Zanzibar, in 1929, funds were provided towards works of reclamation and drainage scheme in the town and the surrounding areas. The decision to provide funds for the drainage works was met by the Colonial Office following the visitation of S. P. James, an Advisor on the Tropical Diseases to the Ministry of Health, London to Kenya and Uganda. In 1929, James recommended that more works has to be done on drainage works in the town and suburb areas.  

Canalization of streams and swampy areas in the town in Zanzibar was initially started in 1907, when the Kiungani tunnel, which linked Ziwani, was constructed. In 1910, the entrance to Kiungani tunnel was lowered by three feet, which caused the Migombani  

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89 Myers, ‘Reconstructing Ng’ambo’, p. 123. Dr. S. W. T Lee was a Museum Board member in 1937. See, AB 86/62, Dr. S. W. T. Lee, Senior Medical Officer.  
swamp to dry out up. In 1908, the Ziwani and Polo Ground ditches were constructed and by 1909 earth ditches had been cut from the Ziwani tunnel outlet to the sea. Other ditches were cut in the Gulioni and Dhobi Station swamps, and in the channels of the Mpepo River, which formed the northern boundary of the town, and the Miwaleni River, which cut through the boundary between Mkele and Shauri-Moyo. These areas were believed to be the chief source of anopheline mosquitoes in the northern portion of the town. The other swamps at Sebuleni, Mwanatenga, Jang’ombe, Migombani and Kiungani were filled in the late 1950s.

Some people in Zanzibar reported to the Health Department that the filling of marshes caused substantial numbers of problems including soil erosion. In 1935, Bishop Heffernan of the UMCA wrote to the Director of Health arguing against the anti-malarial measures about to be introduced near the Mission area. The Bishop was critical of the decision to fill the well near the mission shamba plot at Kiinua Miguu, as he said it would create a water shortage. Also, he was worried that the drainage work near the shamba had caused problems of soil erosion. The canalization and filling of wells was however necessary in order to prevent malarial mosquitoes from breeding. A tap water system was also extended in the town for health purposes. In 1934, the CDF sponsored water supply installation to serve the town of Zanzibar. Also, water flushed latrines and clothes washing platforms were installed in many places in the town.

In 1934, the CDF sponsored the malaria survey in Zanzibar which started in that year. The Malaria Research Officer (MRO) funded by the Colonial Office was appointed to investigate malaria problems in Zanzibar Town and adjoining areas. S. P. James has earlier on in 1929 proposed for the appointment of a malariologist to investigate malaria problems in East Africa. In Zanzibar, the MRO concentrated on ascertaining the “splenic index” in and about the town and determining the parasitic infestation indices. The “splenic index” was done through checking the human spleen in order to understand the

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93 ZNA AJ 29/243, Anti-Malarial Drainage Schemes, Suggestions Re For.
94 ZNA AJ 16/5, Quarrying in the Township of Zanzibar Prohibition, Control, License, For.
95 ZNA AJ 29/243, Anti-Malarial Drainage Schemes, Suggestions Re For.
acuteness of malaria. Normally, enlarged spleens were noticed among those children who were exposed to malaria infection.

The MRO was also responsible for investigating all actual and potential mosquito breeding places in and near the town and for the typing of the various anopheline which were found in the area. He was involved in investigating the infection rates of the various species of mosquitoes and considering statistical evidence with regard to the correlation of the malaria problem with meteorological conditions, vital statistics and sociological circumstances. He recommended that quarrying for rock within the town boundary and for two miles beyond to be prohibited and that the keeping and grazing of cattle in the town area should be forbidden. The MRO advised too on the formulation of schemes for the better drainage of low lying areas and the extension of the piped water supply to certain parts of Ng’ambo to allow shallow wells to be filled in. Following these recommendations, stone quarrying and the keeping of cattle were totally moved outside the town.

The prevention of quarrying in the town was introduced as water retained in these holes permitted mosquitoes to breed. Initially, the decree to stop the digging of holes in the town was enforced in 1929. The decree ordered that “no person shall make or cause to be made any excavation, which is likely to foster the breeding of mosquitoes, on any land within any place which has been or may be declared to be a Town under the Towns Decree 1929 or within two miles of the boundary of any such Town”. At that time, the decree did not intend to stop the quarrying of stones in Zanzibar Town.

In 1934, the medical authorities thought that quarrying works which were going on at both the Kikwajuni private and government quarries, behind the house of the Commissioner of Police and throughout the town had to be stopped. Dr. Lee wrote to the Secretary of the Town Board requesting that a rule to be made under section 79 of the Public Health Decree to prohibiting all quarrying for stone or digging inside the town

97 ZNA AJ1/37 Anti-Malarial Measures Zanzibar
98 ZNA BA 7/13 Annual Medical And Sanitary Report For The Year Ended 31st December, 1934, p 13
boundary or within a distance of two miles from the town boundary. In 1935, the colonial authority in Zanzibar introduced laws to stop quarrying within the Town of Zanzibar.

From 1934 effectively, all cattle and goat pens were removed from the town area. It was established that:

> These animals, driven as they are, backwards and forward from Mji Mpiia, cut up all the soft grassy places into a mass of hoof marks which, unless carefully watched after the rain season, soon begin to produce A. Costalis in prodigious number… In Ziwani swamps the constant daily driving of herds of cattle backwards and forwards across them while they are still wet, pulps the surface of the ground into a honeycombed mass which will neither dry up quickly nor drain normally. These cattle also caused considerable damage to the drains themselves by breaking down the sides and thus blocking the channel.

The Parsee Indian community, however, resisted the order. They requested the medical and public health authorities to allow them to keep cattle in the town for religious purposes. The medical authority allowed only one cattle to be kept by them.

Despite all these measures, in 1945 malaria was recorded as still one of the top listed diseases treated at hospitals and dispensaries in Unguja and Pemba Island. In urban Unguja, 55 percent of the whole population were diagnosed with malarial parasites. While in rural areas, the infection rate was 65 percent. At Pemba Island, the rate was 60 percent in the urban areas and 70 percent in the rural areas.

**Conclusion**

This paper has shown that from the early 1900s, the colonial government in Zanzibar through its Health and Medical Department staff introduced several measures to control

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99 ZNA AJ 16/5 Quarrying in the Township of Zanzibar Prohibition, Control, License, for
100 ZNA AJ3/17 Cattle in the Township of Zanzibar Prohibition for Keeping Re Of
101 ZNA AJ 16/5 Quarrying in the Township of Zanzibar Prohibition, Control, License, for
malaria in Zanzibar. The formation of the ‘Anti-Malaria Brigade’ Unit in 1907 spearheaded the programmes. The Unit employed a large number of workers who oiled holes, pits, water tanks, swamps and rivers. Drainage was constructed, mainly to accommodate rain water flow. By the 1930s, some of the swamps had dried out. In 1934 Department of Health workers started to fill the Creek. The work was finished in 1963. From 1913 onwards health and medical workers distributed quinine in schools and government offices and through Mashehas and Mudirs. Quinine was also sold through the Post Office. In 1943, quinine was replaced by peludrine which began to be manufactured at that time. Moreover, from the early decades of the twentieth century, demolition and construction of new houses took place in urban Zanzibar to control malaria, cholera and plague. Cleaning of streets and clearing of garbage were undertaken by health department staff. Health education and health related measures were introduced from the early twentieth century.

The fight against malaria and malarial-carrying mosquitoes took a new turn after the Second World War with the introduction of dichloro-diphenyl-trichloroethane (DDT). In 1941, Paul Muller, a Swiss, synthesized DDT for use by soldiers in as a safe and efficient insecticide for killing the clothes moth. It was later employed as anti-malarial tool. More other anti-malarial programmes were introduced in the 1950s. The World Health Organization (WHO) assisted Zanzibar and other colonies in Africa and Asia in the eradication campaigns. From 1950, the British government too assisted her colonies by funding institutions that involved in the campaigns against mosquitoes and flies that affected human being, animals and crops. The Amani Research Center, Tanga, in Tanganyika, which later became the East African Institute of Malaria and Vector borne diseases was a case in point. The Colonial Insecticide Unit and the Ross Institute of Tropical Hygiene opened its branches in Arusha, in Tanganyika and Nairobi, Kenya respectively. Much is unknown on the contribution of these institutions in the eradication of mosquitoes that caused malaria in Zanzibar.