

# IN SEARCH OF THE LABORATORY OF SIR RONALD ROSS, THE NOBEL LAUREATE

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*Sir Ronald Ross had a laboratory in rural Bengal and much of it remains unknown. The laboratory was located in Mahanad, a village in Hooghly district. The geographical and scientific context for setting up a laboratory away from Kolkata is understandable. During the British rule, rail communication was established between Hooghly and Calcutta. The Scottish Missions started welfare activities in that region. Scottish doctor Ross built his laboratory in the garden house under the courtesy of the Scottish Mission. Research work on avian malaria demanded large space and hence he selected the place. Evidences disclose that Dr. Ross conducted thorough research on avian malaria in Mahanad*

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## Introduction

How can this happen? The laboratory is meant for research, to search for something through experiments, the answers of many unknowns are to be unearthed there. But the laboratory itself becomes the subject of searching! Where and how was that laboratory? Let us delve through the surface into the core and find it out. It is a lost laboratory and not an ordinary one; truly very precious, wonderful and historical. It was the laboratory of a Nobel Prize winning scientist, Sir Ronald Ross (1857-1932).

Dr. Ross started his career as a doctor in the military department in British-ruled India. He joined the service in 1881 and won the Nobel Prize (1902) for his successful research on malaria. While working in India (1881-1899) he made an epoch-making discovery that the vector of malaria parasite in human is *Anopheles* mosquito. A breakthrough discovery indeed! Dr. Ross completed the work in the city of Calcutta (August 20–21, 1897)<sup>1</sup>.

## The Question

Although he worked as a doctor in many cities in

India, Kolkata and Secunderabad were the main places of his work. But where his main laboratories were located in the country? The answer to this question is quite evasive as many relevant facts are still obscure. However, based on the collected documents, let us find the answer to this pertinent question.

Evidences disclose that the main research centers of Sir Ross were in Secunderabad (Hyderabad) and in Kolkata (then undivided Bengal) and he also had one laboratory in hitherto unknown remote place. Where was that place? What kind of research he conducted there?

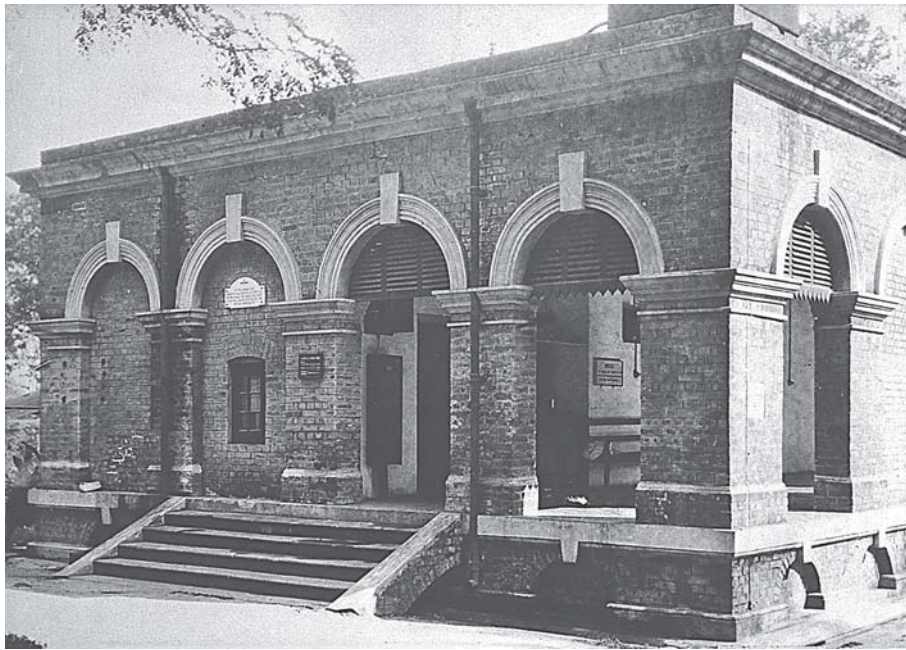
Before discussion, let me remind that the laboratory at Secunderabad is known but little is known about Dr. Ratnam Pillai who was the co-worker of Sir Ronald Ross there<sup>2</sup>.

## Laboratory in Calcutta

Records disclose that Dr. Ross' laboratory in Calcutta was situated within the Presidency General (P.G.) Hospital campus (now Seth Sukhlal Karnani Memorial Hospital) (Fig 1). A lot of information about the activities in Calcutta, like placement in the laboratory, difficulties in collecting blood from malaria patients and the like had been mentioned by Dr. Ross in his Memoirs<sup>3</sup>. This laboratory (Fig.1) was previously used by another British army doctor, Professor D.D. Cunningham<sup>4</sup>.

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**Photograph 1.** Laboratory of Cunningham, Kolkata (Source: The London School of Hygiene & Tropical Medicine | LSHTM).

Laboratory at Calcutta. Surgeon-Major Ross, Mrs. Ross, Mahomed Bux, A Laboratory Assistant, and Birds in Cage, 1898.

Cunningham's laboratory was not readily available for Dr. Ross. This required recommendation from the higher authorities and recommendation came from Dr. Patrick Manson, world-famous malaria researcher from England at that time. Before that, however, Patrick Manson's help was also needed for transferring Dr. Ross to Calcutta<sup>4</sup>.

Dr. Ross carried out his research with extraordinary zeal and spirit in the face of umpteen adversities like lack of necessary equipment, frequent issuance of transfer orders from superiors, hot climate of the country, many failures in research. However, despite all these adversities, he succeeded in research and was able to prove that the *Anopheles* mosquitoes were the carriers of malaria parasite.

### ***Search for Another Laboratory***

At one point of time during his protracted research, there was trouble in collecting blood from patients. Dr. Ross himself wrote about this difficulty in his Memoirs<sup>3</sup>. Perhaps, that was the reason he was looking for another model of malaria-research. Many scientists of the world at that time considered bird-malaria as a research model to understand the cause of deadly malarial attack in human body<sup>5</sup>. Ronald Ross also focused on 'avian malaria' but research on birds would obviously require huge space. A small room in Cunningham's laboratory (Fig.1) was too insufficient to pursue avian malarial research. So how and

where did Dr. Ross set up the laboratory to pursue research on bird-malaria?

Number of evidences disclose that Sir Ross set up another laboratory in the province of Bengal and conducted his research on avian malaria there. The laboratory was located in the village Mahanad, under Pandua block of Hooghly district.

### ***Underlying Reason***

What was the geographical and scientific context for setting up a laboratory in Mahanad, 70 km away from the city of Kolkata?

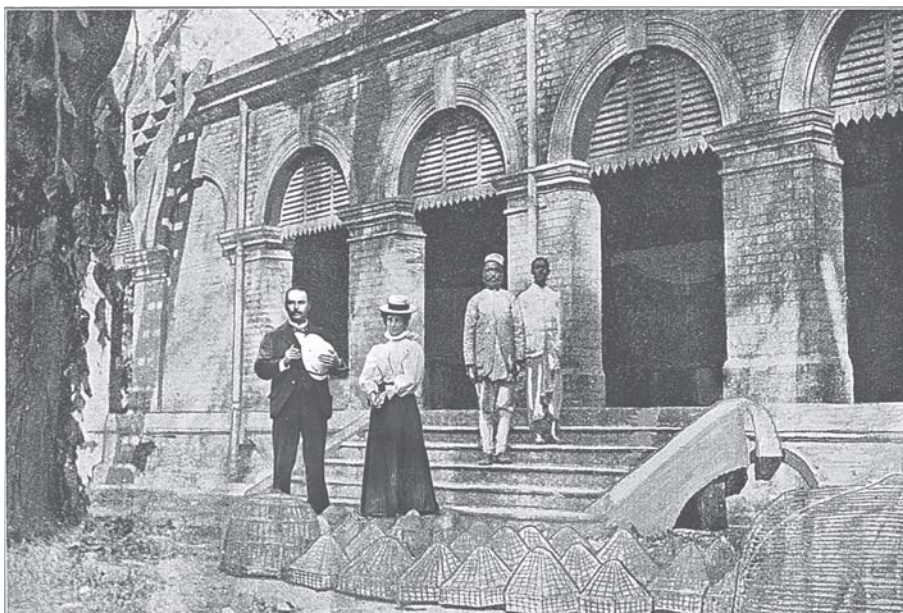
It is important to mention that Mahanad was once a very ancient and prosperous city. Historically, the region was a vibrant place where Buddhism and Brahminism flourished enormously<sup>6</sup>. During the

British rule, an improved communication system was developed between Calcutta and Mahanad. The Scottish Missions started various welfare activities in Mahanad from the mid-nineteenth century. Scottish doctor Ronald Ross built his laboratory in a garden house under the courtesy of Scottish Mission<sup>7</sup>.

Research on avian malaria would be suitable in an open and large space and to this end a laboratory was set up by Sir Ronald Ross in the spacious garden house of Scottish Mission in Mahanad. Evidences disclose that Dr. Ross conducted important research on avian malaria<sup>7</sup>. As mentioned earlier, Dr. Ross focused, for very practical reasons, on the effects of mosquito-bites on birds through examining their blood samples. Many scientists around the world used bird-malaria as a research model to disclose the mechanism of spreading malaria in the human body.

### ***Proof of the Existence of the Laboratory***

But where lies the proof that the birds were reared by Dr. Ross in the laboratory at Mahanad? Apropos, it is to be mentioned that Dr. Ross's laboratory in Calcutta (Cunningham's laboratory, Fig.1) was too small<sup>4</sup> to carry out ornithological research. For studies on bird malaria, spacious laboratory was required and that might be the reason which led Dr. Ross to set up a laboratory in Mahanad. In favor of the fact that birds were reared and



**Photograph 2.** The laboratory of Dr Ronald Ross in Mahanad (Hooghly district).

The photo collected from 'Commons.wikimedia.org'. Although written here 'LABORATORY OF CALCUTTA' but it existed in Mahanad, Hooghly district. On the photograph, behind Dr. Ross and Mrs. Ross the worker Khoda Baux is seen. Behind him stands Kishorimohum Bandopadhyaya. In the front and back sides of the stairs, the caged birds are seen.

studied in Dr. Ross's spacious laboratory at Mahanad, a photograph (Fig. 2) is submitted herein. The context of the photograph will be discussed later.

Nowhere there is any record about the kind of research Dr. Ross conducted in Mahanad but evidences can be cited that Dr. Ross's assistant researcher Kishorimohan (1877-1923) used to come to Mahanad village for medical and research work. Dr. Ross himself used to come and stay in Mahanad. Before going into detail, it is important to introduce Kishorimohan Bandopadhyaya.

### **Co-worker Kishorimohan**

Kishorimohan was a "science researcher, graduate in science (Chemistry, Presidency College), social worker and involved in many social welfare activities. His father, Sri Nanilal Banerjee was a teacher and well versed in Persian and Sanskrit. Kishorimohan's grandfather, Durgadas was an Ayurvedic physician. Kishorimohan was intimately familiar with his grandfather's Ayurvedic medicine and used to treat the villagers. He developed a close relationship with the then doctors of Calcutta"<sup>8</sup>.

Kishorimohan's ancestral home was in Panihati and maternal uncle's home was located in Entalli, adjacent to Sealdah in Calcutta. He used to stay at Entalli while studying in Presidency College and from this place could reach nearby PG Hospital easily. He used to treat patients

while staying in ancestral home and even reach remote villages in Hooghly district by crossing the river Ganges. In those days the villagers knew Kishorimohan as a reliable doctor. The then famous physician Dr. Bidhanchandra Roy (1882-1962), later Chief Minister of West Bengal (independent India) was his close friend [8,9].

As mentioned, PG Hospital was very near from Entally where Kishorimohun would live in his maternal uncle's home (birthplace as well). Kishorimohun could reach PG Hospital on foot from Entally.

The village Mahanad was also known to Kishorimohan, the young assistant of Dr. Ross. Kishorimohan could reach the place Mahanad quite easily. Crossing the river Ganges by boat

from his ancestral home at Panihati, Kishorimohan could reach Dr. Ross's guesthouse cum laboratory in Mahanad. Now-a-days Mahanad can be reached from Panihati in easier way first by crossing the river and then by car from Triveni. Besides, one can get down at Pandua station on the Howrah-Burdwan (Main) line and reach Mahanad by auto rickshaw or bus which is only 6 km away from the rail station.

### **Research in Mahanad**

Dr. Ross studied many types of common birds of Bengal, such as crows, pigeons, tailor birds (Babui), larks in his laboratory at Mahanad. During his research he was able to prove that the bite of the Culex mosquito caused malaria in birds and in human the disease is caused by the parasit *eplasmodium* sprtransmitted through the bite of the Anopheles mosquito<sup>4,9</sup>.

About the existence of Dr. Ross' laboratory at Mahanad, Dr. Pradipta Banerjee, an historian and local resident wrote (in the preface to the book 'Mahanad and the Secret History of Bengal), "During the time of Sir Ross, the people of Hooghly district were badly stricken with malaria.... By collecting mosquitoes from Mahanad and its surrounding villages, Dr. Ross conducted experiments on them and studied the nature, mode of transmission of the disease"<sup>6</sup>.

Long before the arrival of the Scottish doctor Ronald Ross for research work, the Scottish Mission had initiated the educational work at Mahanad. Alexander Duff founded the Free Church Mission School (later the United Free Church Mission School) in 1856. Dr. Pradeepta Banerjee, writer and local resident further wrote in this context<sup>5</sup>, "The Scottish Mission under the leadership of Alexander Duff established a school at Mahanad. The laboratory (Dr. Ross's laboratory) was located near to the school. The house no longer exists and trees have been planted in the area under social forestry. I saw that house, tall building, constructed in old style..."<sup>6</sup>.

Dr. Pradeepta Banerjee in discussion with the author (March 2016) described the same fact. He also wrote, "This house was later bought by a physician, the popular allopathic doctor Shri Abanimohan Bhattacharya. Dr. Bhattacharya had his patient-observation chamber in this house. Following long years stay in that building, Dr. Abanimohon left Mahanad and built a house in Chinsura (district headquarter, Hooghly) and started living there"<sup>6</sup>.

### ***The Look of the Laboratory***

The present author also heard the history of the house from the elderly people of Mahanad during 2015-16 where Dr. Abanimohan Bhattacharya used to live. But how was that house?

Dr. Abanimohan Bhattacharya was the long-time owner of the house at Mahanad, bought from the Scottish Mission. He died in 1995 and unfortunately, during his life time there was no inquiry about that house and laboratory. Doctor Abnimohon's son Satyavarta Bhattacharya was born (1943) in that house at Mahanad. The description of that house is written based on Satyabrata's narration (on February 9, 2016) that matches with the house in the picture (Fig.2). His wife and brother's wife also gave the same account.

The house constructed in Gothic style had thick pillars and long verandah. The floor was constructed on a plinth raised high above the ground. The space in between the floor and the land surface was hollow. After ascending 5-6 stairs and passing through the balcony one could enter the hall that had fire place at the end. There were two massive rooms on the left side of the hall. The rooms had very large bathroom-closet. On the right side of the hall there were two similar big rooms and a large bathroom at the entrance. The doors and windows of the house were made of teak wood spread from ground to ceiling. Framed glasses were placed behind the doors and windows. Ceiling of the room was made of Mahogany wood planks. Pulley

for hand driven fan was also seen mounted on the ceiling of a room. A lot of vacant places outside the big house were also seen. The building shown in photograph (Fig 2, courtesy of Commons.wikimedia.org) is the house they once owned in Mahanad, according to Satyabrata, his wife and his brother's wife.

However, only a small part of the house and the balcony is captured in the picture. On the right side of the photograph (Figure 2), the terrace in total is not visible. According to the author, the full view of the house was not captured by the then an underdeveloped camera (without the aid of a wide-angle lens). No other picture of that house has been recovered so far. The members of the one-time resident and owner of that house identified the picture (Fig 2) to be their own home.

### ***Research Findings in Mahanad***

In the house of Mahanad, Sir Ronald Ross studied the effect mosquito bites on various birds and reached to very important conclusion. What was that? Birds are infected with malaria fever by the bite of the Culex mosquito. This fact is known today even to school students but it was unknown to the world hundred and twenty years back.

Ample evidences support that Sir Ross worked in Mahanad. "At the Presidency General Hospital (now the SSKM Hospital), that Ross confirmed how the parasite spread. Using bird subjects to study avian malaria, he found that after developing in the stomachs of mosquitoes, the parasite would move to the salivary gland, from which it would infect new hosts"<sup>11</sup>.

"Sir Ross discovered the process of malarial transmission in Mahanad village, West Bengal where he had a bungalow built with a laboratory and was assisted by few locals. He also identified the species of mosquitoes which spread the African fever"<sup>12</sup>.

"Ross built a bungalow with a laboratory in Mahanad village. Aided by three assistants he worked almost round the clock"<sup>13</sup>.

How Kishorimohan used to reach Mahanad for research work had already been mentioned. How could Dr. Ross reach that place? In this context it can be cited that, "The first railway in Bengal was started between Howrah and Hooghly and later up to Pandua station. Mr. Duff's school and the surroundings in Mahanad were just six kilometers away from Pandua. It can be assumed that Sir Ross in his train journey from Calcutta used to get down at Pandua and reach Mahanad for his work"<sup>6</sup>. Incidentally,

Calcutta-Pandua is India's second railway line, started in August 1854. The first railway in British India was from Bombay to Thane in Maharashtra.

**The fate of the laboratory:** The house of Mahanad as well as the laboratory associated with the Nobel Prize gradually destroyed due to lack of maintenance. Some scattered brickworks can still be found.

The present study is quite relevant today as it describes an important aspect of history of science in our country and the study may allow us having a glimpse into past global society as well as the tedious endeavors scientists undertake to discover a particular subject. Many facts related to the historical laboratory are yet unknown. Some information may hopefully be recovered through the efforts of researchers and ordinary people. The present report can be considered as an attempt towards that end.

### **Appendix**

There is no written information about Mahanad or Kishorimohan Bandopadhyaya in the archives of the London School of Tropical Medicine where all the documents relating to Sir Ronald Ross are kept. Although in caption 'LABORATORY OF CALCUTTA' is written on the photograph (Fig. 2) but the location was actually in Mahanad (that is not mentioned). The archive authority in London is unwilling to correct and they are asking for more proof in its favor. They have communicated through E-mail to the present author during February 14-16, 2016. The e-mail is given for readers' interest. Many references

and also my previous paper, [Unknown Indian Associates of Sir Ronald Ross, Soumitra Kumar Choudhuri, Sci. and Cult. 88 (5-6):176-180 (2022)] had also been sent to them.

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