

Toward Malaria Eradication

Malaria - A Brief Review

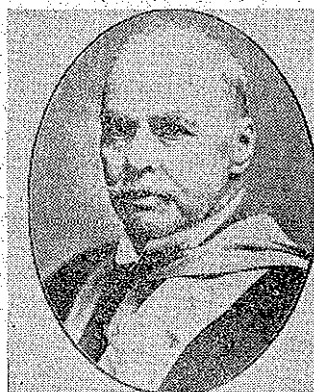
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FOR centuries malaria has been the biggest scourge afflicting mankind, exceeding every other disease in its toll of death, suffering and invalidism. While other diseases can decimate a population, malaria ravages can depopulate an entire region. The disease not only kills but maims. And those that it maims live to eek out a miserable existence, handicapped through economic and physical misfortunes.

Looking at the history of malaria one can say that the disease is perhaps as old as mankind. References to certain types of fevers akin to malaria exist in old manuscripts suggesting that the disease was widely prevalent in parts of Mesopotamia, India and China during the Dark Ages. Some of the Indian books like *Charaka-Samhita* and *Susruta Samhita*, the sources of medical literature of the Vedic times, refer to malaria as the "King of Diseases". The Chinese,

centuries before the Christian era, recognised certain types of inter-



Sir Ronald Ross

mittent fevers which were invariably accompanied by the enlargement of the spleen. However several attempts at associating the disease with some source or the other, centred around black magic, demons, different gods and so on.

'Malaria' Comes into Vogue

Even though malaria had been recognised as a specific disease of man and its symptoms known, it is unique in that no advance was made about the causation or mode of transmission till towards the end of the 17th century, when speculation on the causative agents of disease crystallised into a germ theory for the first time. It was during this period that more rational attempts were made to find out the cause of the disease and how it spread from person to person.

There is a traditional anecdote about the year 1640 of how the

This article opens a series of six articles aimed to stimulate interest in the Malaria Eradication Campaign.

We are indebted to Mr. Jain for sparing some of his precious time to prepare these articles especially for the Journal.

--Editor.

Countess of Chincon, wife of the Viceroy of Peru, was cured of malaria fever by the powdered bark of Quina-quina tree. The Countess and her physician carried samples of the bark back with them to Europe, and for the first time the European physicians learnt about this remedy for intermittent fevers. This anecdote has historical value as the quina-quina bark was named Cinchona.

Another great contribution to the history of malaria in the same period was the baptism of the name malaria. It was common practice amongst Romans of the late 17th century to say that a patient who succumbed to the intermittent fever had died from 'Mala-aria' meaning 'bad-airs'. Later the word was written as mal'aria and finally malaria. Horace Walpole in 1740 is said to have used the word malaria for the first time in English.

19th Century and Ross

Malaria, which was still in its infancy, took an adolescent shape during the last two decades of the 19th century. From then onwards started a new era in the history of malaria and its control. What happened makes an interesting story.

SECUNDERABAD AUGUST 1897.

THIS DAY RELENTING GOD
HATH PLACED WITHIN MY HAND
A WONDROUS THING, AND GOD
BE PRAISED, AT HIS COMMAND.

SEEKING HIS SECRET DEEDS
WITH TEARS AND TOILING BREATH
I FIND THY CUNNING SEEDS,
O MILLION MURDERING DEATH.

I KNOW THIS LITTLE THING
A MYRIAD MEN WILL GAVE
O DEATH WHERE IS THY STING?
THY VICTORY O GRAVE?

Ross typed these couplets after his epoch making discovery about the role of mosquito in the transmission of malaria parasite.



Ross with his wife and laboratory workers outside his house in Calcutta—1898

Following a discovery in 1875 that something specific could be seen in the tissues and blood of persons suffering from certain fevers, Lavern, a French Army Surgeon stationed in North Africa, became interested in the problem of malaria. In 1880 he saw the living parasites in the blood of a patient. This discovery was, however, destined to go into oblivion as eminent men of medicine disputed the discovery and its association with malaria.

This discovery by Lavern was followed by discovery of stains for the study of the parasite by Romanowsky, a Russian scientist, in 1890. From then onwards the progress was rapid.

Who first suggested that mosquitoes might be transmitting malaria, we shall probably never know. However the greatest impetus to the "malaria-mosquito theory" came from Patric Manson in 1894. Working on the assumption of Manson's theory, Ronald Ross, of the Indian Medical Service, started

an intense search with a fanatical zeal for the carriers of malaria. This work of Ross led to the most epoch making discovery of the life cycle of malaria parasite in the invertebrate host, in 1898 at Secunderabad, Hyderabad. Ross completed his work in Calcutta laying the foundations for malaria control work on a scientific footing. For his work Ross was awarded the Nobel Prize.

The 20th Century

Following Ross's discovery from the beginning of the current century started the modern age in the field of malariology. Scientific workers turned their eyes to the subject of malaria control by attacking the mosquitoes. All earlier attempts were anti-larval measures against the mosquito larvæ. These included measures like filling, leveling, drainage of water collections, killing of larval and pupal stages by application of suitable oils or other toxic materials.

It was, however, soon realised

that malaria control by such measures was only economically possible in large towns and cities. Since malaria was essentially a rural problem it was impracticable and economically not feasible to treat large and numerous water collections in the villages.

The Modern Concept

A great step towards control methods was the discovery in 1936 that pyrethrin, obtained as an extract from pyrethrum flower, could kill adult mosquitoes and other insects when sprayed as a mist. Large scale experiments were undertaken first in South Africa and then in India. This method of killing the mosquitoes was a new idea based on the knowledge that a minimum period of ten days was essential for mosquitoes to become infective after they imbibe infection from a human blood meal. In other words, if the life span of mosquitoes carrying malaria parasite could be reduced and intercepted by spraying, there could be no question of transmission of the disease from person to person. Although, it was soon realised malaria control with pyrethrum extract used as a space spray was not always very effective since some species of mosquitoes did not rest in houses and cattle sheds which were sprayed, the knowledge gained about the concept of 'interception of transmission' became the basis on which all further work was to progress. This led the scientific workers to explore other avenues and other remedies for malaria control. The result was the discovery of synthetic insecticides like DDT.

Basis for combating this ancient scourge of mankind were there already and the armaments were being moved in. Success was already there, it was now only a question of time.

(To be continued)

