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MOSQUITO DAY

INCREDIBLE as it may sound, August 20 has been designated Mosquito Day for well over a hundred years. It was on this day in 1897 that Ronald Ross got the first sight of plasmodium in the stomach wall of a mosquito and concluded that these were stages of the malaria parasite (known today as oocysts). The significance of this is that until Ross's discovery nobody had any idea of how parasites in the blood of malaria patients were transmitted by mosquitoes. Fantastic theories abounded, ranging from the drinking of water infected by drowned mosquitoes, to breathing in the air infected by mosquitoes (the word malaria is derived from an Italian compound word meaning "bad air"), but the connection was tenuous at best. The scourge of malaria was not unfamiliar to Ross, an Indian Medical Services officer, as he had treat numerous soldiers ill with malaria in Madras and Bangalore, but it was not until he had discussions with Patrick Manson, a leading authority of tropical diseases, that he began looking in the right direction. Ross's patience was rewarded when the British Medical Journal accepted his results, and his jubilation came out through his memorable poem :

This day relenting God
Hath placed within my hand
A wondrous thing; and God
Be praised At this command,

Seeking his secret deeds
Wth tears and toiling breath,
I find thy cunning seeds,
O million-murdering Death.

I know this little thing
A myriad man will save,
O Death, where is thy sting?
Thy Victory, O Grave?

Sir Ronald Ross became a great medical scientist almost by accident. He was born in British India to a Captain (eventually becoming a General) of the Bengal Army, and tended largely by Indian servants until sent to England when he was 8 years old. His schooling was nothing remarkable, although he developed a taste for art and literature, and dreamed of becoming a writer. He wrote a couple of little-known medieval romances and then turned his creativity towards poetry. It was at his father's insistence that he finally became a doctor.

During his interactions with Patrick Manson, London's foremost authority on tropical diseases, Ross learnt from Manson's experiences in China and his belief that malaria was transmitted by mosquitoes like filaria. Ross had been able to trace this malaria parasite in the salivary gland of mosquitoes, but he disagreed with Manson's belief that the probable mode of disease transmission was through the drinking of egg-contaminated water. He remained steadfast in his belief and was able to collect sufficient evidence to announce to the world on August 20, 1897 that malaria is indeed transmitted by the sting of mosquitoes. By 1898, he was able to uncover the complicated life-cycle of the plasmodium parasite in his laboratory in Calcutta, and this led to his being awarded the Nobel Prize in 1902.

Malaria is not only a disease but also a cure. Julius Wagner-Jauregg, born in Austria in the same year as Ross, won the Nobel Prize in Medicine in 1927 for his discovery that malaria could cure syphilis—at least in the dementia paralytic stage when it attacks the brain. It had been observed, as early as the time of Hippocrates, that every now and then, mental patients were healed or influenced favourably when they were attacked by a fever. It was this ancient observation, which excited Wagner-Jauregg and inspired him to find an effective method of treatment for chronic mental patients by infecting them with a febrile

disease. In 1917 he injected nine persons suffering from paralysis with the infectious blood of malaria patients— although the infected patients developed malaria, their mental illness was significantly improved, and in three of the nine recovery was practically complete. The fever induced this way literally burns up the temperaturesensitive syphilis bacteria while the form of malaria (tertian fever) thus caused is a relatively innocuous disease that can be cured by means of quinine treatment. Thus artificially induced malaria became the standard treatment for syphilitic paresis until the mid-fifties when it was replaced by antibiotic chemotherapy.

Ross spent a considerable amount of time in evolving methods to control and eradicate malaria— he passionately believed that the key to malaria lay in the control of the offending vector, which initially seemed fragile and was compelled to breed in puddles and urban water holes. These could be easily kept in check by "mosquito brigades", groups of workers whose job was to destroy the vector and its larvae. He later demonstrated mathematically how reducing the concentration of anopheline mosquitoes could have a real and potentially cumulative effect, but these were not accepted by his contemporaries. In fact, his pioneering contributions to malarial epidemiology were not appreciated until two decades after his death. Ross was particularly aggrieved that the growing band of malariologists believed that the control and eradication of malaria was not as simple as he had advocated

Following Ross's work, a malaria control programme was gradually developed for India, influenced by a number of malariologists like S P James, Sir Rickard Christophers and J A Sinton whose careers were spent largely in India. Indian malariologists favoured a wider range of strategies, including prophylactic quinine, early detection of epidemics and changes in agricultural practices. However, it was only with the discovery of DDT after Independence that the mosquito eradication programme was launched to prevent malaria.

To Ross, winning the Nobel Prize was no consolation for his disappointment that his life as a researcher was undervalued and underpaid. His analysis of the economics of malaria control went largely unheeded in his lifetime. By demonstrating how much malaria cost the governments of malarious countries, and how it was much more efficient to prevent it in the first place, Ross offered a sober reminder of the economics of prevention. According to experts his message is relevant even today, but it continues to be ignored by politicians and health planners. ❐

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