

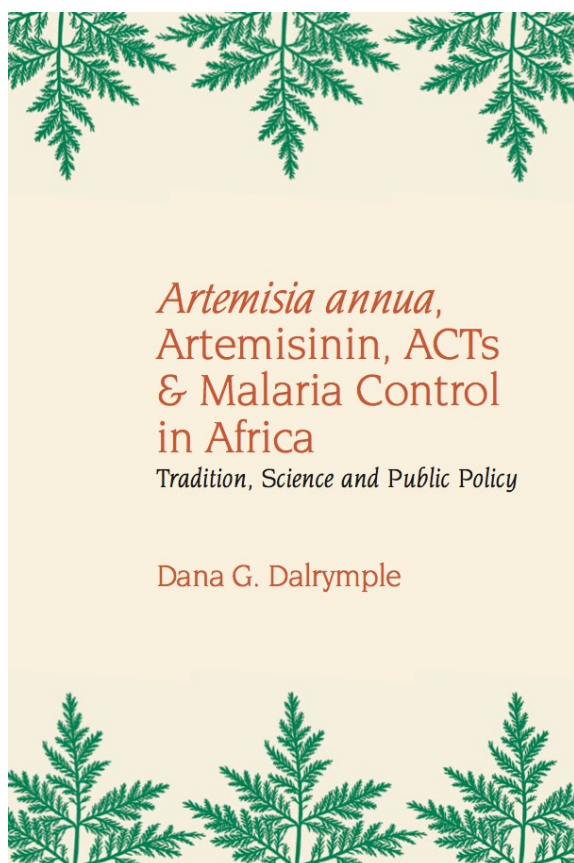
## Book review: ‘*Artemisia annua*, Artemisinin, ACTs & Malaria Control in Africa: Tradition, Science and Public Policy’

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### Review

The first book I ever reviewed was a fascinating account by George Bankoff entitled *The conquest of disease*, The story of penicillin, first published in 1946. This commendably brief work cast a perspective on the potential clinical value of penicillin, the first of a then novel series of what came to be known as antibiotics. Reading Dana Dal-

rymple’s impeccably composed work on what could well have been called *The story of artemisinin* exposes a number of parallels with that of penicillin. The latter compound, the product of a fungus which was first described in the second half of the 19th century, was recognised to be a potent antibacterial agent by Fleming in 1928. Its subsequent study following clinical research pioneered by Florey and his colleagues from 1939 onwards, perhaps stimulated by the imminent outbreak of World War II, revealed penicillin to be a potent treatment against a wide spectrum of bacterial infections in Man, an achievement that was recognised by their receipt of the Nobel Prize in 1945.

Artemisinin first drew international attention in 1976 through the publication in the Chinese Medical Journal in the English language of research that had been carried out in the Peoples’ Republic of China from the late 1960’s. The deployment of wild herbs had been a major feature of traditional Chinese medicine almost since time immemorial. Among the old records was the use of a plant now known as *Artemisia annua* for the treatment of a wide range of maladies including fever. Yet it was only the failure of modern, synthetic drugs such as chloroquine used to cure malaria in Southeast Asia during the war in Vietnam during the 1960’s that triggered a massive search for new forms of treatment through an intensification of the study of plants used traditionally to cure malaria.

The Chinese team revealed that *Artemisia annua*, commonly known as qinghao, contained a component (initially called qinghaosu, or artemisinin ) that proved to be one of the most potent compounds ever known for the treatment of all forms of human malaria. Dana Dalrymple, an agricultural economist working with the U.S. Department of Agriculture, first entered the scene some 30 years

on when artemisinin and several semi-synthetic drugs had already received international acclaim as the leading anti-malarial drugs. However, their large-scale production still depended on the cultivation on an industrial scale of *Artemisia annua*. There was an obvious and urgent need for the input of specialist agriculturists and economists, not to mention botanists. This book contains a masterly review of the historical development of artemisinin and artemisinin analogues.

Already in the 1980's the principle was coming to be widely accepted that antimalarial therapy using only a single compound (i.e. monotherapy) would inevitably lead to the selection of drug-resistant parasites. Subsequently attention was diverted towards the deployment of various combinations of artemisinin with other antimalarials that were known to have totally different structures and modes of action, in order to impede the selection of resistance to one or both of the components in what came to be termed Artemisinin Combination Therapy (ACT). Because in terms of the geographical region where malaria, especially that caused by the "malignant tertian" parasite *Plasmodium falciparum*, imposes the greatest threat to human health and life is tropical Africa, much of the international funding for research in this quest came to be directed to the problem there. This book contains a remarkably complete and readable account of such matters as the global supply of antimalarials, national and international policy issues. Conflicts such as those arising from the competing aims of pharmaceutical organisations, the role of such international agencies as the World Health Organisation, Medicines for Malaria Venture, the Global Fund to Fight AIDS, Tuberculosis and Malaria and national programmes such as those of the U.S. Government are all reviewed. So too are the inevitable conflicts between a number of individual research workers in a search for personal recognition, a delicate topic that is sensitively touched on in these pages.

The bibliography of some 1450 references indicates the thoroughness of the research that has gone into the development of this exceptionally complete contribution to the history of probably the most important medical cum agricultural development of the 20th and early 21st centuries, ranking alongside penicillin as a true breakthrough in chemotherapy. Also included are references to the potential value of artemisinin and its analogues in the chemotherapy of other parasitic diseases and of cancer, aspects that, though beyond the central theme of this book, have a potential so far relatively little touched. To top the composition of his formidable book Dana Dalrymple has led the

way in the novel concept of literally presenting it freely to all and sundry who devote themselves to the management and, hopefully, eventual elimination of malaria, not only in Africa but in every endemic area. This by itself deserves an appropriate award to recognise in full the merits both of his scholarship and generosity. The book is truly a masterpiece.

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