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MALARIA AND ANTIMALARIALS

AMONG the several diseases which afflict this country, malaria occupies the foremost place; it is the largest single disease endemic in India. Annually a third of the population of this sub-continent is said to suffer from malaria, and the percentage of deaths among them is appallingly high. Those who survive the attack suffer from its after-effects which often leave a permanent injury on the patient. The loss of economic man-power and human efficiency due to this disease in the British Empire has been estimated at 52 to 62 million pounds a year, more than half of which is shared by this country.

For decades this widespread disease has been allowed to go practically unchecked and no determined and sustained effort commensurate with the magnitude and seriousness of the problem, has been put forward. In this connection, special mention should be made of the Rockefeller Foundation for the valuable services rendered to the Provincial Governments in conducting malarial surveys in the several provinces, and for furnishing the necessary technical personnel.

Methods for combating this disease are well known and they have been widely and successfully adopted in other countries like Italy and Greece. They consist of the destruction of larvæ, the draining of swamps, mechanical protection against mosquitoes and prophylaxis by quinine or atebrin and plasmoquine. The problem in this country is complicated by the undernourished and poverty-stricken condition of its people. The *per capita* consumption of quinine in India as compared with other malaria-stricken countries is only three and a half grains

as against the 16 and 24 grains respectively in Italy and Greece. The question of malaria control is, therefore, closely connected firstly, with an adequate supply of prophylactic drugs at prices which the average Indian can afford to pay, secondly with the speed and efficiency with which the sources of vectors could be minimised if not abolished and thirdly, with the raising of the standard of nourishment among the masses.

Col. Chopra, in an admirable review of the position of quinine in this country, computes that the maximum potential demand for this drug is 1,500,000 lb. The Public Health Commissioner to the Government of India is of the opinion that "there is no question of the effective treatment of malaria in India until the consumption of quinine approximates to 500,000 lb." Sir Patrick Hehir has estimated that for India, 970,000 lb. of quinine would be the minimum necessary for a successful tackling of the problem of malaria. At the moment, India's annual production of quinine lies between 60 to 70 thousand pounds, which is supplemented by another 130,000 lb. of imported material. These figures reveal the utter helplessness of the situation and call for the most vigorous effort on the part of those interested in the control of this preventable disease.

The Royal Commission on Agriculture realised the acuteness of this problem and made far-reaching recommendations calculated to make India self-sufficient with regard to this drug. They have pleaded for a rapid expansion of the acreage under cinchona; the evidence presented before the Commission had revealed that for many years the progress of cinchona cultivation in the country had remained practically stagnant, in spite of the circumstance that large tracts of territory authoritatively pronounced to be suitable for its propagation, were found to be available. In view of the imperative urgency and vital importance of this matter, the Royal Commission urged that the Central Government should take up the responsibility of producing and distributing this drug.

In 1928, a committee of representatives of the various Provincial Governments interested in the propagation of cinchona, was called with a view to elicit their advice regarding the extent and manner in which the recommendations of the Royal Commission could be given effect to. The Committee was immediately faced with the financial aspects of the problem and recommended a scheme through which all profit which might accrue would be shared equally by all the consumers. The Malaria Commission of the League of Nations emphasised the importance of quinine as the prophylactic *par excellence* in the remission of malaria. In spite of all this forceful expression of authoritative opinion and in the face of the brilliant examples of public health administration in other parts of the world, nothing substantial or effective has been achieved in controlling the disease in India. Considerations of philanthropy, humanity and charity and of public health obligatory on all Governments, have been overpowered by the modern "shopkeeper instinct". We must here refer to the unostentatious and silent part played by indigenous systems of medicine which have been bringing relief to the millions of the malaria-stricken in

rural districts. Captain G. Srinivasamurthy (formerly Principal of the School of Indian Medicine, Madras), who is one of the foremost exponents of Ayurveda, has revealed to us that during the days of the East India Company, a number of indigenous antimalarials were "authorised as official substitutes for cinchona and its alkaloids. They were also included in the pharmacopœia of India which was then in use as supplement to the British pharmacopœia". It is regrettable that these specifics have not continued to receive the official recognition with the rise of quinine as the official drug for malaria.

Cinchona was introduced in India and Java at about the same time; its propagation made considerable headway in this country and at one time it looked as though the country would not only satisfy its requirements but produce a surplus with which a prosperous but not a profiteering export trade could be built up. But Java which was backed up by intensive methods of scientific selection and propagation, evolved varieties which yielded richer percentages of the alkaloid. The Dutch are the foremost in the field of plant improvement and have successfully demonstrated their scientific talent and skill with regard to a number of other economic crops like the sugarcane and the tobacco. The valuable experience in these lines, was utilised for the improvement of cinchona which has been responsible for the supremacy of Java in the production of quinine. Overproduction of this drug threatened to reduce the prices to an uneconomic level but the "Kina Bureau", a powerful syndicate, stepped in to control the world price of quinine. Col. Chopra writes in this connection:

> "The Kina Bureau has tried and has been successful in effecting regulated and gradual reduction of the cinchona areas to proportions fitted to what the world can afford to buy and not what it really needs. In this way the price has been maintained at a level that leaves a profit both for the plantations and the factories."
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> "It follows from all this that it would be absolutely futile to expect any large reduction in the price of quinine under the present conditions. So efficient is the control that even the great world-wide depression during recent years has not affected the price of quinine, which still remains at Rs. 18 per pound, which was the price fixed so long ago as 1926."

This monopoly has been challenged by Germany. As a part of their programme of colonial expansion, Germany was keenly interested in the synthesis of specifics for all the tropical diseases like sleeping sickness, yellow fever, malaria, etc. Intensive work on synthetic antimalarials was launched and in the year 1926, the Elberfeld Chemical Research Laboratory of the I.G. Farbenindustrie, announced the synthesis of plasmoquine. Four years later Atebrin was synthesised. These two synthetic drugs have now been in use in this country as antimalarial specifics. Medical opinion in India, while recognising the efficacy of the two drugs, is averse to their general adoption. These drugs have to be administered under careful medical supervision; otherwise they may prove highly toxic. So far as mass treatment of malaria is concerned, quinine still holds the field, since the drug can be safely administered and is even recommended for self-medication. But the price of quinine is too high. "We cannot get away from the fact that quinine is the rich man's remedy, while malaria is the poor man's heritage; but let medicine once admit and practise the

value of the other alkaloids and many Indian areas might then be turning out febrifuge at costs more suited to the poor. For, with a change of medical opinion and practice we could make use of kinds of cinchona that do not demand java soil and climatic conditions for their best development." This extremely helpful suggestion made by the Government Cinchona Department and Factory in Bengal, is supported by Col. Chopra who adds, "It is unfortunate for India that of all the alkaloids of cinchona bark, the merits of quinine alone should have been recognised by the medical profession, with the result that a monopoly has been created for the plantations and factories of Java. A reference to the history of the treatment of malaria in a recently published work by Lieut.-Col. R. Knowles and Senior-White, shows that this routine use of quinine sulphate is more or less an accident and that 'it is very far from certain that quinine is the best alkaloid of cinchona bark to use. Both quinidine and cinchonidine are more efficacious with regard to their anti-malarial power'. The important investigation carried out by Fletcher in Kuala Lampur in the Malay States and the experience at the Calcutta School of Tropical Medicine show that alkaloids of cinchona bark other than quinine are quite effective in the treatment of malaria if given in the usual doses in which quinine is given. The total alkaloids of the bark in the form of cinchona febrifuge have been used in the Carmichael Hospital for Tropical Diseases and at the out-patient department of the School for many years with very satisfactory results". In view of this clinical evidence, it is difficult to resist the demand for using the total alkaloids in place of quinine. This will cheapen the cost of production, facilitate the utilisation of the quinine-poor barks now considered uneconomical for the extraction of quinine and conserve the antimalarial resources of the country.

The loss of Java has increased the acuteness of the problem a thousandfold. The price of quinine, which was fixed at Rs. 18 by the Kina Bureau has inflated to Rs. 130 per lb. The synthetic antimalarials have practically vanished from the Indian market. It is high time that the Government realises the importance of taking immediate steps to make the country self-sufficient with regard to this most important drug. In addition to this, it is necessary that the antimalarial specifics of established reputation in the indigenous systems of medicine, should be investigated with the co-operation of the Pandits and the Hakims. Investigations on the breeding of hardier and richer strains of cinchona should be undertaken and these researches may be appropriately financed by the Imperial Council of Agricultural Research, while researches on synthetic antimalarials are to a certain extent being financed already by the Board of Scientific and Industrial Research. A Central Advisory Board to co-ordinate and direct these activities should be constituted. This is a matter which demands the earnest attention of the Central Government.