

THE CANTONMENT ANTIMALARIA PROBLEM AFTERTHOUGHTS.

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(3) ON THE USE OF PROPHYLACTIC QUININE.

Major Mansell has brought up this subject in an article in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS of February, 1929, in which he writes on an "Experiment in Prophylaxis." This consisted of the administration of quinine, thirty grains daily for eight days after leaving the last malarious camp, up or down, on a certain hill journey, i.e., to cover the "normal incubation period." He presents some very gratifying histograms to show the result without and with treatment at the mid-season move period. His contrast is not, however, of selected men during the same period, but of the same period in two different years.

We suggest that this article should not be called "An Experiment in Prophylaxis," but "A Result of Early Treatment." His method is really a mass treatment of potentially infected groups.

He states that quinine was given for eight days to cover the normal incubation period. Surely this is a somewhat short time. The normal time, even for *P. falciparum*, is given by several authorities as nine to twelve days, and for the other plasmodia as fourteen to twenty-one days. Even with artificial infection for purposes of treatment, periods of five to thirty-one days resulted, and only by intravenous methods were periods of four to eight days obtained. In the Meerut District this method of early mass treatment of potentially infected, i.e., all men returning from leave through malarious Terai areas, was regularly employed in four stations. The results were satisfactory in that men were kept available for full duty and out of hospital, but there was no claim that this was either a true prophylactic or curative method for the majority of cases.

In many countries eminent malariologists have expressed the opinion that prophylactic quinine is valueless in preventing malarial infection. Yorke and Macfie recently have shown that administration of quinine, for five days before and seven days after bites by infected anophelines, failed to prevent malaria.

Colonel A. B. Fry, after considerable experience on plantations and

with selected groups in Assam, definitely stated that he had no faith in prophylactic quinine.

Webber has shown that quinine given to a donor does not render his blood uninfected to a susceptible person, and that anophelines can be infected by the blood of a person taking quinine.

In Macedonia Wenyon reported quinine prophylaxis during the war to have been a failure.

Knowles and Senior-White state that: "quinine has no destructive action on the malarial sporozoites injected into man by the infected mosquito," but "in reality acts as a very early treatment of a malarial infection," and that "the good old custom of handing round a bottle of five-grain tablets of quinine every evening at dinner with the sherry and soup has nothing to recommend it."

It has been shown in the Panama Canal zone that a compulsory fifteen grains daily, taken under supervision, and which was certainly rarely missed, did not prevent infection in three groups of engineers working outside the sanitated areas. Of 225 men, during four and a half months in the jungle, only fourteen showed malaria, but from two weeks after the cessation of the quinine, malaria occurred in a veritable epidemic which subsided after five weeks. The writers of the article on this incident, in the *American Journal of Tropical Medicine*, conclude that these facts are confirmatory, that fifteen grains of quinine will not prevent malaria, "but by suppressing symptoms and keeping men on their feet has a high military value in a malarious region."

Major Mansell's results, as shown by his histograms, appear most gratifying, but:—

(1) The year 1928 was an exceptionally dry year and healthy, with low malaria rates in large areas, and many stations may well have shown similar results.

(2) This dry and healthy season particularly affected the hill road areas just at the time of the mid-season moves.

Possibly Major Mansell is too optimistic as the result of a single set of figures.

Another form of the prophylactic use of quinine which does appear to be of value, however, is the treatment of obvious reservoirs of infection in the troop lines. By this is meant the treatment of all malarious children of troops and followers in all units in a station, not specially to benefit the children, but as a prophylactic for the troops. This is a method of prevention which appears to hold out considerable prospects of good results, and has been largely carried out in certain stations in the Meerut district.

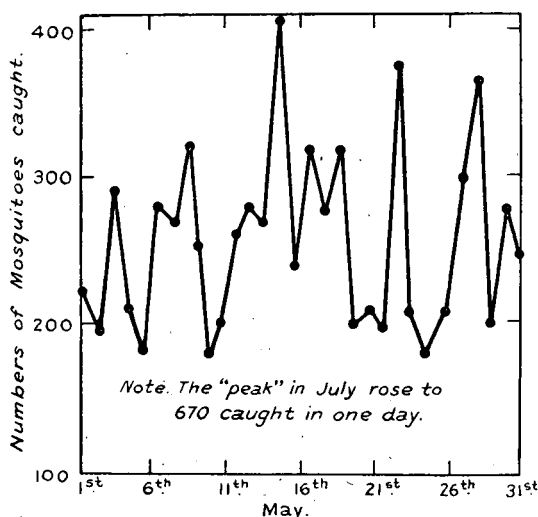
(4) ON THE USE OF FUMIGATION OR SPRAYING.

As mentioned previously, fumigation does not appear to lend itself to the production of great results, at any rate for the Indian type of barrack. The experience of many appears to be that, after much labour and

expenditure of time, the results are extremely disappointing. One example from Jhansi may illustrate this.

A large British barrack was carefully treated at the end of the malaria season in the R.A. lines close to the dhobie nullah, the bugbear of the antimalaria officer. Expert R.E. assistance was obtained and the full quantities of fumigant were used. The deaths officially recorded were: wasps 1, moths 1, mosquitoes 0.

Richardson has shown recently that no permanent results can be expected, even with repeated systematic fumigation. Fumigated barracks were daily infested with fresh arrivals from neighbouring uncontrolled areas; the conclusion was reached that the effort was not worth the result.



Graph of daily catches.

Fumigation, although applicable to European conditions, such as have been emphasized by Colonel James, where definitely infected mosquitoes can be shown to hibernate in inhabited rooms, is not so effective in India where *stephensi* and *culicifacies* may and will repeatedly re-infest the fumigated rooms.

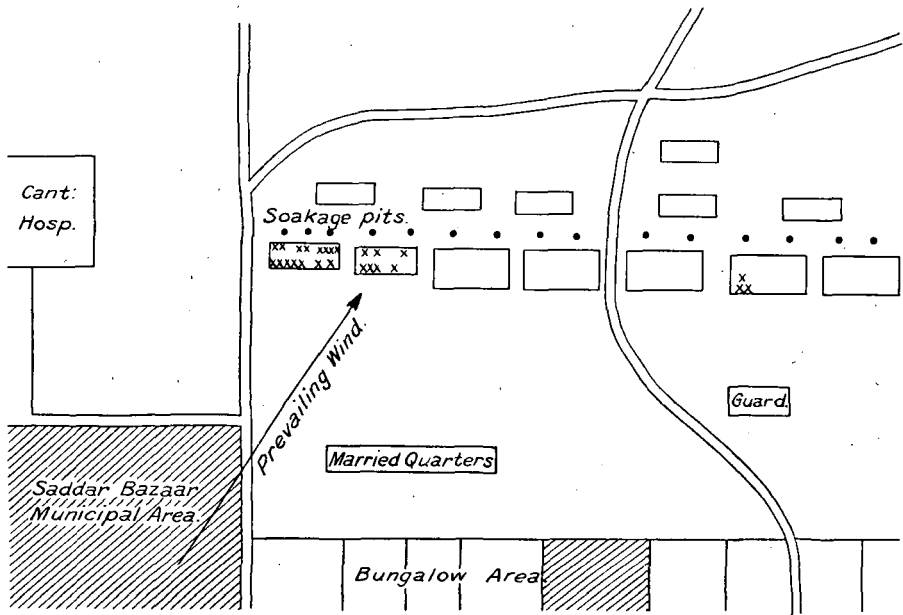
Spraying with lethal solutions, however, appears to be a much more useful method. The method is comparatively easy, except for the upper parts of large rooms; it can be done relatively cheaply and, above all, it is a method which appeals to the mind of the soldier and the company officer, and is therefore carried out regularly, particularly if paid for partly from unit funds.

The proprietary spraying solutions, so freely advertised by means of alarming pictures, although very effective are also very expensive. What we require is a cheap and easily procurable home-made solution which will

be reasonably effective. One such solution called "rids" was found to be very effective and not highly inflammable. This is composed of : kerosene oil 89·6 per cent, carbon tetrachloride 7 per cent, methyl salicylate 3·4 per cent; or a cheaper variety, kerosene oil 98 per cent, carbon tetrachloride 2 per cent. The ingredients can readily be purchased from any bazaar chemist.

Sprays of many kinds are available. Cheap and effective types can be obtained readily through the Planters' Association Stores, Calcutta. A very useful type can be got for about Rs. 4.

The soapy-hand method undoubtedly offers a very valuable alternative to spraying or fumigation. It is easily learned and can be carried out



Karachi. British troops barracks (purely diagrammatic).

by Indian troops ; it proved most effective in the large station of Dehra Dun. It was described in the previous notes.

If inter-company competitions are carried out with a small monthly prize, the weekly "bags" and clearance of mosquitoes are amazing. The graph of daily catchings from the barrack rooms of one company shows the large numbers which may be caught by this method. In a certain dāk bungalow fifty-three mosquitoes were caught in three minutes by one of us.

The methods of spraying and soapy-hand are surely far too useful to discard, and should be used for barracks where mass protection by complete proofing has not yet been obtained. The graph of daily catchings at Dehra Dun may also be regarded as a very strong argument in favour of mosquito proofing of all barracks.

(5) ON THE USE OF SPOT-MAPS.

It is agreed that spot-maps, as generally understood, i.e., maps showing breeding places of mosquitoes and other such items of interest, are undoubtedly essential as a working basis for all antimosquito work. Such spot-maps are found in every average cantonment and *for* the cantonment. But they usually give only very sketchy details for the neighbouring non-cantonment land, which may well form the bulk of the breeding grounds.

But the spot-map to which we wish to draw particular attention is that recorded on a plan of the barracks showing the position of the bed occupied by every case of sickness. A collection of red crosses, or whatever sign is used to indicate malaria, in one part of a barrack-room shows that something is wrong and attention can be directed to ascertaining the cause.

(6) ON IGNORANCE AND EDUCATION.

In the previous series of notes cases of ignorance were quoted to show where antimalarial efforts might well fail from this ignorance in our very midst. Major Mansell considers that this will be gradually overcome in our cantonments, and even in the surrounding areas, by education of civilians.

Perhaps, like the millennium, such a time eventually will come, and the whole of our populations in and around cantonments will be sufficiently educated to carry out complete antibreeding methods. We very much doubt if we shall live to see that time.

In the meantime are we not, from this very ignorance, subject to mass mosquito breeding in our very midst? Can we be sure that the walled Mahomedan house, into which we may not enter, is not breeding mosquitoes freely in its courtyard, fountains or tanks? Can we be sure that the multitudinous staff of the C.M.A., who, by force of persistence and numbers, acquire many desirable bungalows in the midst of cantonments, are sufficiently educated to keep their bungalows free from mosquito breeding? Can we even be certain that the officer or his wife, the cavalry subaltern or the grass-farm manager are all sufficiently educated in this? We beg leave to doubt it, and therefore must admit that the potential danger remains or is likely to remain in our midst.

A further example may be of value.

An R.E. officer, Garrison Engineer to two malarious stations and responsible for the expenditure of several thousands of rupees of anti-malaria funds, was attending a "backward boys' class" for promotion. In a test paper the question was put, "To describe under certain conditions what antimosquito measures should be carried out?"

The reply given was, "Burn all litter to prevent breeding of mosquitoes." However, there is no doubt that education is spreading, and evidence of knowledge in the subject crops up in astonishing places. At the village of

Bageshwar, in the mountains two marches north of Almora, when fishing the Sarju, the fishing chokra, aged 14, was found to have a very fair knowledge of mosquito breeding, and why and how it should be stopped.

But to return to our cantonment; surely the prevailing ignorance amongst a considerable portion of the population makes it obvious that antibreeding methods can, at present, certainly not free our cantonment, and that therefore only mass protection is the true remedy.

(7) CONCLUSIONS.

The various points which have been considered indicate that our cantonments, as at present constituted, are not suited for the eradication of malaria by mosquito destruction, and that therefore we must fall back on protection, the individual protection of the mosquito net and the mass protection of the proofed barrack.

This is really a question of money, and where money is not available all the other methods certainly are of value and play their respective parts. That much success by these methods can be and should be gained is admitted, and is illustrated by the examples given. It is suggested, however, that every endeavour should be made to attain mass protection by a continuously progressive policy.

It is suggested that, in view of the nature of our cantonments, only a minimum amount of the annual grants should be utilized for the actual carrying on of the antibreeding and destruction methods. Such methods should include inexpensive means of filling or drainage on some proper plan; the controlled use of Paris green and oils; the use of co-ordinated spot-maps; the use of suitable inexpensive spraying solutions; the use of the soapy-hand method; and the enlistment of the help of all ranks in the station.

It is suggested that hard-won antimalaria funds should not be dissipated on drainage which will only remotely affect the situation, and the cost of which should be met from other sources such as building or cantonment grants.

Furthermore, as large a proportion of the available funds as possible should be carefully collected and expended on the attainment of mass protection by the proofing of all barracks, institutes and quarters where our valuable military population dwells.

It is not suggested that by this method we can hope to eliminate malaria entirely from our midst, but that under present conditions it does appear to be the most effective and readily attainable way by which we can hope or expect that malaria will cease to be the leading cause of sickness amongst our personnel.