Clinical and other Notes.

ANTI-MALARIAL OPERATIONS AT MIAN MIR.

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The anti-malarial measures at Mian Mir during the last few years have received wide publicity, and their failure has been the subject of some discussion, so that general interest in Mian Mir, as a test case, has been aroused. For this reason it may be of interest to readers of the Journal to hear of any new measures undertaken and progress made.

At the Oxford meeting of the British Medical Association I endeavoured to show that the failure of the operations conducted in 1902 and 1903 was due to (1) the area of operation being too small and not protected from invasion from outside; (2) the area itself not being under complete control, since the irrigation canals—the acknowledged breeding ground of the malarial carrier—remained in existence.

The arguments in favour of the contention that the irrigation system is one of the most potent causes in the spread of malaria in Mian Mir are briefly as follows: (1) The large increase (from 654·3 to 1,386 per 1,000) in the rate of malaria after the introduction of the system; (2) the fact that the larvae of A. culicifacies, which is practically the only mosquito in Mian Mir in which the malarial organism has been found, have been discovered only in the irrigation channels and their overflows.

In this connection it is interesting to note that the year 1904 proved a very healthy year, the admissions for malaria numbering 507·40 per 1,000, as against 1,032 of the preceding year. Moreover, the greater number of these were readmissions of cases infected during the preceding year, the number of fresh infections among new arrivals numbering only 105. At the same time the monsoon rainfall was very scanty, and very few A. culicifacies could be found. This is quite in accordance with the usual observation, which is the same in Mian Mir as elsewhere, that the amount of malaria varies with the amount of rainfall.

At first sight this seems to be utterly in opposition to the view that the irrigation system is chiefly responsible. If the malarial carrier (A. culicifacies) breeds only in the canals, why should a heavy rainfall increase the amount of malaria? On the contrary, since in wet years the canal water is more often cut off than in dry years, surely a wet year should not be so favourable for A. culicifacies and therefore for malaria.

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The answer to these questions lies in a more complete knowledge of the habits of the *Anopheles*. The larvae of *A. culicifacies* are found among the grasses along the edges of running streams. This has given rise to the view that this mosquito breeds from choice in running water; but another view has recently been brought forward by Lieutenant-Colonel O'Sullivan, R.A.M.C. His theory depends on the fact that the canals do not entirely dry up when the water is cut off. Water remains in certain places, the chief of which are, firstly, the small cement tanks which exist in almost every garden, into which water from the nearest channel flows for use in the garden. In these I have found *Anopheles* larvae after the water has been cut off, from June onwards. A still more important place is in the bed of the larger channels themselves, especially the bridges. The canals when passing under bridges are dug out, forming a syphon. In this depression water constantly remains, and in such places the larvae of *A. culicifacies* have been found by Colonel O'Sullivan, as the result of frequent observations, from the sixth day after the canal has been cut off onwards, but never before the sixth day. The deduction from this observation is that the stagnation of the water is favourable to the development of the larvae. So then, it would appear that while the water is running most of the eggs and larvae are washed away and perish in the rapid stream, but when the water is cut off and stagnant pools remain the larvae have every opportunity of developing. Now, in a dry year the water is seldom cut off from the canals, and only for a few days at a time, so that the conditions for the development of the larvae are not favourable. In a wet year, on the other hand, the canal is cut off for long periods, and the pools, being replenished by frequent showers, remained undisturbed for a time long enough for the complete development of the mosquito. This is, I believe, a simple explanation of the difficulty, and explains why a heavy rainfall has such a marked effect on the malarial rate.

I need hardly mention that, even if this explanation is correct for Mian Mir, it does not necessarily hold good for other places, where perhaps there are no irrigation channels, and *A. culicifacies* is not the only malaria carrier, or other local conditions are different. It is put forward merely to explain the local conditions of Mian Mir, and is entirely dependent on the correctness of the observation that *A. culicifacies* is practically the only malaria carrier in Mian Mir.

In the last year there have been great improvements made in Mian Mir, and a really serious effort is now being made to reduce the amount of malaria. The general sanitation of the cantonment is being carefully attended to, and the scheme has been approved of filling in all the canals and irrigation channels in the cantonment, and of making a system of surface drains to carry off storm water. In fact, the work is already in progress and a large part of it has been completed, so that during the
ensuing malaria season we shall be in a position to test the soundness of our theories and the value of the operations.

It may be well to add, since there was some misunderstanding on this point at the Oxford meeting of the British Medical Association, that the filling in of the irrigation channels only affects the cantonment itself and a few square miles in its immediate vicinity, and will not materially contribute to a general famine. The bungalow owners have in each case consented to make a well in their compounds, so that even the cantonment itself will not suffer from drought. The multiplicity of wells, it must be confessed, presents a weak point in the attack, and it remains to be seen whether *A. culicifacies*, being deprived of their favourite breeding places, will not adopt the wells as an alternative. The wells at present are a common breeding ground of various *Culicines*, but hitherto no larvae of *Anopheles* have been found in them.

**PHYSIOLOGICAL EXERCISES FOR MISUSED VOICES.**

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The exercises herein described are quite unique in their way, and I was led to adopt their use after having tried in vain traditional and other methods of instruction to strengthen an easily fatigued voice—the consequence of misuse. The results of the tuition given by the originator of these exercises are simply astonishing. Not only did I note a wonderful improvement in the strength of my voice after a few weeks' practice of his simple rules, but by their use I have coaxed back to its former vigour the voice of more than one drill sergeant, and so strengthened the vocal organs of others that they could with ease stand the wear and tear of barrack square life.

Before discussing the exercises it is advisable to first refresh our minds on one or two points concerning the mechanism of voice. The tone of voice consists of two elements: vibration which gives to the voice its carrying power, and resonance which adds musical quality to the vibrations. It may be said that no one has difficulty in modifying the size of their pharynx and mouth for adding all the resonance required for the production of a full round tone, but owing to bad habits of one sort or another many are unable to intensify the vibrations of the cords so as to make the voice carry further without hurting the larynx—that is to say, if the voice is used at full power for any length of time—for it must be remembered that it is not the amount of air that passes between the cords that originates tone, but the amount of air that is resisted by them in its passage outwards; in other words, for the scientific production of vibrations a certain degree of approximation of the vocal cords is necessary, and this condition must be present at the very instant