

A REPLY TO MAJOR ROSS'S CRITICISM.

BY LEONARD ROGERS, M.D., M.R.C.P., I.M.S.

AT the suggestion of the Editor of the *Indian Medical Gazette* I send the following few lines:—

Major Ross does not think the spleen rate is a good test of the amount of malaria; in which opinion he differs from many Indian authorities, such as Dempster, Chevers, Taylor, Dyson, etc., while the observations of the last two observers on the reduction of the spleen rate, as a result of measures to remove water logging produced by the Western Jumna Canal, strongly support their view. As, however, Major Ross admits the possibility of a connection between the spleen rate and impure water being an explanation of the facts I have recorded, the point is of purely theoretical importance, for repeated blood examinations have convinced me that there is a definite relationship between enlarged spleen and the malarial type of anæmia and general ill-health in malarious places, so that if an improved water-supply will remove these, its introduction will have a greater effect on the health of the population than any feasible crusade against the mosquito; and my results retain all their practical importance. Major Ross's regimental experience, which agrees with my own, only confirms the well-known fact that slight fever, which is immediately and efficiently treated, as will be the case in native troops, will much less frequently cause enlargement of the spleen, than repeated relapses or re-infections in the less favourable situated general population.

Major Ross goes on to deprecate comparisons of fever rates with meteorological data, on the ground that admissions may depend more on relapses than on fresh infections—a factor I have myself laid stress on. Here again it may be admitted that the results of such inquiries may be of more practical than theoretical value, for on account of the great difficulty of appreciably reducing new infections in a malarious tract of country by the destruction of the mosquitos, a study of the conditions which predispose to the frequent and very injurious relapses is of all the more value as indicating the best times for successful prophylactic treatment; while they have the further advantage of being sufficiently simple to be profitably carried out even by such as myself, whom, Major Ross would "warn against undertaking medical researches."

It is to be regretted that Major Ross should have ended an otherwise very fair, if fatherly, criticism by incorrectly stating that I have misquoted his views. If he will read my paper a little more carefully he will see that I was fully aware of his admission that it is impossible to exterminate the mosquito from large areas, for I wrote—"We may hope with Ross to

at least rid towns or small areas of malaria," and again—"The importance of these observations lies in the impossibility of destroying all the mosquitos in even very small areas in Bengal, for the thirty tanks mentioned above all lay within an area of one-sixteenth of a square mile," being in fact a very small corner of Calcutta itself.

In kindly tendering me so much excellent advice Major Ross appears to have overlooked the fact that my orders were not to conduct a scientific investigation into the modes of infection in malaria, but to carry out a practical inquiry into the health of a considerable tract of country, while the results obtained still appear to me to strongly suggest, although they do not scientifically prove, that there is "a very definite relationship between the drinking water and the amount of malaria as judged by the spleen rate in this alluvial area."

SOME NOTES AND QUERIES ON MOSQUITOES.

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THERE are several points in current recent literature on this subject that, it is desirable, should receive notice in the pages of the *Indian Medical Gazette*.

First of all there is Dr. Sambon's note on the attitude of *Anopheles*.

As regards that of the individual species *An. Claviger*, Fabr., no doubt Dr. Sambon is absolutely correct, for though I have never seen a living specimen of the insect, it must be remembered that it is in many ways an aberrant member of the genus, and especially in the fact that, although the wings are spotted, this decoration is produced in a way characteristic not of the genus *Anopheles* but of the spotted forms of *Culex*, such as *C. annulatus*, Schraub, and *C. Spathipalpi*, Rond; the resemblance in the case of the latter species being additionally close, owing to the fact that in it the male palpi are clubbed, just as in *Anopheles*. In fact *An. Claviger* may be said to mimic *Culex* much in the same way that *C. mimeticus* masquerades as an *Anopheles*.

This last curious *Culex*, though rare, I have taken both in Naini Tal and here in Shahjahanpur; and I captured my specimens under the idea, from their attitude, that they were *Anopheles*. Under these circumstances, it is not surprising that *An. Claviger* should copy not only the wings but also the method of sitting of a *Culex*.

As regards the rank and file of the genus, however, there can be no doubt as to the value and accuracy of Ross' observation, and the exceptional behaviour of *An. Claviger* detracts but little

from its value; for, as far as I know, that species is confined to Europe, and hence can be responsible for but a small fraction of the world's malaria.

I daresay other species will turn up, but up to the present, I know as Indian, only of the four species described by me in my handbook, viz. :—

1. *An. Rossii*, Mihi. A small light coloured insect, edge of wings spotted, black on yellow ground, very close to *An. Superpectus* (Grassi) but, I understand, regarded as distinct by Mr. Theobald.

2. *An. fuliginosus*, Mihi. A small dark coloured species, with three good sized yellow spots on a dark edge of the wing.

3. *An. nigerrimus*, Mihi. A good sized very black mosquito with two minute yellow spots on the black edge of the wing, close to and possibly identical with *An. pseudopictus* (Grassi), but differing, I think, in the inner part of the wing, being freer from yellow dappplings than in that species, and in *all* the tarsal joints having minute apical bands.

4. *An. Lindesayii*, Mihi. A small dark insect with only a small yellow spot on the apex of the wing. Taken hitherto only in the hills and seemingly rare there.

I have observed all these four species alive, and in all the angular attitude of the sitting insect is most marked, and especially so in *An. nigerrimus*, which literally stands on its head, even when poised on a horizontal surface. We know too from Ross' observations in Africa that the same is the case with *An. Costalis* (Loen), and *An. funestus* (Mihi).

The customary sitting attitude of *An. Sinensis* (Weid) on the other hand appears variable. I have received this species on two separate occasions from Shanghai from Captain Victor Lindesay, I.M.S. I gathered from the context of his letter that the specimen first received presented no peculiarities as to habits. In the second specimen he, however, notes that he took it on a wall, on which it was sitting horizontally like a culex. In all species, however, the sitting attitude is not absolutely constant. There is an habitual attitude, but insects like other animals vary their postures, and the habitual attitude in the case of *Anopheles* is merely an expression of the fact that the middle legs are in most species disproportionately longer than the front legs. Captain Lindesay's captures show that the *Lancet's* (August 11th, p. 415) correspondent was erroneous in stating that there are no anopheles in Shanghai.

2nd.—As regards the habitat of the *Anopheles* larva

Dr. Sambon remarks that in the case of *An. Claviger* the larvæ are essentially domestic, or, as Ficalbi would term them, "foveal."

In this matter my observations on Indian species are confirmatory and at variance with those of Major Ross. In my experience the

larvæ are commonest in pools or other collections of water near houses; and, in such situations, they are far commoner than the comparative rarity of the adult insects would lead one to expect.

In the rains they are extremely common in the small *pukka* tanks found in every compound in these parts, to facilitate the watering of the garden: often in company with *Culex* larvæ. It is, however, evident that a much smaller proportion survive to maturity. Doubtless they cannot endure the extremely foul water in which some species of *Culex* can thrive (I have found *C. fatigans*, (Weid) larvæ in *Nathdams*), but all the same I have met with *Anopheles* in distinctly foul water and in places where green algæ are by no means in evidence. Moreover, though pools corresponding to what Ross describes as the typical habitat are not uncommon in the rains, they are, in such situations, usually conspicuous by their absence. They are, however, so omnipresent in these provinces that I doubt if their destruction by larvicides comes within the "range of practical politics," except perhaps in exceptional communities as, e.g., in cantonments. My observations tend to show that they cannot develop in too warm water; hence their comparative rarity in the hot dry weather, in the very tanks, then swarming with culex larvæ in which they will afterwards be found during the rains. In the "hot weather" here *Anopheles* larvæ are found only in exceptional situations, which for some reason or other are fed with fairly cool water and protected from the direct rays of the sun, e.g., in the pools resulting from the trickle of hydrants, in the deep shadows of a narrow Oriental street. Just now (November) in the N.-W. P., *Anopheles* larvæ are abundant in pools and garden tanks, but adult insects are hard to get; and, as far as I can judge, the development of the larvæ is arrested; for, in none of the pools can I find any pupæ, or at most but a few.

And now for my queries. What are the facts as to the seasonal prevalence of mosquitoes (a) as a family; (b) as regards the members of the genus *Anopheles*,—in different parts of India?

The acrimonious editorial remarks of the *Pioneer* as to a couple of letters of mine on this subject show in what extraordinary fashion the memory of the casual observer of daily surroundings may play him false when dealing with facts which he is not accustomed to observe closely. Here we have a presumably fairly intelligent and well-educated writer calmly asserting that mosquitoes are extinct in the rains and common in the cold weather in the N.-W. Provinces. Such a statement is such an inversion of common knowledge on the subject, that without exception everyone with whom I discussed the *Pioneer's* leaderettes commenting on my letter, argued that they could be only intended as a joke designed to

"draw" me; but the editorial comment at the foot of my second letter shews that this idea is erroneous, and that the writer of this ludicrous nonsense is perfectly serious. I made a tour during the past rains through the length and breadth of the N.-W. Provinces—from Saharanpur to Gorakhpur and from Bareilly to Jhansi, including a stay of four days in Allahabad, and it is almost superfluous to say that I found swarms of mosquitoes of all kinds present in every station I visited; as they always are, in every tropical climate, during the rainy season. It is equally well-known that wherever there is any distinct "cold weather" mosquitoes cease for the time to be troublesome.

Even in Calcutta I have found no need for a mosquito net in December, and here in Rohilkund already so few are left in an active condition that I only retain my net because I still meet with a few strong *Anopheles* fairly active. As a family few are to be seen, and the cold at night, even in the house, renders the few that have not gone into hiding so sluggish that they refuse to fly unless disturbed. Of course all this is a matter of such common knowledge that one is simply astounded to find the facts questioned; but under the circumstances it is extremely desirable that some few of your readers should state the facts as to the region with which they are acquainted, and especially as regards the Punjab. A few lines would suffice, but what is wanted is numerous communications from the various provinces.

Again, how do the species of *Anopheles* tide through periods such as the cold and very hot dry weather, which are unfavourable to their multiplication?

It has been suggested that either the larvæ or ova resist desiccation and revive when the pool in which they are deposited is refilled at the next rains. As regards larvæ, such is certainly not the case, as I find they are not only dead, but decomposed long before the mud on which they have been left stranded is thoroughly dry.

What happens to ova I cannot say from direct observation, but I have repeatedly placed dried mud of puddles that had held *Anopheles* in water, and have never found any larvæ develop. Here again, however, we require as many workers as possible to record their observations, and especially as to the manner and situations in which *Anopheles* deposits her eggs.

Lastly, what are the causes that determine the intensity and virulence of different outbreaks?

As regards the first point it is obvious that it does not follow that *Anopheles* need be extraordinarily plentiful to produce a large crop of cases. A single infected insect may infect an entire family; although it would require many hundreds for each unit of the human population to make anything like the show of a "swarm"

of mosquitoes. What is required is a plentitude of the malarial parasite; and, given this a comparatively insignificant number of insects are adequate to produce a widespread outbreak.

As regards virulence of individual cases one would, *a priori*, expect to find the severe type associated with the malignant type of the parasite and with crescents, but we entirely lack very extensive observations on Indian epidemics, and must for the present confess that in the case of such an outbreak as that which has recently occurred in the Punjab, we do not know why the cases have been of so much severer a type than usual.*

Wanted observations!

A NOTE ON TWO CASES OF PERNICIOUS MALARIAL FEVER.

By J. G. McNAUGHT,

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THE following cases are not uncommon, but present some points of interest. Both cases illustrate the fact on which Koch has laid stress that the intra-corporal forms of the parasite of "summer-autumn" fever may be found in the peripheral blood days after any febrile disturbance has subsided,—*e.g.*, in case No. II, these forms were found on 3rd September, six days after, and ten days before, any febrile paroxysm. In the first case the patient had repeatedly suffered from malarial fever, and crescents were very numerous—two, three or four in each field. In the second case the patient had not previously suffered much from malaria, and before the attack recorded was in excellent health, stout and with a fresh, healthy colour. The present illness in the course of a week reduced him to a condition of typical malarial cachexia. The dysenteric diarrhoea, from which the first case suffered, appeared to me to differ from ordinary dysentery; in that the amount of blood was large and unmixed with faecal matter, the pain and constitutional disturbance slight, and the stools became normal immediately after the subsidence of the fever, without any tendency to relapse. Out of twelve cases examined during the present rains, the parasite of "summer-autumn" fever was found in eleven cases, and the parasite of "mild tertian" fever in one case.

CASE I.—Lance-Corporal R., aged 22; service in India 6 $\frac{1}{2}$ years. Patient came to Deolali on furlough from Jubbulpur, where he had frequently had attacks of ague. He was admitted to hospital on 14th August 1900, suffering from fever and diarrhoea. He was extremely anæmic, and the

* For a further criticism of Dr. Sambon's views on the attitude of *Anopheles*, see *B. M. J.*, p. 1345, of Nov. 3rd, 1900.—Ed., *I. M. G.*