

SOME NOTES ON MALARIA FOR NURSES.

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NOW-A-DAYS it is very necessary that all Nurses in India should possess a clear idea of the nature of malaria in order that they may know both how to protect themselves from the disease and what precautions to adopt in regard to their patients.

Nature of Malaria.—Malaria, is caused by the presence in the blood of a minute parasite. There are at least three varieties of this parasite. When the spores of malaria are introduced into the blood, they promptly attack the red blood corpuscles, entering them and speedily destroying them. If the blood is examined early in an attack of fever, the parasite is seen under the microscope as a tiny ring lying within the red blood corpuscle. After, from 48 to 72 hours, according to the kind of parasite present, it is found that the ring has grown to a much larger size filling or nearly filling the red blood corpuscle. It may also be seen that it has lost its ring shape, and has become a compact mass, which by this time has begun to divide up into spores, from seven to thirty in number, according to the species of parasite. It is when these masses of spores break up, setting free the young parasites, that ague and fever occur.

How is Malaria contracted?—For hundreds of years, before the French doctor, Laveran, discovered the malarial parasite, it was supposed that the virus of the disease existed in the earth and water of unhealthy districts. It was imagined too that it had the power of rising into the air at certain times of the day and seasons of the year. It was noticed that when people visited a malarious district, they speedily contracted the disease, and although when they left that part and returned to a healthy country, they carried the poison with them, as evidenced by their frequent relapses of fever, yet those with whom they lived and mixed in the latter place, did not contract malaria from them.

It was argued from this that malaria was not an infectious or contagious disease, and that the poison producing it was strictly limited to the air, soil and water of certain localities.

Physicians therefore sought to find a possible germ in marsh-water, mist and dew, or in damp soil and decaying vegetable matter. In 1880, however, Laveran first found the true microbe, and proved it to belong to the animal world, unlike the bacilli of cholera, typhoid and plague, etc.

After Laveran's discovery many investigators sought once more to find this organism free in nature, in water, air or soil of malarious countries. Hundreds of experiments were carried out without result,

except to demonstrate the falsity of all the old ideas about malaria. Meanwhile it had been recognised that many birds and animals also suffered from parasites very like those of human malaria, and it was thought at first that possibly mankind was infected in some way from animals. It has been shown however that man cannot be infected with bird or animal malaria, neither can animals be infected with human malaria. At last, however, Ross made the important discovery that bird malaria was conveyed from sick to healthy birds by means of the mosquito. Then it was all plain sailing, for application of the same methods of research soon placed beyond a doubt the fact that human malaria is conveyed in precisely the same way.

Now, arguing from analogy and from the results of countless observations, we can affirm with little fear of contradiction that malaria can only be contracted through the bite of an infected anopheles mosquito, and that the mosquito can only become infected by sucking the blood from a sufferer from malaria. It is upon these two facts that modern methods of preventing malaria have been based. The success of such methods, where properly carried out, is one of the strongest arguments in favour of the correctness of present-day knowledge regarding malaria.

The Malaria Parasite in the mosquito.—Before passing on to discuss methods of prophylaxis, I must point out that the mosquito does not merely carry malaria from one person to another. Malaria is as much a parasite of the mosquito as of man. When certain forms of the malaria parasite have been taken into the stomach of an anopheles mosquito, they undergo a rapid development, as a result of which a little worm-like body is produced. This quickly bores its way into the wall of the mosquito's stomach, and becoming encysted there soon grows rapidly into a sort of tumour. After a time, thousands of tiny spores form within this tumour, which finally bursts. The spores are then spread throughout the body of the mosquito, and many of them are carried into the poison gland of the insect. Naturally, a mosquito so infected is capable of conveying malaria to the blood of anyone it may happen to bite, and, as it may live for months, it may thus be able to infect many persons or, as frequently happens, by biting the same individual night by night, convey a very serious amount of infection. It takes about ten days for a mosquito that has bitten a malarial patient to be able to convey that infection to other people.

The Prevention of Malaria.—Having followed the life-history of malaria, first in man, and then in the mosquito, we are in a position to discuss ways and means to prevent its spread.

It will, I think, at once strike every reasonable person who has understood my remarks that there must be at least three ways in which we may hope to check the spread of malaria.

- (1) If we kill off all the parasites in the blood of sufferers from malaria, mosquitoes could not become infected, and we may hope to stamp out malaria either quickly or gradually according to the thoroughness of the campaign. Fortunately, in quinine we possess an efficient disinfectant of the blood, for this drug rapidly destroys most forms of malarial parasites.
- (2) If we can kill off all anopheles mosquitoes within a certain area, we should as surely prevent the spread of malarial disease.
- (3) If we can prevent anopheles mosquitoes from sucking the blood of persons harbouring malaria parasites in their blood, and if we can also prevent such mosquitoes as may have been infected from biting healthy individuals, we shall also as certainly prevent the spread of malaria.

We can then divide preventive methods into three classes:—

Firstly.—Measures directed against the parasite.

Secondly.—Measures directed against the mosquito.

Thirdly.—Measures for keeping mosquitoes and men apart.

Destruction of the Malarial Parasite by Disinfection of the Blood.—

The only method we can use for this, with any degree of certainty, is the administration of quinine, in one of its many forms. As with all other disinfectants, we can use it in two different ways, either in a large amount to destroy infection, when we know it to be present, or systematically in smaller quantities to prevent infection occurring.

As a matter of fact, nearly all Europeans always make use of the first method to cure an attack of malarial fever. Quinine, we must remember, is taken purely for its effect upon the malarial parasite, not for any effect it may produce upon the person who takes it. Unfortunately, few people quite understand this, and so they cease taking quinine too soon after an attack of fever has left them, when, as a matter of fact, they have not killed off all the parasites, but only reduced their number. This is why relapses of fever after a few weeks or a month or so, are only too common.

Professor Koch, the great German scientist, introduced a method of stamping out malaria from a town or district by means of the systematic treatment with quinine of all who happened to have parasites in their blood. In other words, wherever he found the germs of malaria

in the blood of individuals, he promptly destroyed them by means of disinfection of the blood with adequate amount of quinine. In this way he was enabled to entirely eradicate malaria from some villages in German New Guinea. His method was also tried with success in Brioni, a little island off the coast of Istria.

This island possessed a population of 300 people, and in 1900, 97 fresh cases of malaria occurred as well as many relapses. In 1901 the proprietor of the island had the blood of every person examined at stated intervals, and to all those who had parasites in their blood, quinine was administered systematically every eighth or ninth day. Every one who came to the Island had to submit to examination and everyone who refused to take the quinine was promptly expelled. In the following year only 17 fresh cases and 3 relapses occurred. A year later, 170 healthy labourers were introduced, and though formerly a stay of a single night had been sufficient to gain an infection, not a single one of these 170 contracted malaria, neither was there any other fresh case of infection contracted on the Island. In other words, malaria had been eradicated, solely by the treatment of every sufferer with sufficient quinine.

Celli's Method of Quinine Prophylaxis.—Quite distinct from Koch's method of eradicating malaria is Celli's, which aims at preventing malarial infection by the systematic administration of small doses of quinine to a whole population, throughout the fever season; as well as carefully treating actual cases of the disease which may occur.

Naturally more quinine will be used in this way, but the results are very good, and they are beginning to be sanguine in Italy that by this means malaria will eventually be wiped out.

The Italian Red Cross Society have been working on these lines for some years. They record that in one area, with a population of 12,061 people, 17 per cent. had suffered from malaria in 1900, before they began work. This was reduced successively to 16 per cent. in 1901, 7 per cent. in 1902, 2 per cent. in 1903 and 1.3 per cent. in 1904.

Another report upon their work for 1906 states that, among 16,000 people in the Pontine Marshes, where in 1900 over 26 per cent. were attacked with malaria, in 1906, as a result of quinine only 3 per cent. suffered from malaria. Already the mortality from malaria in Italy has been reduced to less than one quarter of what it used to be a few years ago; and this, it must be remembered, means a far greater reduction in the total malarial sick-rate.

Destruction of Mosquitoes and their Larvæ.—Excellent results in the reduction of malaria have been obtained at Ismailia, Panama, and

other places, by destroying the larvæ of anopheles mosquitoes, or by preventing their breeding, by the obliteration or protection of their breeding places. Most of you have heard of the work at Ismailia, but a repetition of the figures will be useful. In 1900 in a population of 6,000 they had 2,300 cases of malaria. As a result of the work done in preventing the breeding of anopheles mosquitoes, and partly owing to the free use of quinine, they have had no fresh cases of malaria since 1906.

Years.	Cases.	Years.	Cases.	Years.	Cases.
1877	300	1888	1,400	1899	1,545
1878	400	1889	1,450	1900	2,284
1879	500	1890	1,900	1901	1,990
1880	400	1891	2,590	1902	1,551
1881	450	1892	2,050	1903	214
1882	480	1893	1,750	1904	90
1883	550	1894	1,100	1905	37
1884	900	1895	1,350	1906	No fresh cases.
1885	2,000	1896	1,150	1907	No fresh cases.
1886	2,300	1897	2,089	1908	No malaria contracted in Ismailia.
1887	1,800	1898	1,545		

(To be continued.)

THE NATIONAL CANINE DEFENCE LEAGUE.

THIS Society was founded in 1891 to protect Dogs from torture and ill-usage of every kind. Its motto is "Whatever concerns the dog, concerns the League."

Those responsible for the work are doing their utmost, with a small staff, and altogether inadequate funds, to protect the "Friend of man" from cruelty. This work includes :—

1. Organised opposition to the muzzle; repression of dog scares, opposition to Pasteurism, and a Buisson-bath propaganda.
2. Quarantine business of every kind.
3. Issuing leaflets dealing with every phase of the Dog question and advising Dog-owners by correspondence and otherwise in reference to all matters concerning their dogs.
4. The promotion of humane feelings and the kind treatment of dogs among all classes of the community, and the rewarding of acts of special heroism in the defence of dogs, as well as by dogs.
5. The protection of stray dogs—and in every case possible—their restoration to their owners.
6. Parliamentary work which consists of—