

they should be utilised as post-graduate schools for nurses who have already taken a general training, and the difficulty vanishes.

SOME NOTES ON MALARIA FOR NURSES.—(concluded.)

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Protection from Mosquito Bites.—Most people in India use a mosquito net for at least a portion of the year. They do so, however, for the sake of comfort and not to protect themselves from malaria. This explains why so many people still prefer the style of net that hangs to the floor, instead of one that tucks under the mattress. A mosquito net if properly used is no doubt a great safeguard, but as generally used, it is only a makeshift.

It has now-a-days been shown, time after time, that by the use of metallic gauze screens to a bungalow and verandah, it is possible to almost entirely escape malarial infection. The importance of this fact is so great that nearly all the Italian Railway Companies supply these screens to the houses of all their employees. The results attained in this way are truly astonishing. Among some 6,000 persons so protected, less than 2 per cent. have contracted fresh malarial infections, as compared to 38·7 per cent. of infections occurring along the surrounding population who were not protected.

Segregation, the isolation of Europeans from infection.—Before leaving the question of the prevention of malaria, I wish to point out the possibility and the necessity of Europeans protecting themselves from malarial infection, by ensuring that the parasite is not brought near their bungalows.

In many places it is customary for bungalow servants to live either within the house or only a short distance from their master's residence. Europeans in this way often create a regular reservoir of infection within easy distance of them; and people who would be horrified at the idea of living near to persons suffering from plague, cholera, small-pox, etc., view with equanimity a hot-bed of malarial infection, in the persons of their servants and their servants' wives and children, within a mere stone throw of their homes.

Personal Prophylaxis.—In the foregoing paragraphs attention has been directed to the preventive measures applicable to large and small communities; but it is also necessary to draw attention to a few practical measures of special use for personal protection.

It is essential that nurses in India should know how to protect themselves from malaria, for it frequently happens that they may have to attend on patients in areas in which the danger of contracting malaria is very great.

Personal Protection Against Mosquitoes.—Every nurse in the tropics should possess a small mosquito net of her own, and she should carry it about with her everywhere. It should be of a convenient size and shape so that if necessary, it can be used in railway trains, steamer berths and on camp bedsteads. It should be made of the finest mosquito netting; should be about $6\frac{1}{2}$ feet long by 3 feet wide and be provided with a wide hem of stout calico, part of which is to tuck in below the bedding and part to form a protection to the hands or feet if they happen to touch the sides of the net during sleep. The top of the net should be corded or taped, and it is a useful thing to have a number of small brass rings attached to it, as the net can then be easily suspended from two cords or wires, when posts are not available.

If a nurse is always particular about carrying and making use of a mosquito net, she will soon find that those, among whom she has to work, will note the fact and imitate her methods.

It is probable that there are few European bungalows unprovided with mosquito nets, but it often happens that the nets in use afford little or no protection from malaria; either by reason of their being faulty in design, or in a bad state of repair, or because they are improperly used. In the Bengal Duars, which is intensely malarious, it was often found that Europeans took very little care of their mosquito nets and those supplied to visitors were often old and full of holes. The Indian servants also rarely placed the net in position until late at night, and, as many of the nets in use were very large ones, anopheles mosquitoes were often already present inside them. The servants also had got into the habit of bringing their masters' morning tea at day-break and pulling up the mosquito net at this time; and as few people rose and dressed immediately, it frequently happened that they were bitten again and again in the early morning. The following rules can be laid down regarding the use of mosquito nets:—

- (1) The mosquito net should be made of fine mesh netting. If the mesh is too large, dangerous mosquitoes which are often very small in size, may be able to squeeze through.
- (2) The net should not be too large, otherwise it is difficult to keep it free of mosquitoes, or to catch any that may have entered.
- (3) It should be made to tuck in below the mattress or bedding. The large nets which hang to the floor are dangerous because mosquitoes often hide below the beds, and are enclosed when the net is lowered.

- (4) In use the net should be lowered and tucked in position an hour before sunset; and it should not be raised in the morning until rising or dressing. In the case of a patient or other person remaining in bed, it must be kept in position until at least an hour after sunrise.
- (5) In a malarious district it is well to carefully search the interior of the net before retiring; and if any mosquito is seen within, it should be caught by means of a little portable hand net (similar to that supplied by Lawrence and Mayo for Rs. 3) and killed.

It often happens that a nurse has to sit up at night in a place infested with mosquitoes, possibly of a dangerous kind. At such a time a person is liable to be bitten about the feet, ankles and the hands. In the evening therefore it is well to put on two pairs of thick stockings or to wear high boots. Gilgit boots, which are made of felt, are both soft and silent in use, and can be drawn up to the knee, afford useful protection from mosquitoes. They can be obtained from Cockburn's Agency, Srinagar.

If a fan or punkha is available, it is usually possible to keep mosquitoes away from hands and face but in some places it may be well to wear loose gloves which can be drawn over the hands when sitting up at night. In some places in which mosquitoes are very bad a bee-net is useful, and may be worn over the head and face when sitting up at night.

Now-a-days in European bungalows which are infested with mosquitoes, especially those in the mofussil, there ought to be a portable mosquito-proof room provided, in which to sit at night. Portable frames for such rooms are supplied at the Army and Navy Stores.

Some people make use of oil of Lavender, Lemon Grass, Eucalyptus, or even ordinary Kerosene, for anointing their feet and hands as a protection against mosquitoes; but few of these preparations are of much value, as hungry mosquito will face any of them after a short time.

The use of quinine as a preventive of Malaria.—Any one who is obliged to visit or to live in a malarious locality will find it a wise precaution against malaria, to take a small dose of quinine at regular intervals.

It is difficult to lay down a hard and fast rule about the amount of quinine necessary to prevent malaria, because what is sufficient to protect a person in one place may not be enough in another.

If a nurse has to go to a place which is known to be malarious, she will be wise to take 5 grains of quinine daily. She will usually be able to learn on enquiry if there is malaria present or not.

If there are native servants and any native children living near the bungalow in which she is staying she can usually find out if they suffer from fever. Unfortunately native servants often deny suffering from fever unless they happen to be sick at the moment; but if their children have enlarged spleens, it may be taken for granted that malaria is present. Most nurses know the situation of the spleen and can easily satisfy themselves by palpating the abdomen of a child, as to whether or not its spleen is enlarged.

The writer, as the result of many years' experience in some of the most malarious parts of Assam and Bengal, found that it was possible to escape malaria by taking a daily dose of 5 grains of quinine. But the 5 grain dose was not rigidly adhered to and whenever a little headache, a sensation of tiredness in the limbs, or a slight soreness of the throat occurred, an extra 5 grains of quinine was taken during the next two days.

In this way, although constantly exposed to malaria, the writer kept absolutely free from infection for a period of eight years.

It frequently happens that when people who are taking quinine as a preventive of malaria feel a little out of sorts, they ascribe their symptoms to the quinine and immediately stop it. This is a mistake. Such symptoms are more often a sign that a little more quinine is required.

When once a person has become used to quinine it is very easily taken; and it is not more likely to do harm when taken in moderation than is the drinking of tea or coffee. It is necessary to remember this because people who think nothing of taking regular doses of alcohol, in beer or whisky, or of smoking cigarettes, cheroots, or tobacco every day of their lives, become alarmed at the suggestion of taking a small regular dose of quinine, which is really no more harmful than either of these practices.

The form of quinine to use.—Medical practitioners who have frequently to treat cases of severe malaria do not usually care to use pills or sugar-coated tablets, because in patients who are ill, the condition of the stomach and bowels often prevents the action of the remedy in this form.

But for the prevention of malaria there is no reason why sugar-coated tablets should not be used; and this form of the drug is very convenient. Many people find no difficulty in taking either the sulphate or bi-sulphate of quinine but for those who have a tendency to dyspepsia, the hydrochloride or bi-hydrochloride is the best form.

If quinine is taken for preventive purposes, it does not matter very much at what times of the day it is taken or whether it is swallowed

before or after a meal ; but if a larger dose than 5 grains is used, it may prevent some people from sleeping if taken at night.

By the intelligent use of these two measures of prevention, the mosquito net and quinine, anyone can protect themselves effectually from malaria, even in the most unhealthy climates. Every nurse in India should see that her equipment includes

- (1) a good mosquito net ;
- (2) a supply of quinine ;

and if she is anxious to make even more certain of her own comfort and safety she should also be provided with a pair of Gilgit boots, a pair of loose gloves or gauntlets, a bee-net for use at night and a little hand net for catching mosquitoes inside a mosquito net.

HEAT.

IT is commonly assumed that muscular energy produces heat, but as a matter of fact, heat produces muscular energy. It has been ascertained that only a fairly warm muscle contracts readily, and that the temperature of one at its greatest activity is 104 degrees ; muscular activity and heat increase simultaneously ; then the accelerated heart-beats and increased blood pressure send the blood to the surface of the body to be cooled far more quickly than when the body is at rest, and so in all normal muscular exertions, heating of the body to the point of danger is prevented. The simple exercise of walking raises the temperature of a normal man from 1-2 degrees according to the length and speed of the walk ; a hard game of tennis will raise it 3 or $3\frac{1}{4}$ degrees,—but with rest comes immediate re-action, and in 20-40 minutes, the temperature is at its usual again. Residence in a hot climate will permanently raise it about 1 degree. Heat increases the activity of the muscles—anger raises the temperature too, hence the terms ‘warming to the job,’ ‘preliminary canter’ or ‘boiling with rage :’ anger gives the muscles a sufficiency of heat to begin a fight, no one fights in cool blood unless he is made to, and that is a very half-hearted affair, either he is angry or works himself up to the point of rage, or he makes a few preliminary passes before the fight to warm his muscles enough for their full exercise. A race-horse should have his preliminary canter to warm his muscles and a preliminary small game is commonly played before a big match. But this heating of muscle has a limit or there will ensue destruction of muscle and then death of the animal, that is one reason why a *driven* animal dies, the limit of heat a muscle in activity can stand is 113° in man and all mamalia, after that it becomes incapable of contraction, and it is impossible for the mechanism to evaporate a