

Before closing, I wish to emphasise a few points regarding *compound fractures*.

All compound fractures are potentially septic cases. We have selected particulars of 39 compound fractures treated in the Sambhu Nath Pundit Hospital. Of these 23 were cured before leaving hospital, 8 were discharged otherwise, and 8 died. Those 23 cured include 2 amputations which may be called secondary. Thus of the 39, 6 died of shock, leaving 33. Of the 33, 6 were discharged on request long before treatment was completed, leaving 27. Amongst these, sepsis more or less defeated us in 5 cases: one man died of sepsis, two were discharged otherwise, having wearied of our efforts to check long continued sepsis, and 2 required amputation on account of sepsis.

I do not know how these figures compare with other hospitals in the city, but I am sure they are capable of improvement.

In compound fractures the defeat of sepsis is the primary consideration, the apposition of the fragments is of quite secondary importance. This means that when occasion arises to give first aid to a case of compound fracture, every doctor ought to be alive to the necessity for cleansing the surrounding skin, for fixing the limb so that no further movement of the parts can take place pending arrival in hospital. In hospital it means an immediate thorough operation which cannot be done without an anaesthetic.

The necessary steps are:—

- (i) Cleanse the skin.
- (ii) Excise the edges of the wound, both skin and subcutaneous tissues.
- (iii) Excise from the muscles and fascia and periosteum all dirty and severely damaged tissue.
- (iv) Examine the ends of the bone so that these also may have dirty portions nipped or sawn off.
- (v) Swab the parts out with an efficient anti-septic.

(vi) Keep the wound soaked in sodii hypochlorite in some form and do not worry about rotation of bony deformity until after the third day, when you are sure that you have defeated sepsis.

NOTES ON MALARIA IN HILL-STATIONS IN OR NEAR THE EASTERN HIMALAYAS.

By C. STRICKLAND, M.A., B.Ch.,

Professor of Medical Entomology, School of Tropical Medicine, Calcutta.

THESE notes are a symposium from three papers by Shortt (1924), McCombie Young (1924) and the present writer (1924), the first two dealing with Shillong, the third the neighbourhood of Kurseong.

In both these places the authors have concluded that *Anopheles maculatus* is mainly

culpable, so that the differences in the incidence of the disease which have been reported are interesting and the explanation instructive. The incidence of the epidemic in Kurseong is from April to July inclusive, while in Shillong it is from the middle of May to the middle of October.

The Onset of the Epidemic.

This being earlier in Kurseong than in Shillong, may be accounted for either by the possibility that in Shillong *maculatus*, owing perhaps to climatic considerations, is practically non-existent until April (as is stated by McCombie Young) while it can be found in Kurseong all through the cold weather; or that, granted it is present in the early months in Shillong, some conditions there, perhaps meteorological, preclude the development of the malaria parasite in the mosquito until a later date than in Kurseong.

Shillong lies at about 6,000 feet as against 3,500 feet at Kurseong where the observations were made and as *maculatus* is to be found throughout the cold weather at Kurseong, it appears likely that it can also be found in Shillong before April, so that probably the reason for the difference in the two places in the time of onset of the epidemic is not so much because of a difference in the number of mosquitoes, as in the conditions, probably meteorological, which influence the development of the parasite in the mosquito.

The Duration and Termination of the Epidemic.

The epidemic incidence is of rather short duration in Kurseong, lasting from April to July inclusive, while in Shillong it lasts longer, from the middle of May to the middle of October.

The difference probably depends ultimately on the different geological structure of the two tracts. Kurseong lies on the Himalayan foot-hills, Shillong lies on rocks which are characteristic of peninsular India; the correlated physical features of the two tracts being distinct; Kurseong hills are scarred with rough stony ravines and nullahs, whilst the Shillong hills have valley beds of rich lush soil on which paddy is grown.

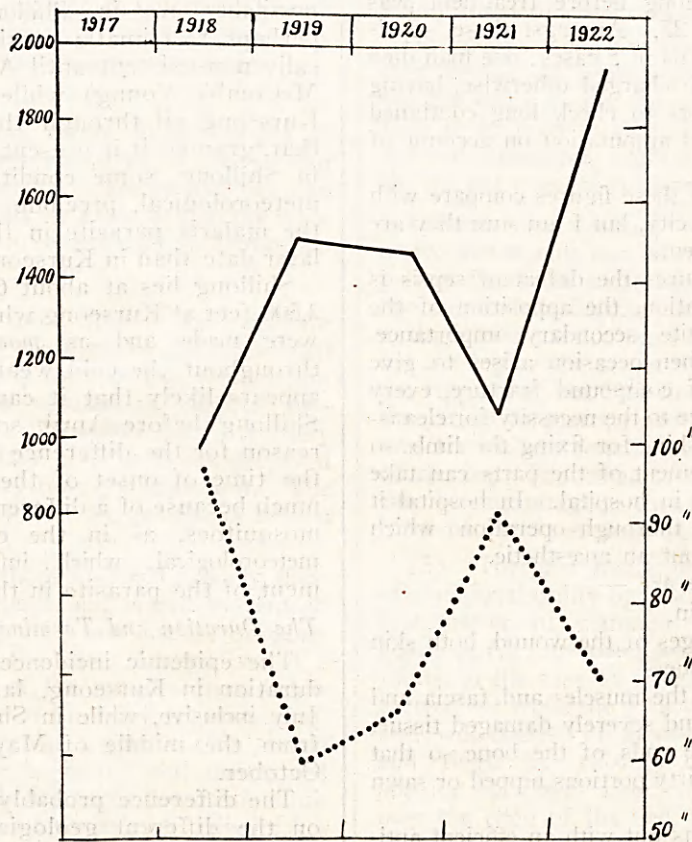
Apparently at Kurseong as soon as the rains break all the stream-breeding anophelines are washed away, they can get no foothold elsewhere, and malaria abates by crisis, while in Shillong, so it is stated, when the rocky nullahs are scoured out, *maculatus* is found in the swamps and rice fields in the valleys at the foot of the step hills, and thence carry on their harmful work till the onset of the cold weather, when the epidemic gradually subsides.

McCombie Young believes that early heavy rains have a potent effect in modifying the severity of the annual epidemic in Shillong, as the writer concluded was the case in

Kurseong. Nevertheless, the factor which appears to be of prime importance is the severity of the monsoon of the *previous* year. The writer has charted the incidence of malaria cases at the Civil Dispensary each year from 1918 to 1922 against the rainfall for the previous year, and the inverse correlation is perfect (*vide* Chart).

probably more important in Shillong than engineering works. The police and indigenous population are not likely to indulge in the former, and the European and Indian visitors if not the high officials, would probably prefer to live in an atmosphere unvitiated by joss-sticks, katol, and citronella oil, or by excessive carbon dioxide inside a mosquito net.

SHILLONG.



Malaria ———
Rainfall Previous Year.

Prevention of Malaria.

The writer, while on a visit to Shillong, had the pleasure of accompanying Colonel McCombie Young round some of the malarial terrain there, and pointing out that the correct way to drain the *maculatus*-ridden swamps in the shallow valleys of the station is by a system of hill-foot contour drains, a system largely used by Watson in Malaya, who in his turn had it from a planter Mr. Carey, instead of by the really harmful central drain which had been previously instituted.

While one often sees attempts at drainage of the land for economic if not for hygienic purposes, one rarely sees it correctly done, so that the point cannot be too strongly insisted on.

The writer does not agree with McCombie Young in stating that personal prophylaxis is

Moreover engineering works which would reduce the malaria in Shillong a great deal would not be costly unless a system of sub-soil drains be laid down. All that would be necessary is a system of contour hill-foot drains, and as *maculatus* will breed in these as well as in the swamps, the drains must have either subsoil pipes laid in them, or a ribbon of jungle allowed to grow up over them which will prevent *maculatus* breeding in them. If rubble be laid in such drains, as is sometimes suggested, the effects are likely to be disastrous.

REFERENCES.

Shortt.—*Indian Journal of Med. Res.*, January, 1924.
McCombie Young.—*Indian Medical Gazette*, No. 3, March, 1924.
Strickland.—*Ibid.*