

The above table clearly shows that blackwater fever cases were most numerous when malaria was at its height. Thus it is apparent that malaria plays an important part in the causation of blackwater fever in conjunction with some factor still obscure.

Species of Anopheles mosquitoes found in this district.

<i>A. culicifacies.</i>	<i>A. vagus.</i>
<i>A. barbirostris.</i>	<i>A. fuliginosus.</i>
<i>A. sinensis.</i>	<i>A. philippinensis.</i>
<i>A. umbrosus.</i>	<i>A. funestus.</i>

Among the above mentioned species prevalent at the time, *A. sinensis*, *culicifacies*, and *barbirostris* were numerous and heavily infected. The presence of the above three species, which are well-known carriers, accounts for the high incidence of malaria in epidemic form in the 3rd quarter. Following the hæmolysin theory of damaged liver and lowered salt content of the blood, I adopted serum treatment together with alkalis.

The following are the details of treatment:—

(1) The diagnosis being confirmed as blackwater fever, the patient was given 10 c.cms. of anti-streptococcus serum intravenously, followed after 8 hours by 5 c.cms. of hæmostatic serum by the same route.

(2) Malaria parasites were found in the blood in large numbers in cases 1, 2 and 8, so desensitizing doses of quinine hydrochloride and sodium bicarbonate were given for 2 days.

(3) Alkali mixture consisting of:—

Sodii bicarb.	..	..	grs. 30
Sodii sulph.	..	..	grs. 10
Sodii benzoas.	..	..	grs. 15
Sodii citras.	..	..	grs. 5
Liq. Adrenalin hydrochlor.	(P. D. & Co.)	(1 in 1,000)	.. m. 10
Aqua	..	..	ad. oz. 1
Sig. one mark every 2 hours.			

(4) Glucose and saline per rectum, in the following proportions:—

Liquid Glucose,	drachms 2.
Normal saline,	ounces 10 b. d.

(5) Continuous application of hot water bottles over loins.

(6) The patient throughout his illness was strictly confined to a liquid diet consisting of whey, barley water, and ice to suck when there was a great tendency to vomiting. No alcohol was administered throughout the treatment.

I might mention that the alkali mixture was discontinued if the patient complained of terrible burning sensation all over the body, and Hearesay's mixture (modified) given.

Sodii bicarb.	..	..	grs. 30
Liq. Hydrag. perchlor.	..	..	dr. $\frac{1}{2}$
Aqua	..	..	ad. oz. 1
Sig. one mark every 2 hours.			

(7) Hot fomentations, 4 hourly, with 1 c.c. of pituitrin if the abdomen was tympanic.

DETAILS OF CASES TREATED.

Case No. 1.—Mahommedan male, aged 46 years. Resident of the district. Case seen on the first day of disease. Previous history of malaria. Ten c.c. anti-streptococcus serum intravenously was given immediately, lower bowel evacuated by a large saline enema, alkali mixture 2-hourly alternately with desensitizing doses of quinine and sodii bicarb. Glucose and saline b.d., hot fomentations to loins continuously with a hot water bottle. Urine showed signs of clearing up 8 hours after the injection; 5 c.c. of hæmostatic serum was given and the following morning the patient passed clear amber coloured urine. Recovery in this case was rapid, he was subsequently kept under treatment for 14 days, without return of any symptoms.

Case No. 2.—Hindu male, aged 36 years, Inspector of Police, Bochaganj. Residing in the district for 2½ years. Previous history of malaria. Seen on first day of disease. The same treatment was followed, recovery was a bit delayed as his was a very serious case and he had persistent hiccough for the first 2 days. Cases 3, 4, 5, 6, 7, were milder cases, and they all responded well to treatment.

Case No. 8.—Hindu male, aged 42 years, a relapse case, merchant, a permanent resident of the district, previous history of malaria. Seen on first day of disease. This case was undoubtedly of a serious nature being a relapse; he unfortunately did not carry out my instructions and ultimately died on the 4th day. I might mention a few points in his case which may be of interest. After the 2nd serum injection he felt comparatively better and his urine cleared up considerably, a faint pink colour remaining. On the 4th morning he insisted on my giving him some solid diet which I refused. At about 2 p.m. of the same date I was sent for by his relatives who stated that his abdomen was swollen and that the patient was in great pain. On making enquiries I found that the patient had insisted on having a hearty meal of *dal* and rice which was foolishly given him by his wife. His abdomen was acutely tympanic and there was complete retention of urine. The bladder was emptied by a catheter, hot fomentations over loins with 1 c.c. of pituitrin were given, 4-hourly, without any success; the patient succumbed after 4 hours.

The malarial origin of blackwater fever from the history of these cases seems obvious for the undermentioned reasons.

1. The susceptibility of a community to blackwater fever exposed to intense malaria.

2. It was noticeable that blackwater fever cases occurred when malaria was at its height, and subsequently declined with a fall in the incidence of malaria.

3. Quinine prophylaxis was seldom or never carried out, accounting for the high endemic index.

4. Length of residence in the district is another fact accounting for the close relationship of malaria with blackwater fever.

In conclusion since these cases responded to anti-hæmolytic treatment, I would like to suggest the possibility of a hæmolysin being present in the blood brought about by some pathological condition which is still obscure.

“MASSAGE IN THE TREATMENT OF VENOMOUS SNAKE-BITES.”

By LUCIUS NICHOLLS, M.D., B.C., B.A. (Cantab.),
Director of the Bacteriological Institute (Ceylon).

WHERE poisonous snakes exist there will be found people who profess to be able to cure snake-bites. These people may be generally designated “bush doctors.” The methods of

treatment pursued by some of these have some similarity to the methods of bone-setters.

Many years ago I first witnessed the rough treatment of a "bush doctor" for snake-bite. It was in the West Indian Island of St. Lucia where there exists the Fer-de-lance (*Lachesis lanceolatus*), a viper which grows to over four feet in length.

One day I received information that a youth had been bitten by one of these vipers and the scene of the accident was about five miles from my bungalow. I went as quickly as possible to his assistance and I arrived about 2½ hours after he had been bitten. The patient was a robustly-built Mulatto of about 17 years of age, he had been bitten on the outer side of the fleshy part of the calf of his right leg. He was undergoing treatment at the hands of an old negro "bush doctor," who had enlisted the services of two bystanders; the three of them were vigorously scrubbing the skin of the youth with tightly screwed up bunches of herbs. The rubbing was such that the bunches quickly frayed and wasted, when the "bush doctor" went to the nearest jungle growth and gathered any weeds he found and made fresh bundles for the scrubbing.

He made little selection of any particular weeds, except that he seemed to prefer those with rough stems.

The patient was not kept in one position for more than about a minute, he was turned over and over, and not a square inch of his skin was allowed to escape, even his scalp and the soles of his feet were rubbed. And further, the rubbing was accompanied by pressure on the deeper structures, which might pass as massage of the muscles.

This treatment had been given for about two hours; and because it appeared to be brutal and to be exhausting the patient, I persuaded them to cease, whilst I gave the youth stimulants and injected a strong solution of potassium permanganate into the site of the bite.

I left about half an hour later, and I do not know whether or not the "bush doctor" continued the treatment. Thirty-six hours later the patient had almost recovered from the snake-bite and the treatment of it, except that his leg was very swollen and there was an area of gangrene about three inches in diameter around the site of the bite. It was many weeks before the leg finally healed.

There are "bush doctors" in Africa who make use of similar methods of rubbing and massage in their treatment of snake-bite. They often assert that the rubbing must be done with herbs known only to themselves.

Cases have been recorded in Ceylon where patients have been treated by being vigorously rubbed with lime-juice; and again plantain-juice is used in other cases.

It is impossible to decide the value of treatment in any case of snake-bite, because it can never be known whether or not the snake has injected a lethal dose of venom. Yet there is a

reasonable explanation why rubbing and massage should be of value in snake-bite.

After venom has been injected beneath the skin, the portion which does not combine with the tissues near the site of the bite quickly reaches the blood-stream and is distributed throughout the body. When the patient is at rest there is proportionately more blood passing through the organs and tissues supplied with involuntary muscles than through the skeletal muscles and the other tissues of the body. Therefore the heart, diaphragm, the intestines and other important structures will receive a relatively larger quantity of venom than the muscles and tissues which are at rest.

When the skin is vigorously rubbed, the capillary vessels are dilated and an increased volume of blood passes through the skin; and the same occurs in the skeletal muscles when they are massaged.

Therefore it is probable that vigorous massage and rubbing will cause much of the venom to combine with the muscles, skin and subcutaneous tissue and prevent a proportionately large quantity from acting upon the "vital" organs within the thorax and abdomen.

It follows from this that rest and quiet are contra-indicated for the first few hours after snake-bite and that rubbing and massage with some embrocation or mild vegetable irritant are indicated.

(This explanation of how massage may possibly act in a case of snake-bite is ingenious. Another amateur method of treatment is to make the patient walk about; much the same action would occur here, though less satisfactorily. We have shown this paper to Lieut.-Col. H. W. Acton, I.M.S., who comments as follows:—

"With viperine poisoning a certain amount of fixation occurs when a ligature is put on and the circulation stops, as by this means one can save animals from the effects of several lethal doses. I have not experimented with massage and would have thought that it would tend to drive the venom into the circulatory system rather than to fix it. Massage would be useless in colubrine poisoning, as the venom does not become fixed on the local connective tissues, but only in the brain."—EDITOR, I.M.G.)

DIPHTHERIA AN EVER-PRESENT DANGER IN INDIA: A REPORT ON A SERIES OF CASES IN BILASPUR DISTRICT, CENTRAL PROVINCES, INDIA.

By V. C. RAMBO, M.D.

ON arrival in India two conflicting reports came to the writer's attention. One was that diphtheria is exceedingly uncommon in India and need not be feared or expected. The other, that four young boys of the Mission of which he was a member had in previous years lost their lives, two having suffered from definitely diagnosed diphtheria where no antitoxin was available until too late, and two (not diagnosed diphtheria) of some disease with sudden onset which caused