tensive fracture running well back into the parietal bone, and at an angle of 45° with the sagital suture, was found. The anterior quarter of the line of fracture was depressed and gutter-shaped, while immediately behind the depression a large quadrilateral piece of bone was found to be loose, and from underneath it pus could be seen oozing.

Before trephining, cautious examination with the probe revealed the fact that at the lower and anterior edge of the depression the dura mater had been penetrated, and the trephine was, therefore, so applied, as to remove the disc of bone from the neighbourhood of the rent in the membranes. This was done in the usual way, the greater segment of the circle implicating sound bone to the lower aspect of the line of fracture. After removal of the circle of bone the depressed area was elevated, the tear in the dura mater carefully investigated, and the loose quadrilateral piece of the skull, before alluded to, which was entirely separated on both surfaces from its periosteum (and must evidently necrose) and from beneath which pus was seen to be oozing, was removed entire.

Though no brain matter was escaping, nor any pus from within the membranes, the probe passed freely into the brain. It seemed probable however, that after so long an interval, there was a very fair prospect that the dural injury was shut off from the general subdural and subarachnoid spaces, and it was hoped that, provided satisfactory drainage was arranged for, the rent would rapidly close; and special attention was paid to this matter. After free irrigation and cleansing of the now extensive area of the membranes, exposed by the removal of the loose quadrilateral piece of the skull (already spoken of as lying close to the site from which the circle of bone had been cut by the trephine), as well as by that of several smaller pieces from the line of fracture, which had obviously been already deprived of all hope of recovery, the lower half of the incision made in the soft parts was then sutured with silkworms gut, the edges of the original wound were refreshed and brought together by stitches of the same material, the tail of a narrow gauze drain was led into the hole in the dura mater, and a small tube so adjusted as to permit of the best general drainage of the wound, and a cyanide gauze dressing applied. The injury to the brain implicated the first and second right frontal convolutions.

The recovery of the patient has been rendered difficult by a severe intercurrent attack of diarrhœa, from which he has now fortunately recovered. The slight headache complained of for the first day or two after operation has passed off; he suffers in no way from loss of memory, affection of speech, or from any other serious consequence of his injury, and, though he is still at the date of writing, October 29th, under treatment, he bids fair, indeed, is practically certain, to be up and about very shortly.

It will be seen that the nature of the fracture, the fact that some time elapsed before treatment was sought (a much greater interval in this second case than in the first, the more serious of the two), the injury to the membranes and the compulsory removal of a considerable area of the skull are common to both cases. In the first case, however, apart from the symptoms peculiar to an injury in the Rolandic area, there was, as will be remembered, injury to and loss of an appreciable amount of brain matter, and the formation of a hernia cerebri, which latter was in itself a matter for congratulation and led to no difficulties in treatment. While in the second case, as distinguished from the first, although there was absolutely no symptom to indicate the severity of the injury, the presence of pent up pus beneath the cranium led to the necessity of removing the large necrosing portion of bone loosened from all its connections and denuded both of its pericranium and dura mater that has been already spoken of.

I am indebted to Mr. E. Phillips, Assistant-Surgeon at Abbottabad, for careful notes of the case first recorded and to him and to Assistant-Surgeon Firoz Din Mohroof of the Mardan Dispensary for their care in the after-treatment of both cases.

REPORT ON MALARIA FOR THE MONTH OF NOVEMBER 1899.

BY E. LAWRIE, M.B.,

LT.-COL., I.M.S.

The Report is furnished as usual by Dr. N. Evans. The photographs and drawings by Mr. Ram Chunder.

PART I—CLINICAL.

EIGHTY-TWO cases of malarial fever were treated in the Residency Hospital during the month of November, three only as in-patients. All the cases have been tabulated with drawings, to show the kind of Laveran body seen in the blood in each case. This will enable others to make the diagnosis of the type of fever in our cases for themselves, and to criticise or check ours. In twenty-one, or 25·6%, of the cases nothing abnormal was found in the blood. Quotidian was as usual the most common type of fever, but eleven of the quotidian cases had the simple tertian body in the blood; one had the quartan; and in sixteen hyaline bodies of the malignant tertian type were found. Thus, out of fifty-five cases of quotidian fever, only five were correctly diagnosed by means of the microscope alone. In seven the diagnosis was doubtful, and in eleven the examination of the blood gave negative results. The so-called æstivo-autumnal types of the Laveran body were most frequently met with. In nine cres-

cents only were found, and in these cases no diagnosis of the type of the fever could be made with the microscope. In two cases, in which hyaline bodies were found, the diagnosis was doubtful; they have therefore been classed in the table with the crescent cases as aestivo-autumnal.

It will be observed that in all but one of the cases in which the fever had lasted for one day only, no Laveran bodies were found in the blood. Some of these cases were possibly not malarious fever, but it has been noted that in undoubted malarious cases, the Laveran body is rarely met with in the blood before the second or third day. It can, therefore, hardly be regarded as the unquestioned cause of the fever, since it is never seen in the blood before the attack. During the month under report four cases have been under observation in which the so-called quartan parasite was found in the blood. This is the rarest type of the Laveran body, at all events, in this part of India. In two of the cases the fever was quartan, in one irregular, and in the fourth quotidian. Two tertian cases had large and small intra-corpuscular Laveran bodies—the full grown and the young "parasites"—and were diagnosed from the blood examination to be examples of double simple tertian fever, and should have had fever every day. But the fever was actually of the true tertian type, coming on every alternate day instead of daily, and the microscope diagnosis was consequently incorrect. In case No. 65 the intermediate stage between the hyaline body and the crescent was seen. This case was diagnosed as malignant quotidian, and the patient had been suffering from fever for eight days. His temperature was taken hourly in the rectum and varied between 103 and 105·6, and while he was in the hospital never went below 100. The fever was accordingly not quotidian but continuous. On the morning he was admitted the blood was examined, and many pale hyaline bodies were seen, some of them having a few coarse granules. In some of the red cells two or three small hyaline bodies were seen. Another examination of the blood was made the same afternoon. Hyaline bodies of the pale and the ring-shaped varieties were found, also those with the granules in them. Besides these there were some red cells containing large pale bodies almost crescentic in shape, and with the black granules more or less clumped in the centre. The clear outline and dark coarse granules gave them the appearance of proteosoma. An indistinct rosette inside the red cell was also seen. Drawings of these bodies are given in the tabulated list of cases. Next morning the blood was again examined, and hyaline bodies in large numbers were seen, a few with black granules in the centre, and one well formed crescent. No more observations were possible after this, as the patient absconded. In the blood of case No. 73 two varieties of Laveran body were found, the ring-shaped hyaline—malignant tertian—and the simple tertian. The patient, a child of ten, was admitted on the morning of the 25th with a temperature of 99·6. No quinine was given. The temperature rose to 104·6 in the evening, and dropped to 102 the following morning. At 4 P. M. it rose to 106·6, and five grains of quinine were given. The next morning the temperature was normal. An examination of the blood was made, and hyaline bodies were found, but no simple tertian. The child was ordered fifteen grains of quinine a day, and the temperature remained normal that day. On the 28th, at 6 A.M., it had risen to 104, hyaline bodies were still present in the blood, and in the evening it fell to 99·6. On the morning of the 29th the temperature again rose to 104, and the dose of quinine was increased to twenty grains a day. Hyaline bodies and a crescent were seen in the blood. After this there was no rise of temperature, except one to 100·5 on the evening of the 30th, and the child left the hospital, quite well, on the 3rd of December.

PART II—EXPERIMENTAL.

At the end of October some anopheles larvae were obtained from pools about two miles from the laboratory. The mosquitos hatched from them showed the spotted wings described by Ross, and in every way answered to his description of the anopheles claviger. Experiments were begun with these mosquitos, but could not be completed because they all died in a short time. The experiments were carried out as follows: The anopheles were allowed to bite a case of fever in which Laveran bodies were found in the blood; and on the following days bit healthy persons. All the mosquitos except two died within a week. One of the two survived for twenty-three days and the other for ten. None of the healthy people who were bitten by the mosquitos got fever, though, as this is a malarious locality, the experiment would not have been conclusive if they had. The mosquitos were kept in test tubes plugged with cotton wool, but after a time it was suggested that in this way they did not obtain enough fresh air. The end of the test tube was therefore broken off, and covered with mosquito netting, the other end being plugged with wool as before. This seemed to make no difference; in fact they died more rapidly than before. Feeding them on plantains was tried without effect, and latterly the mosquitos have not lived more than a day or two. Towards the end of the month it was so difficult to find mosquitos that the experiments could not be continued. In consequence of the failure of the monsoon, all the small pools for miles round the Residency are dried up, and the large ones are said to contain no larvae. Fever, however, continues as usual.

It would be a great help in future, if we could learn the exact time the Laveran body is supposed to take in travelling from the mosquito's stomach to its poison gland. The upholders of the mosquito theory of malaria cautiously refrain from making any pronouncement on this point, beyond stating that "the mosquito must be kept the requisite time." What the requisite time is we are not told. Ross claims to have infected sparrows with proteosoma, through bites of mosquitos on the fourth or fifth day after they had sucked the blood of birds with proteosoma. He does not say, as far as I am aware, that it is the same in malaria, nor has any information been given us with regard to the period of incubation—the interval between the time when the healthy person is bitten ("infected,") and the time he gets fever. As our experiments were not completed, the only conclusion we can at present draw from them is that, unless the malaria "parasite" takes more than twenty-three days to travel from the mosquito's stomach to its poison gland, the mosquito is quite uncertain as a carrier of malaria.

PLATE I.
SIMPLE TERTIAN.

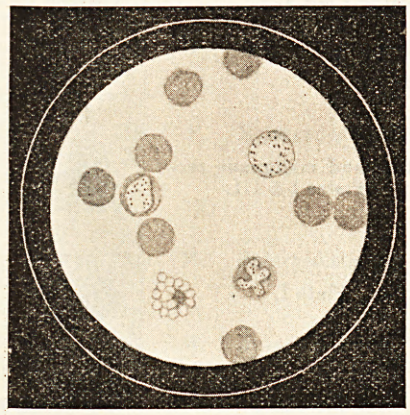


PLATE II.
MALIGNANT QUOTIDIAN.

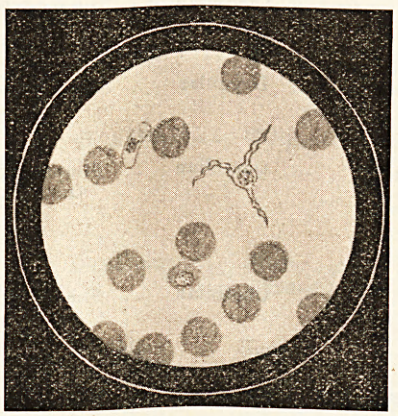


PLATE III.
MALIGNANT TERTIAN.

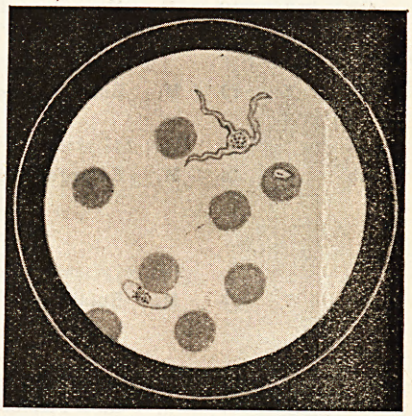


PLATE IV.
QUARTAN.

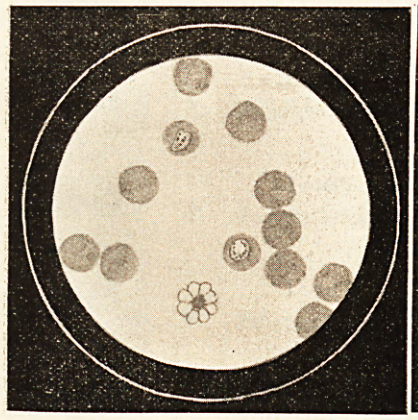


PLATE V.
CRESCENTS ALONE.

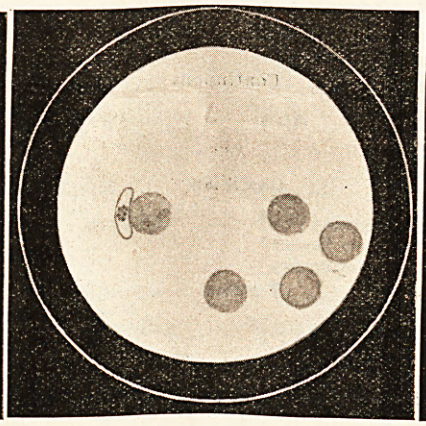
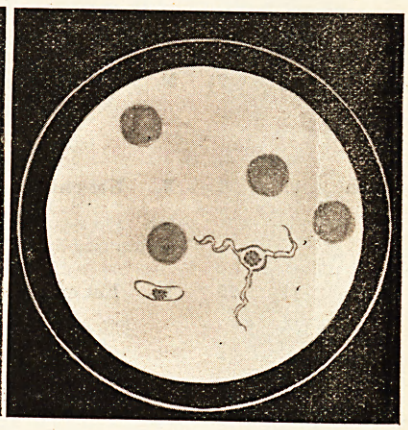


PLATE VI.
CRESCENT AND FLAGELLATING BODY.



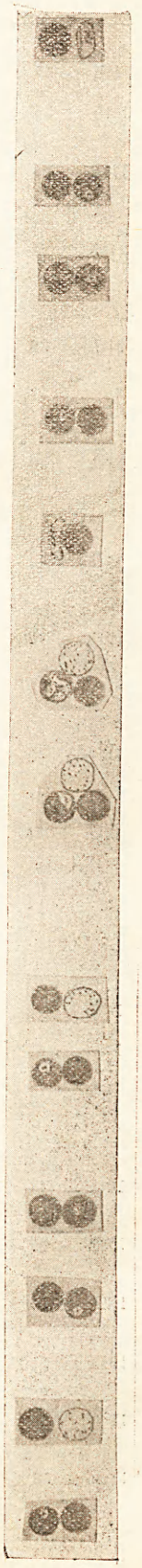
Explanation of Plates I to IV.

PLATE I.	PLATE II.	PLATE III.	PLATE IV.
Simple Tertian.	*Simple Quartan.*	*Malignant Tertian.*	*Malignant Quotidian.*
1. Amœboid movement more active.	1. Amœboid movement less active.	1. Small and non-pigmented.	1. Amœboid movement.
2. Pigment delicate, fine light brown, and copious.	2. Pigment coarse, large, dark, and scanty.	2. Annular or ring-shaped.	2. Non-pigmented or very fine granules.
3. Protoplasm delicate in appearance, contour indistinct.	3 Contour defined and distinct.	3. Blood corpuscle shrunken and dark in colour.	3. Blood corpuscle smaller than normal and bronze-coloured.
4. Blood corpuscle swollen, larger than normal, decolorised rapidly and completely.	4. Blood corpuscle normal in size, decolorised slowly and incompletely.	4. Forms crescents.	4. Forms crescents.
5. Spores numerous and small, 15 to 20.	5. Spores less numerous and larger, 6 to 12.		

Tabulated list of Fever Cases with drawings of the kind of Laveran body found in each case.

November 1899.	No.	Age.	Sex.	Condition of Spleen.	Clinical type of Fever.	Kind of Laveran body present in the blood.
2nd	1	6	M.	Enlarged moderately ...	Quotidian ...	Simple tertian Double. Plate I.
2nd	2	16	F.	Enlarged slightly ...	Quotidian ...	Simple tertian. Double. Plate I.
2nd	3	44	F.	Not enlarged ...	Quotidian ...	Simple tertian. Plate I.
4th	4	12	F.	Not enlarged ...	Quotidian ..	Simple tertian. Plate I.
4th	5	12	M.	Enlarged greatly ...	Irregular ...	None found.
6th	6	16	M.	Enlarged slightly ...	Quotidian ...	Simple tertian and malignant tertian mixed. Plates I & III.
6th	7	35	M.	Enlarged ..	Quotidian ...	Simple tertian. Plate I.
6th	8	7	F.	Enlarged moderately ...	Quotidian ...	Simple tertian. Plate I.
6th	9	10	M.	Enlarged moderately ..	Quotidian ...	Simple tertian. Double. Plate I.
6th	10	2½	M.	Not enlarged ...	Continuous ...	Simple tertian. Plate I.
6th	11	6	F.	Not enlarged ...	Quotidian ...	Simple tertian. Plate I.
6th	12	25	F.	Not enlarged ...	Tertian ...	Simple tertian. Plate I.
7th	13	20	M.	Enlarged slightly ...	Quotidian ...	Malignant quotidian. Plate II.
7th	14	7	M.	Enlarged slightly ...	Tertian ...	Simple tertian. Double. Plate I.
7th	15	1	F.	Enlarged moderately ...	Quotidian ...	Malignant tertian. Plate III.
7th	16	26	F.	Not enlarged ...	Unknown (only one day's fever)	None.
7th	17	27	M.	Enlarged slightly ...	Tertian ...	Simple tertian. Plate I.

November 1899.	No.	Age.	Sex.	Condition of Spleen.	Clinical type of fever.	Kind of Laveran body present in the blood.
7th	18	1¾	M.	Enlarged much ...	Quotidian ...	Æstivo-autumnal (crescents only.) Plate V.
7th	19	25	F.	Not enlarged ...	Unknown (one day's fever)...	None.
7th	20	17	F.	Not enlarged ...	Quotidian ...	Malignant tertian. Plate III.
7th	21	1½	F.	Not enlarged ...	Not known ...	Malignant tertian. Plate III.
8th	22	10	F.	Enlarged greatly ...	Not known ...	None.
8th	23	19	F.	Enlarged slightly ...	Quotidian ...	Malignant tertian. Plate III.
9th	24	22	M.	Enlarged slightly ...	Quotidian ...	Æstivo-autumnal (crescents only found.) Plate V.
9th	25	30	M.	Enlarged slightly ...	Quotidian ...	None.
9th	26	7	F.	Enlarged slightly ...	Quotidian ...	Simple tertian (double). Plate I.
9th	27	3	M.	Enlarged moderately ...	Quotidian ...	Simple and malignant tertian. Plates I and III.
9th	28	7	F.	Enlarged greatly ...	Tertian ...	None.
9th	29	1	F.	Enlarged much ...	Quotidian ...	Æstivo-autumnal (crescents only found, as round extra-corpuscular swarming bodies).
10th	30	50	M.	Enlarged slightly ...	Quotidian ...	Malignant tertian. Plate III.
10th	31	25	F.	Enlarged moderately ...	Quartan ...	Quartan, or malignant quotidian. Ultimately decided to diagnose as quartan. Plate IV.
10th	32	30	M.	Enlarged much ...	Irregular ...	Malignant tertian. Plate III.
11th	33	15	M.	Not enlarged ...	Quotidian ...	Aestivo-Autumnal (crescents only). Plate V.
11th	34	29	F.	Not enlarged ...	Quotidian ...	Malignant quotidian. Plate II.



November 1899.	No.	Age.	Sex.	Condition of Spleen.	Clinical type of Fever.	Kind of Laveran body present in the blood.
11th	35	40	F.	Enlarged slightly	Quotidian	None found.
11th	36	8	M.	Not enlarged	One day only	None found.
11th	37	45	F.	Not enlarged	Quotidian	Malignant tertian. Plate III.
14th	38	12	M.	Enlarged moderately	Quotidian	Malignant quotidian. Plate II.
14th	39	40	F.	Enlarged slightly	Tertian	Malignant tertian. Plate III.
14th	40	40	F.	Not enlarged	Quotidian	Æstivo-autumnal (crescents only) Plate V.
15th	41	19	M.	Not enlarged	Tertian	Æstivo autumnal. Crescents only found. Plate V.
16th	42	8	M.	Enlarged greatly	Quotidian	Malignant quotidian. Plate II.
16th	43	5	M.	Enlarged much	Quotidian	Malignant tertian and quotidian. Plates II and III.
16th	44	25	M.	Enlarged much	Quotidian	Malignant tertian. Plate III.
16th	45	20	M.	Not enlarged	Quotidian	Malignant tertian. Plate III.
16th	46	21	F.	Not enlarged	Continuous	Malignant tertian. Plate III.
16th	47	11	M.	Enlarged moderately	Irregular	None.
16th	48	22	M.	Not enlarged	Quotidian	Æstivo-autumnal (crescents only found). Plate V.
17th	49	22	M.	Not enlarged	Quotidian	None.
17th	50	9	F.	Not enlarged	Tertian	Simple tertian. Plate I.
17th	51	8	M.	Enlarged much	Quotidian	Malignant tertian. Plate III.
17th	52	30	M.	Not enlarged	Quotidian	None.
18th	53	7	M.	Not enlarged	Quotidian	Malignant tertian. Plate III.

November 1899.	No.	Age.	Sex.	Condition of Spleen.	Clinical type of Fever.	Kind of Laveran body present in the blood.
18th	54	50	F.	Enlarged moderately ...	Quotidian ...	None.
18th	55	1	F.	Not enlarged ...	Continuous ...	Malignant tertian. Plate III.
20th	56	10	M.	Enlarged much ...	Quotidian ...	None.
20th	57	25	F.	Enlarged slightly ...	Quotidian ...	Malignant tertian. Plate III.
20th	58	13	M.	Not enlarged ...	Continuous ...	Doubtful kind of hyaline body found, diagnosis with microscope not made.
20th	59	23	M.	Not enlarged ...	Tertian ...	Simple tertian, double. Plate I.
21st	60	27	F.	Enlarged slightly ...	Quotidian ...	Malignant tertian (æstivo-autumnal). Plate III.
21st	61	27	M.	Not enlarged ...	Quotidian ...	Malignant tertian. Plate III.
21st	62	3	F.	Enlarge moderately ...	Irregular ...	Simple tertian, double. Plate I.
21st	63	10	F.	Not enlarged ...	Continuous ...	None.
21st	64	16	F.	Enlarged slightly ...	Quotidian ...	Malignant tertian. Plate III.
21st	65	25	M.	Not enlarged ...	Continuous ...	Malignant quotidian. Plate II.
22nd	66	11	M.	Enlarged much ...	Quotidian ...	Malignant tertian. Plate III.
22nd	67	25	F.	Not enlarged ...	Quotidian ...	Malignant tertian. Plate III.
24th	68	16	F.	Not enlarged ...	Quotidian ...	Simple tertian, double. Plate I.
24th	69	28	F.	Enlarged much. ...	Irregular ...	Quartan. Plate IV.

November 1899.	No.	Age.	Sex.	Condition of Spleen.	Clinical type of Fever.	Kind of Laveran body present in the blood.
24th	70	20	F.	Enlarged much ...	Quartan ...	Quartan. Plate IV.
24th	71	18	F.	Enlarged much ...	Quotidian ...	None.
24th	72	7	F.	Not enlarged ...	Quotidian ...	None.
25th	73	7	F.	Not enlarged ...	Quotidian ...	Malignant tertian and simple tertian. Plates I and III.
25th	74	50	M.	Enlarged slightly ...	Quotidian ...	None.
25th	75	25	F.	Not enlarged ...	Tertian ...	None.
28th	76	25	F.	Enlarged moderately ...	Quotidian ...	None.
29th	77	3	F.	Not enlarged ...	Quotidian ...	Malignant tertian. Plate III.
29th	78	4	M.	Enlarged slightly ...	Quotidian ...	None.
29th	79	1	F.	Not enlarged ...	Quotidian ...	Quartan. Plate IV.
29th	80	26	F.	Not enlarged ...	Continuous ...	None.
30th	81	21	M.	Enlarged moderately ...	Quotidian ...	Æstivo-autumnal (hyaline body only).
30th	82	40	M.	Not enlarged ...	Quotidian ...	Simple tertian, double. Plate I.

Clinical type of fever.	Number of cases.	KIND OF LAVERAN BODY PRESENT IN THE BLOOD.						No Laveran bodies found in the blood.
		SIMPLE.		AESTIVO-AUTUMNAL.			Mixed.	
		Simple tertian.	Quartan.	Malignant tertian.	Malignant quotidian.	Crescents only.		
Quotidian ...	54	11	1	16	4	7	4	11
Tertian ...	9	5	0	1	0	1	0	2
Quartan ...	2	0	2	0	0	0	0	0
Irregular ...	5	1	1	1	0	0	0	2
Continuous ...	7	1	0	2	1	1	0	2
Not known ...	5	0	0	1	0	0	0	4
Totals ...	82	18	4	21	5	9	4	21

Percentage of cases in which no Laveran bodies were found in the blood 25·6.