

gested were noticed (Fig. 4 (b)). There was no lesion to account for the enlargement which was non-inflammatory. The mesenteric glands were bigger than normal and distinctly visible.

*Large intestines.*—The cæcum was mesially situated (opposite the sacral promontory), and the sigmoid flexure was on the right side (Fig. 4 (b)). The vermiform appendix was healthy and rose from the right and back part of the cæcum.

Liver, very large and almost black in colour, completely transposed, occupying the left hypochondriac, epigastric and part of right hypochondriac regions, the two ends were in contact with the kidneys on either side. The gall-bladder was distended and opposite the ninth costal cartilage in the left nipple line.

Spleen was entirely absent.

Suprarenals were enlarged to nearly twice the usual size.

The interesting points of the case are:—

1. According to the patient the transposition was never recognised before.

2. The difficulty of localising the liver and spleen during life is shown in Fig. 1. There was no structure found in front of the left half of the liver; why it was tympanitic during life, I am unable to say.

3. Total absence of spleen. No abdominal operation of any kind had ever been performed as seen from the absence of any scar, as well as ascertained from the patient.\*

4. Though he has had three attacks of malarial fever before, can the absence of spleen be held responsible for the severity of symptoms ending in death this time?

5. The very dark colour of liver (not congestion), the enlargement of glands along the lesser curvature of stomach and in the mesentery as well as the large size of the suprarenals had perhaps something to do with the absence of spleen, *i.e.*, were probably compensatory.

6. This case shows clearly that spleen is not an absolutely necessary organ, and though it has not been ascertained what share the spleen has in the destruction of organisms that gain admission in the system, how and to what extent this patient was equipped against bacterial invasions, I am not in a position to explain, but believe that the hypertrophy referred to in para. 5 above was compensatory.

7. Detection of parasites with processes and the peculiar arrangement of pigment lining the membrane shown in Figs. 5 and 6 about 20 hours before death. Such racquet-shaped bodies have, I believe, never been noticed before; whether they were any new form of parasite or only the result of quinine, I cannot say.

The stained specimens do not show these processes noticed in a fresh one.

8. As the symptoms presented by the case (*i.e.*, chiefly of heart failure) were quite distinct

\* I believe this is the first case of congenital absence of spleen in a man who lived to the age of 24 years.

from any of the forms of malarial fever I have read or seen, in the absence of any heart lesion, I venture to suggest "syncopal form" of malarial fever as probably the best name for the disease. The striking point about the case was that though symptoms were so severe as to end in sudden death, yet no malignant form of the parasite was found.

## MALARIA: AS SEEN IN THE ANDAMANS. PENAL SETTLEMENT.

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THIS is the disease that causes by far the greatest amount of sickness in the Settlement, and which consequently causes a serious disorganisation of the labour supply and a heavy financial loss to the administration.

In 1902 there were nearly 14,000 admissions from malaria, and though only 57 deaths were directly attributed to this disease, yet I am convinced that many patients who died from other diseases had their constitutions undermined by previous malarial attacks. In other words, a healthy man has strong resisting powers to the bacilli of dysentery or tuberculosis, but once his vitality is lowered by malaria he falls an easy prey to these complaints.

The tax of malarial fever is a very heavy one; taking 14 days as the average period for which fever cases are non-effective, malaria alone in 1902 accounted for 196,000 labour units (one man for one day) or, at four annas per day, for 49,000 rupees. This represents the labour of two thousand men for 98 days. And all this is exclusive of the cost of quinine, hospital establishments and medical comforts.

On investigating the causes of this disease one notices that in 1902 the least malarial month was February with seven inches of rain, that the admissions increased slightly in March (1.10 inches of rain), much increased in April (3.73 inches), further increased in May (rain 12.65) till they reached a maximum in June (21.32 inches rain). In July (9.8 inches rain) there was in nearly all districts a decline in the malaria, more or less marked, whilst in August and September, the two wettest months of the year (28.85 and 26.24 inches respectively), the admissions for fever sharply declined.

These statements also apply for the two previous unhealthy years 1900 and 1901, but more especially to the larger stations and districts. Ross and Female Jail show variations and do not conform to this.

The table here inserted shews precisely for the last year how the monthly malarial admissions have occurred in the various areas and what the rainfall has been.

## MALARIAL ADMISSIONS.

Approx. strengths.	Average Rainfall.	Ross.	Aberdeen.	Haddo.	Female Jail.	Wimberley Ganj.	Southern District.
		700	2,200	1,800	400	2,350	3,500
January 1902...	0.12	15	24	67	21	313	218
February ...	7.28	12	13	41	29	232	199
March ...	0.53	22	41	52	20	287	312
April ...	1.93	33	61	85	19	472	608
May ...	18.59	31	147	156	34	626	793
June ...	21.47	35	372	312	192	738	817
July ...	16.49	75	310	253	196	620	484
August ...	33.65	39	172	129	123	460	279
September ...	24.83	27	129	109	89	354	211
October ...	9.44	37	153	77	85	278	212
November ...	10.95	58	158	98	84	219	186
December ...	5.38	67	98	51	53	225	242
January 1903 ..	0.31	70	70	40	66	186	185
February ...	4.61	53	49	35	49	200	180
March ...	<i>Nil.</i>	67	88	54	33	310	213

The rainfall is the average of the whole Settlement. In 1902 Ross was the wettest station.

There are two methods in which we may attempt to account for the prevalence of malaria:

- (a) The purely mosquito theory.
- (b) The relapse or recrudescence theory.

(a) *The purely mosquito theory.* This would require infection from a specific anopheles to account for every attack of malaria, and the malarial admission rate should be coincident with a marked increase in mosquitoes, or at least, with more favourable conditions for their existence. Now, our malaria begins in April, the hottest and one of the driest months. It increases and reaches its maximum in June and then declines irrespective of the rainfall. This feature is constant.

If mosquitoes are *solely* responsible for our malaria they must be of a type which flourishes in the hot month of April, and the wet ones of May and June, suddenly dying off in July and subsequent months, although these months, from conditions of temperature and moisture, would appear to be equally suitable for their development. More than this, the number of malaria cases from which the mosquitoes may become infected is much greater in May and June, and consequently the number of infected and dangerous mosquitoes should be much larger. With more infected mosquitoes the malaria rate should rise, but it undoubtedly falls. (It has been suggested to me that the mosquitoes themselves become so ill from malarial poisoning that they too die off. This theory is ingenious, but it is hardly practicable to investigate it).

Also it may be that in July other mosquito-eating insects and animals appear who prey upon

the Culicidæ, and so enormously reduce their numbers.

*If we can exclude mosquitoes does malaria diminish?* It does, most decidedly. For the past fifteen months careful experiments have been carried out in the Female Jail, one of the most unhealthy and malarious units in the Settlement. This experiment was initiated by Major Anderson and has since been extended by me.

Thirty-seven women selected from all classes were placed under mosquito curtains, going under them at dusk and coming out in the morning. Their occupation, health and food in no way differed from any other section of the Jail. The remainder of the Jail population was divided into two classes: To one class 20 grains of quinine were given in two successive days, to the other no prophylactic issue was made. The effect was most marked.

Class A. mosquito net ... 1,007 admissions per mille.

„ B quinine ... 2,421 „ „ „

„ C. no quinine ... 4,177 „ „ „

I believe the class A figures would have been better, but for an unfortunate case of chicken-pox in one of the women which necessitated a change in the inhabitants of a second net which had just been occupied.

These figures go to show that under conditions prevailing in the Female Jail the exclusion of mosquitoes is an effectual and inexpensive method of reducing malaria.

(b) *The relapse or recrudescence theory of malaria.* This theory is somewhat heterodox nowadays, but it has some grounds for consideration.

To begin with, practically every native who comes to the Andamans has suffered from malaria in his youth, and probably has had several attacks of fever. He has not become immune, or he would not suffer from malarial of fever. The malarial parasites are supposed to be locked up in the spleen, and if in favourable conditions, will be eventually destroyed there. But it is a matter of common knowledge that, in the case of a person who has once suffered from malaria, a chill, over-exposure, &c., will induce a fresh attack, even years after the original infection, and that a malarial subject should avoid circumstances where he is likely to be so exposed. Now, as I have said above, most natives have suffered from malaria, and on arrival here as prisoners they are subject to new and trying conditions. The climate, water, and food are strange to them, they are worked hard and of are constantly exposed to sun, rain and wind. Differing from free men they cannot, if feeling only slightly unwell, leave work for a day or two, change their food or take life a little easily. They must either work on or go sick to hospital, with the possibility of not being admitted and the risk of punishment.

(To be continued.)