

and feet, fancying he was ascending a ladder, and complained of not being able to get to the top, and of being fatigued with the weary length of it. The pricking of imaginary darts and arrows was not an infrequent hallucination. Hallucinations of common sensation also were observed, the delirious man fancying he had been cut in pieces or had undergone a surgical operation, and scarcely being re-assured when induced to pass his hands over his body or limbs. One went through the movements of collecting fuel and lighting a fire and warming his hands at it, with seeming satisfaction. Illusions were sometimes occasioned by concurrent organic disease;—a man suffering from pneumonia, fancying he was walking in the street, complained that passers-by were constantly jostling him. Another with acute hepatitis declared that he had just been stabbed. In one case there was hyperæsthesia of the whole integument, rendering the least touch painful.

Vertigo was often observed to be present: more than one patient, while lying down, grasped the sides of his cot, fancying that it was being tilted up to throw him off. Others fancied they were in a boat on a rough sea, and “held on” to steady themselves; one thought he was on a sea voyage for the recovery of his health.

Delusions or erroneous fancies were seldom unattended with illusions or hallucinations of perception, and when they were so, there was reason to fear the disease was verging into mania. During the five years two confirmed drunkards who had been repeatedly under treatment for delirium tremens, became at length inmates of the Lunatic Asylum.

In their delirium many were noisy who were not violent, their terror being the cause; but others were extremely violent and intractable, offering violence to themselves or others; and although the greater number of these may be included under the first species, there were others who could only be classed in the second, their violence being perhaps attributable to their natural or habitual temper. Of 193 cases in which the point was noted, there were 47 violent and 146 not so.

Among this class of sick there are some who, without sense of shame, tear off their clothes; and others who are devoid of all regard for propriety or cleanliness in answering the calls of nature: such instances, however, are less frequent than among maniacal patients.

If sound sleep ensues, the delirium is found to be gone when the patient wakes, or if the sleep be short, he is more rational than he was before it, except in those cases of secondary delirium before mentioned. In some cases the delirium progresses to the degree of incoherence and loss of attention, and then gradually lessens,—the power of attention returning before sleep begins.

The mean *duration of delirium* in 124 recovered cases, was 82 hours. In 65 of these in which delirium began while still drinking, the mean duration was 99 hours; while in 59, in whom delirium began after having ceased to drink, the duration of it was but 63 hours,—the difference being 36 hours. These additional hours that in the former group were passed in delirium, approximate, although not closely, to the usual time (45 hours) passed between the last potation and the beginning of delirium and may be viewed as its equivalent; and perhaps, if the cases had been made out with more minuteness, the supervention of a secondary delirium upon that which began during drinking, would have been found to be far from uncommon.

In the 124 cases the duration of delirium did not exceed

24 hours	in	11	120 hours	in	8
36	"	13	144	"	10
48	"	15	156	"	3
60	"	11	168	"	4
72	"	17	180	"	2
84	"	10	192	"	5
96	"	8	216	"	1
108	"	5	240	"	1

The condition of the *pupil of the eye* has been the subject of careful observation, especially during the last three years of the period under review. In my Hospital Report in No. V. of the Society's Transactions, I mentioned the sources of error

that render observations as they are usually made, useless for determining whether there is an abnormal state of the pupil in this disease. In the first year of my observations in the European General Hospital I did as others, and with patients whom I had never seen before, I noted the pupil as "dilated," "natural," "contracted," &c. without knowing what sizes of pupil were really natural to them, and without a thought of ascertaining this point after their recovery. I however became dissatisfied with this procedure, and finding that there was no absolute standard size in nature, and that each eye must be judged of by its own standard, I prepared the *mydriometer* which I described in the Report referred to. As the result of my observations with it, I stated that in Delirium tremens the pupil is abnormally large. From the iris remaining sensitive, the pupil may vary in size according to the amount of light to which the eye is exposed, but with a fixed amount of light it is larger during the delirium than it is with the same amount of light after recovery. Dr. Morehead in his admirable and valuable work on Diseases in India, does me the honour to refer to my observations, but unfortunately he gives too much weight to those of the first year, which I discard as worthless, while he suggests doubts of the accuracy of those I made with the aid of the *mydriometer*, from his not being aware of the improvement in the accommodation in the Hospital that had been made, and overlooking the precautions that I mentioned as being taken in observing.

To ensure accuracy in my recorded observations they were made at the morning visit, while the eyes were directed to the sky, *not to the observer*. The amount of light being thus uniform, and the patient having had no medicine, any difference between the size of the pupil during delirium and its size before delirium or after recovery from it, may with reason be attributed to the influence of the disease. By this procedure the absolute natural size of each pupil was not ascertained, for this is no fixed magnitude, but is ever varying with the amount of light, neither was the mean size obtained, as the light even of the

morning Western sky on which the window opened, was stronger than that which the eye usually meets among surrounding objects, but as the comparative size was what was sought, this amount of illumination was chosen as being more equable than any other at hand. As it is much more convenient to deal with fractions of the same denomination, I have latterly used decimal instead of vulgar fractions in the scale of the mydriameter.

As the iris is far from being sluggish during Delirium tremens, the effect of such medicines as usually influence it are readily manifested: thus, Quina in febrifuge doses has been found to increase the dilatation, and Opium even in quarter-grain doses at three hours' intervals, in the treatment of concurrent disease, has been seen to lessen the pupil, the effect remaining for some hours after the opiate has been discontinued. Alcohol as is well known, acts as a *mydriatic*, and in patients who have been drinking up to the hour of admission, the pupil will, it is likely, be affected by it, whether delirium has already begun or not, and some time must elapse before this effect of the last potation passes off. All these disturbing causes have been eliminated or taken into account in arranging the observations of which I have now to give the result. I have to add that the maximum dilatation observed during delirium in each case was that which was used in the calculations.

From the mean of observations in 106 patients, the diameter of the pupil was $\cdot 355$ of the diameter of the clear cornea during delirium, and but $\cdot 248$ of the diameter of the clear cornea after recovery; and as circles are to each other as the squares of their diameters, the area of the pupil was doubled during delirium, being as 100 to 49. Among these 106 cases there were 7 in which the pupil was the same after recovery as it was during delirium, but in none of them was it smaller during delirium, and in no other case was it observed to be so, except where opium had been taken.

In further analysing these observations on the pupil it is found that in 58 who were admitted delirious, and who had been

drinking up to the time of admission, the diameter of the pupil was during delirium $\cdot 355$ of that of the clear cornea, and after recovery it was $\cdot 253$, which, by the rule which makes circles to each other as the squares of their diameters, gives a ratio of 100 to 51. It is further found that in 32 cases in which delirium did not begin until 24 hours or more had elapsed after drinking had ceased, the mean diameters during and after delirium were respectively $\cdot 348$ and $\cdot 233$, which give areas of the ratio 100 to 45. Thus, in the former group, notwithstanding the mydriatic effect of the alcohol recently drunk, the delirium was less potential in dilating the pupil than the delirium in the latter group, in which it came on after a considerable interval.

In twelve only of the cases of secondary or relapse delirium was the size of the pupil noted; in two of these the pupil was smaller in the secondary than in the primary attack: in three it was the same in both, and in seven it was larger in the secondary than in the primary.

When convulsions threatened, the dilatation was great, and during the convulsions the iris was often nearly invisible. In some prolonged cases uninfluenced by alcoholic liquor or medicine, the pupil was observed to increase in size while the delirium advanced in severity, and to decrease when the delirium became less engrossing and when sleep approached. I give a case illustrative of this.

CASE OF ———, Engine-man, aged 35; in India 5 years. Admitted 9 A.M., 5th January 1860.

Says he had fever, and notwithstanding drank, and the last few days has taken nothing but drink, thinking it would steady him and enable him to continue at his work. The last two days he has vomited much; for some nights has not slept. He is very tremulous with, at times, convulsive movements of his arms. Surface warm; pulse in recumbent posture 96, full. Is timid and afraid to be left alone.

Since admission has slept 3 hours. Pupil was in diameter $\frac{1}{4}$ that of clear cornea.

<i>Besides ordinary meals, Extra</i>		<i>Cold affusion to the head, and cold broth in the night.</i>
		<i>wet cloths to the forehead.</i>

January 6th. No sleep; has been vomiting in the night; surface is cool; pulse less frequent. Tremor is still great.

Extra broth every 6 hours.

Vespere. Very tremulous: vomited a little this morning; has since then retained his food. Now he says he sees phantoms when he closes his eyes, so that he lies with them open, trying to escape from the visions. The hallucinations are confined to visions.

January 7th. Was delirious, talkative, and sleepless in the night. Now is under the delusion that there is a conspiracy to defame him and to rob and murder him. Pupil $\frac{3}{4}$ rd.

Continue the broth. | Omit the cold affusion.

8th. Was noisy in his delirium until day-light. He fancies he was kicked through the streets in the night; and now, that grog has been put into his broth. Pulse 100 to 110 in both the recumbent and the sitting postures. Surface of natural warmth, moist. Is very tremulous. Pupil $\frac{3}{4}$ th.

Vespere. Pulse 84: delirious fancies wholly occupy him.

9th. Slept not. Is delirious but quiet and tractable. Pulse 84: pupil $\frac{3}{4}$ th

Vespere. No sleep: pulse in sitting posture 110; delirium continues.

10th. No sleep: is delirious and restless. Pulse, in sitting posture, 96; pupil $\frac{3}{4}$ th.

11th. Fell asleep last evening, and has slept continuously until now, and is still asleep.

12th. Did not awake until 5 o'clock last evening, and then between 7 and 8 P.M. slept again, and is now asleep. There was no delirium when awake last evening.

Vespere. Awoke about 9 A.M. Has slept at intervals during the day.

14th. Has continued free from delirium; sleeping naturally; pupil between $\frac{3}{4}$ th and $\frac{1}{2}$ th.

To have mutton diet.

16th. Continues better: pupil between $\frac{3}{4}$ th and $\frac{1}{2}$ th.

To be removed from the single Ward, in which he has been, to the common Ward.

January 24th. *Discharged.*

The treatment was not uniform; but in the cases that were under my own immediate care, no medicine, as a general rule, was given, unless some concurrent disease seemed to call for it;

and as it happened that in none of these was opium in any form imperatively requisite, none was given by me. I was thus the better able to observe the natural course of the disease. The exceptions to this rule among the uncomplicated cases were two to whom some doses of aromatic Spirit of Ammonia were given with the broth, on account of alarming depression, and three others who had each an aperient to remove constipation. The following is one of the former :—

A Press-corrector, aged 35, born in India, admitted in the morning of 11th October 1860.

Said to have been drinking for two or three months; and for ten days to have been drinking very hard, said to have, during the last two days, had delirium. Drank hard up to the 8th instant: on the 9th, took only one glass: it was to steady himself when going to the meeting of the Temperance Society to take the pledge. Says he has not slept for five nights, owing to fearful fancies. Now is stupid and does not readily comprehend when spoken to. Pulse 96 in recumbent posture, weak. Tongue, moist and clean. Head hot, and extremities chilly. Mouth compressed, and when he opens it, there is tremor or convulsive twitching of the jaw: no vomiting; pupil $\frac{1}{2}$ rd.

*Cold affusion to the head and
hot pediluvium.* | *Sinapisms to the calves.*

Sago and strong broth with bread, alternately, every three hours.

October 12th. After the pediluvium yesterday he perspired freely and the inordinate heat of head went off. He was restless and delirious, speaking as if in conversation with some one he supposed to be present, and following imaginary objects about the room and striking at them. In broad day-light, with only a spotless, whitewashed wall before him, he hurt his knuckles striking with his fist at a phantom. At 1 P.M. he was exceedingly weak and exhausted with his exertions: the pulse at the wrist was barely perceptible, and the feet were chilly. His attention could not be commanded. As danger from exhaustion was imminent, he was not left alone in his room, but an intelligent person was placed beside him to prevent his getting into the erect posture, and this watch was kept up by reliefs until this morning. Sinapisms were applied to the soles of the feet, and Spiritus Ammoniac Aromaticus was given in the broth, and thrice it was given in the intervals. In the night he became quieter and seemed inclined to doze. This morning is less weak and replies more rationally to questions, and the warmth of surface is equable and natural. Pupil between $\frac{2}{3}$ th and $\frac{1}{2}$ rd. Pulse, recumbent, 84 soft, weak. Tongue furred.

It is said that before admission he had bilious vomiting: there has been no irritability of stomach since coming to Hospital.

Vespere. No sleep. Has been talking to himself or to imaginary persons, and fancying objects on the wall. Says he has slept, although it is known that he has not: pulse 72, of better strength.

13th. Slept from 1 to 3 A.M., and a little between that time and 6 A.M., there was then very little remaining delirium. Since 6 A.M. has been sleeping soundly.

Vespere. Awoke at 3 P.M., and has been free from delirium.

October 14th. Slept from 9 P.M. to 6 A.M., when he was improperly awakened by an attendant. Bowels have acted twice, loosely: pupil $\frac{1}{4}$ th.

To have milk diet.

| *If again moved loosely to
have Mist. Creteæ.*

October 15th. Did not require the medicine, had no return of looseness of bowels: slept well.

16th. Continues well. Pupil $\frac{1}{4}$ th. *Discharged.*

In the treatment seclusion and as much quiet as could be commanded, were enforced. There was often at first a fear of being shut up alone, but it soon passed off. There were, however, exceptional cases, in which the dread, inspired by their delusions and hallucinations, was overpowering; and in such, an attendant was placed in the room with the patient, and also, as in the case last given, where a patient in a weak and exhausted state was over-exerting himself in moving after or struggling with phantoms, an attendant remained beside him to induce him by persuasion to keep to his bed, thus averting the probable accession of convulsions or collapse. It sometimes happened that the patient was so outrageously violent, that to prevent his self destruction, or his doing grievous injury to others, he was secured with sheets to his cot. This measure was used in one of the cases of attempted suicide; the man had, before admission, jumped into the sea from a boat, and after being brought to Hospital he tried to destroy himself by butting with his head against the wall, and wounded the scalp severely. This means of restraint was not resorted to by me except in like extreme necessity: the effect, where it was used, was generally salutary, as the patient, when he found himself to be powerless, ceased to struggle; but it is not without much ground

for apprehension of evil that this means can be used, lest the struggling should continue and induce convulsions.

The rooms for the treatment of the delirious were bad and ill-adapted for the purpose during the first part of the five years; but after representations of this being made, I had the satisfaction of having others erected; and from 1859 until the close of 1861 the accommodation was nearly all that could be desired, the chief remaining imperfection being that the rooms were not free from surrounding noises.

There were four sufficiently spacious rooms, well ventilated, and each lighted in the day-time from the western sky, by a window guarded with wire netting and above the reach of the patient, and at night lighted by a lamp, placed outside, through a thick pane of glass which was secured from violence. On the east side the door opened into an open verandah, and above it there was a venetian window, beyond reach; the iron cot was in the middle of the room with its head against the wall, and was firmly fixed, so that it could not be used to barricade the door, or to aid the inmate to reach the window. The floor was planked so that in cases, not rare, in which the patient could not be induced to lie on the cot, from fancying it was occupied by a corpse or some other frightful object, he might not suffer from cold, as he would have done, on a paved or plastered floor. The walls were white-washed and kept as free as possible from spots and marks which might favour illusions; and there was a securely fixed close-stool in one corner. There was an attendant day and night outside, who, through a peep-hole with a slide in the door, could watch the patient without disturbing him, if inclined to sleep, or exciting or irritating him, if restless. There was a shower and douche bath attached to these rooms. The means of self-injury were, so far as easily practicable, kept away from the sick: no strings, handkerchiefs, knives or forks were ever allowed in these rooms, yet the patients had to be watched to prevent their injuring themselves in the ways already described.

It is very needful that, whether in hospital or in private dwellings, the delirious sick should be removed from the opportunities of precipitating themselves from windows or balconies, which they will sometimes try to do, even when not intending self-destruction, but merely to escape from some terrific phantom or fancied danger. Two of the delirious patients were brought to hospital suffering from injuries thus received,—one of them had fracture of the femur and of the forearm. Another patient had been nearly drowned by jumping into the water to escape from fancied murderers.

When there was disproportionate heat of head, or when in robust men there was much excitement, either mental or vascular, cold affusion to the head was had recourse to; sometimes a hot pediluvium being at the same time used, or cold wet cloths were kept on the forehead. In the weakly, the injury that might ensue from the over-depressing effect of the cold applications was kept in view.

Sanguineous depletion by leeches was ordered in two of the patients on account of acute dysentery; in three who had fever with inordinate heat of head, a few were applied to the temples; and in two others, in whom there was no complication, and in whom there were convulsions, a few leeches were applied to the temples: one of these last recovered; in the other, the convulsions which had been accompanied with much flushing of face, intermitted for some hours, but then returned, and proved fatal. In former years I had experience of depletion among high-fed, robust, well-exercised men, in whom the disease was almost always from a debauch and not from long-continued tipping, and it was borne well by them and no untoward consequence followed. Now, from further observation I think, as a rule, depletion is unnecessary even in such cases: among habitual drunkards I deem it to be very hazardous.

Alimentation along with quiet I consider to be the most important part of the treatment of Delirium tremens, and this was carefully followed, except in the few who had pyrexia and much vascular excitement: in them the quiet only was sought. Irri-

tability of stomach, if present on admission, ceased now that alcoholic liquors were discontinued, and aliment was retained. Besides the ordinary hospital diet with meat at dinner, strong broth with bread was given day and night, every six, four, or even every three hours, or this was alternated with sago. In every case all alcoholic drink was at once stopped, and in no instance was this abrupt discontinuance of the accustomed stimulus to be regretted; on the contrary it was beneficial, because the stomach became retentive of food which it before loathed. It is besides of no small importance as regards the future welfare of the patient that no impression should be made or left on his mind that liquor had become necessary in his case. As an instance of the safety with which the habitual use of alcoholic liquor may be at once stopped, I give the following from my private notes of cases among another class of the community.

— —, aged 66 years. For many years habitually drinking largely of Sherry or Port-wine, but chiefly the former, and having already had three slight attacks of Delirium tremens, has lately been much fatigued by his official duties, and to enable him to get through them has taken largely of wine, while his appetite has failed. The quantity of wine drunk latterly has been a bottle and a-half or two bottles a day, and he besides has taken one or two glasses of brandy and water.

November 5th. This morning I found him in a very feeble state, extremely tremulous, so as to be scarcely able to stand, yet dressing to go to his office: this he was not permitted to do. His skin was perspiring and cool; he had not slept owing to horrid visions, and his eyes were red. The pulse could scarcely be counted on account of the tremor—it was about 72 in the sitting posture, and weak. He had griping of the bowels and slight diarrhoea: tongue was clean, and moist and tremulous. No vomiting, but had loathing of food. He smelt strongly of alcohol.

All alcoholic liquor to be discontinued.

To have his regular breakfast, meat-tiffin and dinner, and besides to have strong broth with bread, so that he shall take food every 3 hours, day and night.

November 6th. Yesterday would eat no meat, and with difficulty could take the broth; but now he is taking it more readily: dozed a little in the night but was disturbed by frightful dreams. Is very tremulous.

November 7th. The same nearly as yesterday, but less weak. Takes food willingly now, but still has great craving for wine.

November 8th. No sleep : fancied the room was full of people, and the furniture appeared to be persons. Tremor continues ; pulse 84.

November 9th. Slept from 11 to 12 o'clock last night, but afterwards was very restless, and was occupied with hallucinations and delusions, and fancied he was to be tried for forgery : also that he was not in his own house but in the Lunatic Asylum. Has taken his food : pulse 96 : says his head is confused, but is free from pain. Tremor great, surface of natural warmth. Bowels acted loosely this morning. Pupil in the diffused light of his room is between $\frac{3}{8}$ th and $\frac{1}{2}$.

November 10th. Sleeplessness and delirium continue, and he is more fully occupied with his delusions ; it was with difficulty he could be kept in bed last night : it is said there was slight increased warmth of surface. Fancies various criminal charges are brought against him, and he has the hallucination of seeing persons beside him, and among others one who has been long dead. Fancies he was out last night and that he did not return home until this morning. Addresses persons intimately known to him as others. Pulse in sitting posture 96, not very compressible. No heat of head ; takes his food well ; tremor is great ; pupil between $\frac{3}{8}$ th and $\frac{1}{2}$.

November 11th. Yesterday was stronger and was able to walk across his room. Delirium continued and he was less tractable than before. He took food with appetite. From half an hour after midnight he slept continuously until half-past nine this morning. Now speaks rationally, but he says that in his sleep he had a dream so vivid that it was like reality. Feels confused and appears sleepy. Pulse 96 in sitting posture. Still is tremulous, but says he feels much stronger, and he is able to walk without assistance. Diameter of the pupil, in the same light as that in which it was observed yesterday and on former occasions, is $\frac{1}{3}$ rd of the diameter of the clear cornea.

November 12th. Slept yesterday from 10 $\frac{1}{2}$ A.M. to 2 P.M., and then after taking food he slept until 6 P.M.; after dinner he went to bed and slept soundly all night. Has had no return of delusions or hallucinations since yesterday morning. To-day feels well but a little giddy. Pulse in sitting posture 72. Pupil in the same light as yesterday's, between $\frac{3}{8}$ th and $\frac{1}{2}$.

November 17th. Has continued well. Appetite is good. Strength has returned. Takes no wine or other alcoholic liquor.

Of the whole 210 cases, there were, without counting five who had merely an aperient dose or enema, 53 who had medicine ; and there were 157 who had none. Of the 53 who had medicine, there were 27 to whom it was given on account of concurrent diseases, namely, six who for fever had small doses

of nitrate of potass and antimony, and one who had quinine. Nine had chalk, or chalk and catechu for diarrhœa. Two had ipecacuan and were leeched for dysentery. Eight had opiates for diarrhœa and dysentery; one had antimony for pneumonia, and one who had fracture took opium.

Of 26 who, without having concurrent disease took medicine during their delirium, two, as above mentioned, had ammonia on account of depression. Eight were treated with the *mistura antimonii cum opio*, formerly used in the Hospital; ten with draughts of chloric ether and carbonate of soda; one with chloric ether and ammonia; one with spirit of nitric ether and camphor. Besides these, two had chloroform inhalation. In two instances the *mistura antimonii cum opio* had to be discontinued, and camphor and ammonia to be given on account of depression; in one of these the depression was accompanied with vomiting and purging, which were treated with opium. In one of the two cases in which inhalation of chloroform was used, sleep was induced that terminated the delirium: in the other the remedy failed.

All the eleven who died were habitual drunkards: their cases may be divided into groups.

I. Three of them—A, P, and H, who, there is reason to believe, had been exposed to the sun, had pyrexia on admission, with little or no delirium; but in all three there was soon, along with exacerbation of fever, sudden, violent delirium, quickly followed by convulsions and death. All three on admission were treated on account of the fever with a saline refrigerant and antimonial mixture, and on accession of delirium, with cold wet cloths to the head. One had an ounce of leeches to the temples. It was in the bed of one of these, that after his death, a phial was found with the remains of laudanum he had been secretly taking.

II. Other three—T, S, and B, had convulsions on admission, which in one proved fatal in the course of the first

day: he had been delirious for two days, yet had continued to drink; there was flushing of the face, but no violence: an aperient, which he required, was given, and a few leeches were applied to the temples, as before mentioned. Another was treated with the *mistura antimonii cum opio*; and the third had merely cold applications to the head, and seclusion.

III. In four—N, F, A, and E, who, as the preceding, had continued drinking a longer or shorter time after delirium had begun, the common symptoms of the 2nd species of the disease were exhibited; all died from convulsions, or convulsions passing into coma. The treatment in one was with small doses of tincture of opium with carbonate of ammonia; in another with draughts of chloroform and ammonia; in a third a purgative and a saline and antimonial mixture; and in the fourth, cold applications to the head.

IV. In one, admitted in an advanced stage of dysentery, death was from exhaustion, without convulsions. He was treated with opium, ammonia, and brandy.

The duration of delirium in all the fatal cases could not be ascertained, as it had begun, in most of them, before coming to Hospital. The deaths took place within the following time from admission:—

In 16 and 18 hours in	2
„ 25 and 46 „ „	2
„ 54 hours „ „	2
Within 4 days „ „	4
In 104 hours „ „	1

The recorded appearances on examination after death were—

Groups.	Head.					Lungs.	Lining of Stomach.	Intestine.		Liver.	Spleen.	Kidney.
	Meninges and Pia mater.	Substance of Brain.	Quantity of serum.		Heart.			Small.	Large.			
I. { A. P. H. }	Turgid highly injected.	Normal.	Arach.	Ventricles.		Great congestion.	Morbidly injected.					
	Full.	Vascular.	Small.			Very great congestion.	Injected.			Right lobe mottled.	Large.	
	Full.	Vascular.	Serum.	Serum.		Weight 46oz.	Not noted.					
No Examination.												
II. { T. S. B. }	No Examination.											
	No Examination.											
	No Examination.											
III. { N. F. A. }	Septum between ventricles wanting.	Septum between ventricles wanting.	Much.		22oz. lower lobes congested.	Cardiac end mulberry coloured.	Peyer's glands opaque.	Duodenum vermilion.		Fatty, congested.		Congested.
	Deeply congested.	Vascular.	Distended.		30 oz.					Large, tough, not much congested.		
	Congested.	Vascular.	2oz.	Hypertrophied.		Very much congested.		Congested.		Large, fatty, congested.		Congested.
IV. { E. G. }	Deeply congested.	Vascular.	Serum.			Congested partially.				Large, congested.		Large.
	Some fullness at base.		oz. 2 or 3		Some tubercles.	Thick and soft.				Fatty.		Congested.
	Congested.	Normal.	6oz.	Little.	Normal.					Congested.		Degenerated.

In all these eleven there was more or less congestion of the pia mater and meninges. In the greater number congestion was not observed in the cerebral substance, and the quantity of serum varied greatly and was not always in proportion to the time the patient had been in *articulo mortis*. The injected state of the stomach I do not attribute to the direct irritation of the alcohol that had been drunk, but from its being concomitant with deep congestion of more or less of the lungs, I consider it due to the state of the pneumogastric nerves in the particular mode of death. This I have mentioned in my Report for 1859-60, printed in the Society's Transactions, Volume for 1860, as observed also in other diseases, the congestion of the lung sometimes amounting to splenization, and the redness of the lining of the stomach, sometimes mulberry or claret colour, being generally confined to, or being markedly greatest at its cardiac end. The duodenum was also in some cases much injected. The condition of the liver was such in most of the cases as might be expected in habitual drunkards:—in three it was fatty, in one mottled, in two hypertrophied, and tough in one of these; and congestion was noted in four. The kidneys were congested in four instances, and in one they were degenerated.

Although an Hospital affords a good field for the observation of disease and for ascertaining the effects of particular courses of treatment, yet there are circumstances that tend to render Hospital statistics fallacious. In any large institution, open for the reception of all sick applicants, it cannot be but that some are brought in whom disease has run its course towards a fatal termination, and one must be distrustful of reports on dangerous diseases from such institutions, extending over years, in which, among many admissions, no such cases are shown. And as regards the treatment, the patient may, up to the hour of admission, have been under a totally different mode of it, from that ordinarily pursued in the Hospital to which he is brought; yet the result, whatever that may be, is attributed to the Hospital treatment; or, in the instance of Delirium tremens, a man

may for several days have been delirious, yet may have continued drinking hard up to the time of entering the Hospital, there to die in a few hours of convulsions; while, had he been admitted at the beginning of the disease, he would, in that institution, have been debarred from all spirituous liquors. Besides these sources of fallacy that have to be taken into account, there is one arising from uncertainty or differences of definition of diseases: of this, as applicable to Delirium tremens, I have already made mention, and I have endeavoured to obviate it in the examination of the present series of cases.

The mean time the patients were kept in Hospital was nine days, but that exceeded the mean duration of their treatment, because many being without friends in Bombay to care for them on their being discharged, it was considered necessary to detain them in Hospital, to keep them from being too soon exposed again to the temptations which they would meet in their lodging houses, or taverns.

REMARKS ON SANATORY SUBJECTS, WITH SPECIAL APPLICATION TO MAHABLESHWUR.

By D. GRIERSON, M.D., Deputy Inspector General of Hospitals.

Presented November 1862.

IN the following remarks, it will occur to every one that an attempt is made to combine what is lofty on the one side, with what is mean and low, if not disgusting, on the other. Good taste, it may be thought, would have kept them apart. It has been judged desirable, however, to unite them, because they shed a mutual light on each other, and to obtain this good object, the venturesome navigator has sought to steer his frail bark between the two narrowing whirlpools. The truth is, man presents himself to scrutiny in a two-fold aspect, and whoever would know and serve him well, must study him in both points of view. He is high and he is low. We must follow him, if we can, in his highest spheres of thought, feeling, and of action; nor must we shrink from observing him in his lowest depths. If we scan him in his highest manifestations, we shall fetch from the contemplation something useful for the business of life; if we survey him in his deepest descents, we may be sure that whatever pertains to him cannot be unimportant.

Man springs from the dust and returns to the dust. Man subsists by the use of the atmosphere,—of that substance, which is brine in the sea, vapour in the air, and becomes available as water for his use on the earth, which it reaches only to hurry off to the air or sea again, and of the lower animate and inanimate creatures of the animal and vegetable worlds. These last too came from the earth, and return again to the earth. We have not to do now with the beautiful order, constancy, and precision manifested in these sublime successions of events. We have to do with practical matters. What is a necessity of nature indi-

cates the duty of man. What man voluntarily or involuntarily takes from the earth, that he ought to return to the earth again. Man was taught this lesson also in the primitive commandment delivered to him in the infancy of the race, when it was ordained that he should live by the sweat of his face: that he should dress the earth and keep it. To dress the earth is obviously necessary, in any but the rudest state, that it may give food for man and the domestic animals. But that the earth should yield its increase, it is as necessary that it be kept, as it is imperative that it be dressed. The Hebrew word too, *Shamar*, it may be observed, corresponds with the double sense of the English word keep, not only to guard from external violence, but to conserve from internal loss or decay. To dress the earth is one branch of agriculture, and but one. Another branch, and one not less important, is to keep it. The modes in which the earth may be dressed are various; there is but one mode by which to keep it. This is, to return to it for assimilation with the soil, the waste and effete matters of organization, which vegetables, the food of animals and of man, have abstracted from it. To dress the earth will be vain, if a continual process of exhaustion go on without recourse being had to the necessary duty imposed on man to keep it. Thus, in such a case of negligence, the food of man in a country might cease to be produced, and a peopled, cultivated land become by ignorance, sloth, or unskilled cultivation, unproductive, and desolate. Before this consummation is reached, however, another result of mismanagement will follow. The effete waste of vegetable and animal life misused, misplaced, and neglected, left in accumulated masses on the surface of the earth, instead of being returned to its bosom, is slowly decomposed, and sheds newly formed gaseous products into the air, deleterious, and noxious to life; which, when they produce in their various degrees of concentration, various diseases and death, thin the population, and aggravate the evils of scanty and bad food.

Man's destination was to multiply and fill the earth, which he was appointed to dress and to keep; and we have seen

how this is possible only under certain conditions. In the proceedings, or rather inactivity, of the ignorant and slothful above detailed, these conditions are wholly wanting. And we saw how they necessarily lead, not to increase and extension of population, but to the extermination of it. In the processes of industry alone, as they are connected with the double office of agriculture, that of dressing the earth and that of keeping it, are these conditions to be found. In this matter, than which none can be more important, as in others, it is certain that ignorance, negligence, and sloth, are hurtful to the interests and obstructive to the duties of man, just as, by intelligence, foresight, and activity, man becomes useful, promotes his interest, fulfils his duty, and completes his destiny. Further we see that what is prejudicial in the way of performing his duty and detrimental to his interests, is that which also debases man, corrupts or extinguishes his purer and nobler tastes, familiarizes him, and leaves him in contact with what is foul, unsightly, and noxious; whereas it is his high prerogative that he is endowed with faculties, which, in happier circumstances, procure to him a peculiar delight, when he contemplates the wooded hills, the cultivated plains, the trees, the flowers, the beautiful fruits, which the mind and hand, by intelligence and toil, raise up from the willing fertile earth, and by which she yield subsistence and health to the physical necessities, and recreation and gratification to the moral and mental susceptibilities of man. Is there anything yet to be added to commend this subject to our attention? It is found in the consideration, that with the neglected duties of man and his debased condition, there are associated not only ignorance, sloth, and vice, but disease, suffering, and death, while, on the other hand, where intelligence, industry, and prudence, characterize a people, where a moral and mental elevation obtains sway, there we look not only for prosperity, but a contentment, disquieted only by the ardour of the pursuit of higher achievements and success, a security and enjoyment of life unknown elsewhere, and the study and use of all that promotes perfection of development, bodily energy, mental activity, health, longevity, productiveness,

and happiness. Or will any one say that this is an exaggeration,—a picture rather of what ought to be, than a representation of the reality among any people, which has yet existed to gladden the earth or give extension to the capabilities, and minister to the prosperity and happiness of man? Be it so; then is there the more need that we give deep, thoughtful deliberation to what in the light of reason, to what tried by the test of æsthetic sensibilities, to what brought in contact with our deepest moral emotions, is found to be a subject of profound interest, and to what, compared with the state and duty of man, is clearly matter of very high importance. For if the world has not yet a people, elevated enough above earth and earthly conceptions, to see the truer and nobler way their duty and destiny open up to them—nor wise or tender enough to be allured to the right path by the hope and prospect of a common and bountiful reward, then all the greater obligation rests on us to arouse the supine to activity, to enlighten the ignorant to urge them to acquire knowledge, and animating the selfish with another spirit, impel them to deeds of wisdom and benevolence.

But in order to fulfil the duty which has been indicated—that of returning to the earth the products it yields; when they have become waste or recrementitious, to fertilize the soil, the right management and conservation of these is indispensable. This is a wide and extended subject, which cannot be surveyed even in the briefest manner. There is one special branch of it, however, which lies peculiarly in our way. This is that which concerns the regulation and control of all that is effete, and will prove noxious, if neglected, by pollution of the air which surrounds the habitations of men, whether solitary, or more thinly, or more densely, aggregated. The great sources of evil which require to be looked to, are our latrines, bath-rooms, kitchens, and stables. The application of the principles we have sketched, as respects the management of these necessary yet noxious conveniences will be best seen if we try to bring them to bear on a small scale. For this purpose let us select the mountain

station of Mahableshwur. To begin with isolated houses, we will look first at the kitchen. The floor is clean, the roof black with a varnish of smoke, the wall opposite the door at which you enter, or perhaps some other, has a buttress built up against it like a ship's bunker, and on this, fire-places are ranged; and here may be seen bright fires, pots which should be bright, and the simple nor much varied apparatus of the cook. Pots and dishes may be seen on the floor also, and a lower fire-place fitted for spits; but one corner is destined for another use. There is a small square, built higher than the floor. It slopes to the corner, where an outlet is to be seen. Here are water vessels near it. Here everything is washed, here all waste matter is cast down, or poured out, and all issues from the hole in the corner; and a foul stream and a foul putrescent lake of fœtid, waste matters is spread out or lies concealed in a cesspool at not many feet from the outside wall. Here is an evil, and how is it to be remedied? It seems possible that some receptacle might be used inside, daily removed, cleaned, and replaced, which should serve the purpose of conserving the waste matter and of permitting its being carried to a distance, where it may be useful, or to be buried in some convenient spot. The water of bath-rooms should, in like manner, be conserved, and might be used at once for horticultural uses. Allowed to flow and lodge outside the wall, it is noxious. In respect to latrines, the old plan of a small wicker basket, with a small portion of straw, put into it and placed in a recess in the wall under the seat of the latrine, is most offensive and injurious. Commodes in private families ought universally to supersede, if they have not superseded, such a barbarous practice. For servants, under proper cover a tub sunk in the ground so that the top shall be on a level with the surface of it, dammed with a composition of equal parts of coal tar and dammer, or the pitch of this country, should be used. A covered top affords a standing place with a slit in the middle, to be fitted when the tub is removed by a sliding board, and two iron handles through which a pole passes, to rest on the shoulders, for carrying it, completes the apparatus. But when the house and seat and recess in the wall exist, what

is required is, that a cylindrial bucket, made of iron and dammered as before, of height nearly as great as the seat, with a loose, curved handle lying two inches over the rim should be passed under the seat from without and removed, cleaned, and replaced daily. This will catch, retain, and remove everything offensive, and keep the building and ground perfectly clean. In regard to each one of these places, it is plain that the servants of each house should perform these offices of removal; but a difficulty will be found to arise here, and additional work will be weighed in the balance against old usage, injury, and neglect, and will kick the beam. Custom will be pleaded against innovation. The dissatisfaction which should be expended on the old practices will be transferred to the new proposals, and these will be objected to, negligently set about, or resisted altogether. And men who pretend to philosophy, and delight to trace the relation between effects and their causes will say, "It cannot be denied that there is good in the new movement, and the originator of it is a well-meaning man, but with little discernment withal, and weak-minded." "This is always the way," he will say, "with your enthusiasts and over-zealous reformers. They grasp at too much, and thus lose all. These things should have been gone about quietly, and introduced one by one as men's convictions grew upon them, and constrained them to come over to the right side." Very good, gentle critic. Yours has not been the weary thought to devise or the toil to propose these things. You have had set before you what you are pleased in part at least to approve. Pray be kind to another's failure. And pray be kinder yet, and set about the work, and carry out according to your own exquisite conception of what is expedient, what remains, or is yet wholly to be done. Take this advice and let your practice be guided by it. And we give you an example into the bargain. The bees produce a perfect whole. Was it in their design to do this? They do each but a small part of the whole. We may not say so; but we may say that the whole was in thought somewhere, before the bees translated it into work. Meanwhile opposition, or worse, *non-chalance*, which does not stir the feelings and rouse up partizans,

as opposition does, may be expected ; and therefore it were very desirable that public carts could be kept to go round, at stated times, to stimulate exertion in a common good, by removal of the conserved waste, or conservancy, of each house, and carry it to a proper place of deposit, where it would have a market value, and be available, and most useful, for agriculture. It yet remains to make a remark as to the stable. The waste of the stable will now probably be sought after for use in the fields, and on this account if it bears no higher value, may be removed freely by those who want it, and little nuisance is likely to arise from it : but if it be otherwise, and the removal troublesome, it may be easily burnt—a very profitless expenditure of it. The whole recrementitious waste of the horse, liquid and more solid, both for health and purposes of agriculture, ought to be carefully conserved. Old thatch is to be also carefully burnt or otherwise disposed of.

- Having laid down these principles for private dwellings, the application is not difficult on a larger scale. When bodies of men are aggregated, such as detachments of Horse and Foot, under proper shelter, it seems not unreasonable to think that the vessels or tubs sunk in the ground and level with the surface, designated before for the use of servants, would be readily taken advantage of ; and with due attention to daily cleansing, easily effected, the air would be preserved pure, health entire, and the waste of life would be deposited where it would be useful, or at least not noxious.

In regard to the Bazar, whatever the population, a simple calculation will give a tolerable guide to the requirements of the plan as respects latrines and their accommodation. It may be assumed that the matter to be provided for and removed—I do not speak of street cleanings and offal, but of recrementitious waste matters—the effects of the economy of life of the inhabitants, will amount to a quantity represented by the number of inhabitants multiplied by three and converted into pounds. This amount must be distributed into parts,—some assigned to one place, and some to another, respect being had to females as well

as males, when deliberation is held about the position the latrines ought to occupy, and they should be in pairs, and where the population is most, in order to meet the wants of both sexes. Strong stakes and mats might be used to mark off these enclosures if meant as temporary or experimental, and stone or brick walls, if more permanent. In the interior according to the number of seats intended, smaller divisions would be erected to screen the occupants from each other. These seats are those before alluded to, sunk under the ground and easily removeable by the handles attached.

Wherever the matters deported are deposited, there trenches should be used, and carefully covered daily. After some months this becomes excellent and inoffensive manure. It has not been thought necessary to allude to trenching near the Bazar, or detachments. It is efficient if carefully attended to; and as a temporary expedient, admirable: but the other is considered superior, as affording in case of neglect, an immediate check against the negligent, and as being better in point of prosperity.

The natural wood of Mahableshtar, its decaying leaves, and the ferns, so conspicuous a feature of the hill, might suffer diminution without disadvantage. In some places the view might be improved, in some the access of the breeze would be favoured by the removal of trees: these, if they cannot be made marketable, with the leaves everywhere undergoing a slow decay, and the ferns turned to no account, might be burnt and be productive in Potash. Scarcely any tree has less than 1 per cent., many greatly more, and the ferns, in Europe at least, are exceedingly productive in Potash. Certain tribes of the people practise the art of the manufacture of Potash, and if they were encouraged to produce the kshur, or khur, *i. e.* potash, on the hill, a branch of industry might spring up, an improved aspect characterize the place, and its salubrity be promoted.

But settlers must have privileges. They must have the privilege to live. We have been trying to point out work for them, and to find manure for them; yet something is wanted.

They must have water. At suitable places reservoirs should be formed to provide this inestimable supply. And they must have another privilege. They must have roads for the transport of articles whether of consumption, or of production. And the Government which rises to the conception of its duty in these matters attaches to it the wise and good, who admire and support it, while it reaps the higher glory of scattering, with bountiful hand, benefits amongst the poor.

THE SANITARY CONDITION OF HILL STATIONS, WITH ESPECIAL REFERENCE TO MOUNT ABOO.

By DR. MOORE, in Medical charge Aboo Sanitarium.

WITH STATISTICAL TABLES, COMPILED FROM THE ABOO
SANITARIUM HOSPITAL RECORDS, AND OTHER SOURCES.

Read July and August, 1862.

GENERAL PEEL, as recently as November last, in his speech at the late "Herbert Memorial" meeting at Willis's Rooms, stated—"The British soldier has a right to expect from his Government, that he will be provided with every thing that tends to his comfort when well, and to his recovery when sick."

Medical Officers from the time of Lind—who devoted a short section of his work to the subject—have not ceased to recommend, that Europeans serving in tropical climates should reside in elevated localities, in preference to the plains below.

The credit of establishing the first Sanitary Station in the Himalays would appear to be due to the exertions of the late Superintending Surgeon Gibb, of the Bengal Army, who as early as 1820 was exerting himself in this direction. This officer was ably seconded by Julius Jeffreys, who in 1824 wrote his "Essay on the Climate of the Hill Provinces of the Himalayas." In consequence of this Essay, as Mr. Jeffreys tells us (*The British Soldier in India*, page viii.), the attention of Government was more immediately directed to the subject, and the Military Stations of Simla, Missouri, and Landour, shortly afterwards fixed upon.

The late "Report on the Extent and Nature of the Sanitary Establishments for European Troops in the Bengal, Madras, and Bombay Presidencies" shows that, instead of three, upwards of thirty Sanitary Stations now exist, most of them situated on one or other of the Mountain ranges.

The Report just mentioned is a striking confirmation of the fact that our wise and humane Governments have long acted on the principles enunciated in the quotation above given from General Peel's speech at Willis's Rooms.

The same Report must also be a source of congratulation to those who, like Jeffreys, early in their career devoted themselves to promoting the great Sanitary Improvement of placing European Soldiers in the Hill Ranges of India, instead of the burning plains below. Moreover it is also highly encouraging to others who, recognizing existing defects, may determine to use their best endeavours to bring such matters under consideration.

It will not be questioned that I am justified in holding the opinion that, if the *desirability* of any change affecting the health of the troops *be demonstrated*, such alteration will be ordered by authority.

I purpose in this paper making an attempt to prove that the advantages derivable from the climate of many Indian Hill Stations *are negatived* by the neglect of sanitation in such localities; that preventible or mitigable diseases are much more prevalent on Mountain Ranges than they should be; and that so long as this remains the case, the majority of our Indian Hill Stations can only be regarded as "Retreats from intense heat during the hot months."

It was remarked by Dr. Johnson that "an ignorant man will deny more in a single hour, than one hundred doctors have proved in one hundred years." Were I certain that these remarks would never be perused by any excepting members of the Medical Profession, I might with propriety abstain from mentioning any of the triumphs which Sanitary Science has latterly obtained over the causes of disease. As it is, however, some of those individuals referred to by the great lexicographer may peruse these lines, and hence I cannot refrain from referring to a few of the advantages the world has derived from the adoption of Sanitary measures.

It is far from my intention that the foregoing remarks should apply offensively to even the class indicated. In witnessing the apathy and neglect with which the truths and teachings of Sanitary Science are frequently received, even in the 19th century, feelings "more of sorrow than of anger" must result: sorrow that the public will not submit themselves to our care as regards preventive medicine, in the same manner that they place confidence in our *less certain* curative means. The man who, when sick, takes our medicine without remonstrance, when well, ignores or even treats with contempt our Sanitary regulations. He does not profess to cure disease. Although many are ready and sufficiently capable in their own opinion, to animadvert on the Doctor's conduct—he does not ever attempt to distinguish disease, and yet he practically shows that he imagines he knows more of *its causes* than the person who has made such knowledge the study of a life. Let such remember the line of Horace "*Nec scire fas est omnia.*"

"One science only can one genius fit,
So vast is art, so narrow human wit."

I shall confine myself to an enumeration of a very few among the great advantages which attention to Sanitary matters has from time to time conferred on the human race.

I suppose even the most sceptical will not dare to deny, that many of the laws promulgated by the inspired Moses, were sanitary regulations in their fullest acceptance, intended for the enforcement of cleanliness, and thereby the removal of the causes of disease from the Israelitish camps.

Among these may be mentioned the directions what to eat, and what to avoid (Leviticus, chap. vii., chap. xi.); the purification of women (chap. xii.); the laws concerning leprosy (chap. xiii.); the disposal of excreta (chap. xv.), &c. &c.

Had it not been for such wise regulations, we of the present day, with our knowledge of the epidemics of the middle and later ages, have no difficulty in surmising the diseases which would, in a semi-tropical climate, have decimated the camps of the children of Israel.

Again, we may trace Sanitary regulations, in very many of the religious ceremonies of the people among whom we live. the Mahomedans and Hindoos of the East. Were certain regulations of the above religions nullified, and the general meagre sanitation of European civilization not substituted, the cities of India would become infinitely more prolific in the production of zymotic disease, than is at present the case.

In ancient Rome, the naturally malarious position of the city was only combated by constant attention to sanitary matters. Thus, in consequence of the badness and deficiency of the water, this invaluable and indispensable necessity was obliged to be brought to the inhabitants by means of aqueducts. There were several of these magnificent structures. One brought water upwards of sixty miles; rocks were hewn through; mountains tunneled; and valleys arched for the purpose of carrying out this gigantic design. The water was brought into reservoirs termed "Castella," and from the "castella publica" flushing and cleansing of sewers, houses, and streets was effected, which not only raised the general physical health, but also efficiently contributed to the morality of the community.

The baths also of Rome, during the days of the republic, must have been an immense aid to the general salubrity. At this period we have authentic evidence that these structures, although dark and far from commodious, were used by the "oi polloi" with great benefit. It was not until the days of the Emperors, when the simplicity of structure of the bath began to give place to the "frigidarium," "calidarium," or "balnearium," when effeminacy, and luxuriance, and neglect of Sanitary matters generally, took the place of Spartan denial and simplicity, that the Roman empire began to decline.

It will also be admitted that the Sanitary teachings of Lycurgus must have had great effect in inducing the general healthy constitution of the people amongst whom he lived.

Again in later times, what except Sanitary regulations, destroyed the jail fever, which in the last century ravaged our

prisons and was frequently conveyed from the criminals to the jury and judge who tried their cases ?

The almost entire extermination of scurvy and dysentery in England is one of the most striking facts in Sanitary Science. In the 17th century, the annual number of deaths from dysentery and bowel complaints fluctuated from 1,000 to 2,000. Now the Registrar General's reports show that the same diseases kill from 20 to 100 annually !

In former days ague and malarious fevers were prevalent in Great Britain ; now, owing to an universal system of drainage and proper cultivation, these diseases, excepting in a few isolated districts, have become unknown.

"Batavia" for some time past has ceased to deserve the name of "the grave of Europeans," the part of the city built on alluvial soil has been almost deserted as a residence by the Dutch, who now live on higher ground.

In "Sierra Leone," on the east side of which lies a large undrained marsh, an improvement of the great general unhealthiness has been attained by the introduction of better water for drinking, in iron tubes from the heights above.

"Arica" on the coast of Peru, situated in the desert, used formerly to become a dangerous abode after the overflow of a small river in the vicinity, but has now been rendered healthy by preventing that taking place.

"Acapulco" on the coast of Mexico, has been rendered more healthy by cutting through a mountain and obtaining a freer draught of air, whereby the drying of the soil has been promoted.

Before the marsh of Chatreuse was thoroughly drained, malarious fever in one year killed 8,000 persons in the immediate neighbourhood.

What was it excepting the general want of Sanitary regulations, which in the early period of the Crimean war, caused the decimation of an army and the lamentations of a nation ? and what but Sanitary regulations enabled us to contrast the health of

the British army, during the latter period of the same campaign *favourably* with legions employed on garrison duty at home.

Again in the late China war, Sanitary Art enabled us to show "the almost unparalleled spectacle of an army moving rapidly in an enemy's country, and that country the sea-coast of a semi-tropical district, in the highest condition of health, and therefore efficiency : the soldiers' health being equal to the highest rate of the civilian at home."

Were it needful, numbers of localities in India might be mentioned where sanitation has done much towards turning an unhealthy locality into a salubrious one, or towards rendering the latter still more conducive to health.

There are scarcely any localities where, both on account of the peculiarities of the climate, and the particular conformation of the surface of the ground, Sanitary regulations are *more demanded*, than in Indian Hill Stations. Neither are there any sites where such requirements may be effectually carried out with greater facility.

As an illustration of these remarks the all-important subject of drainage may be adduced. Mountain ranges are composed of rocks in the hollows and valleys of which, disintegration and decay of vegetable products have caused deposits of rich soil of a very porous description. The water percolating through this sponge-like mass, lodges in the cavities of the rock. For fluid so lodging there is *no escape* by drainage, and hence under the influence of a hot sun,—as is the case on the plains—the occurrence of paroxysmal fever demonstrates the formation of malaria.

Of course if the geological formation presents those conditions—among which a large proportion of ferruginous hornblende appears the chief—which are now known from experience to be inseparably connected with malarious disease ; then, as is shown by Dr. Hyne ("On the Hill Fevers of the South of India") the paroxysmal demonstrations will become doubly violent, from the presence of an additional cause.

Hence it is necessary, as a sanitary measure, to avoid mountain ranges containing ferruginous rocks, and to institute a thorough system of drainage in other localities, in the carrying out of both which requisites much difficulty need not arise.

To allow the water to lodge in hollows, and to saturate the soil without any attempt to cut channels down the natural slope of the ground for its speedy flow, is to court that disease which experience has so frequently shown is the certain sequel of all drying marshes. That height alone, unless indeed we pass near the range of eternal frost and snow, will prevent the formation of malaria is not a tenable idea. The causes of paroxysmal fever evidenced by the mild type of the disease, are certainly less intense on mountain ranges, but that malaria is there formed is sufficiently demonstrated by the following tables on malarious fever. The reasons for its being less active in its nature are to be sought for in the smaller amount of evaporating surface which an undulating range presents and in the natural drainage which the formation of the ground necessitates, *for while such formation prevents drainage from a lower stratum, it facilitates fluid exit from the surface.*

Broadly speaking, the climate of mountain ranges may be said to differ from that of the plains in having a mean temperature, some ten to twelve degrees cooler than the latter; in being above the range of the hot winds, and in the greater damp which exists during the monsoon season.

In a cold climate such as England, where decomposition is retarded by the low atmospheric range, and by the frosts and cold of the winter season, the value of sanitary measures has been over and over again demonstrated.

Under the action of a tropical sun decomposition goes on "*viâ sicca*," and excepting in the confinement of sewers and cesspools, where the same process does not take place, the products of such decomposition are by no means so injurious as those which result from decay "*viâ humidâ*." Indeed, as Mr. Low states (Medico-Historical Narrative of the B. Company

Madras Engineers, 1857-8), under the full glare of a tropical sun the "*bodies of animals dry up like mummies, no decomposition taking place.*"

Hence we find that both the cold of a temperate clime and the intense heat of a tropical sun, are made by a Merciful Providence subservient to the health of man.

When however, man, for his own convenience ascends the mountains of tropical and semi-tropical regions, he finds that such preventives of disease do not obtain with equal force. He finds that *there is neither the cold of the temperate region, or the intense heat of the equatorial zones retarding the progress of decomposition*, or the preparations of disease, to nearly the same extent which exists in other localities.

Hence I ventured to state, that Sanitary measures are even more demanded on Indian Hill stations than on the plains, and under this particular head, Conservancy holds an important place, and

"Tho' low, the subject still demands our care."

Although the composition of the atmosphere has been, over and over again, demonstrated to be the same, whether such air be taken from the summit of mountains or the centre of cities, excepting the small quantity of sulphuric or sulphurous acids which exist in the latter (the products of the oxidation of sulphur from burning coals), still it must be recollected, that *air like water may be soiled.*

It is not difficult to prove that animal and vegetable matter, during a state of decomposition disengages from its surface portions of its substance of sufficient tenuity to be invisible, and to remain suspended in the air. Without referring to offensive smells which of course are material, we have other sufficiently strong and satisfactory proofs. If a glass be inverted over decaying matter, its inner surface becomes covered with microscopic fungi, the same description of which are found also in the glutinous drops depending from the roofs of sewers, which must have been derived from the air of the receptacle. Again,

milk turns sour if exposed to putrid exhalations: butchers cannot successfully kill meat near a stinking gully; and flesh will not "keep" in a moist, cloudy atmosphere, which is most retentive of organic impurities. Again, the fact that sulphuric acid becomes dark colored, on passing impure air through that fluid, sufficiently demonstrates the large amount of organic matter which the air contains, and the acid chars.

Also Dr. Angus Smith's ("On the Air of Towns") now well known experiments of passing air through a solution of *Permanganate* of Potash (the strength of which had been previously determined by its power of decomposing oxalic acid), demonstrates that the same quantity of the *Permanganate* which was decolorized by one bottle of air obtained in a close court in Manchester required twenty-two bottles to decolorize it on the hills in the neighbourhood!

Those who are conversant with the physiology of respiration, and understand the process of the decarbonization of the blood, which takes place in the vesicular structure of the lungs are well aware of the danger of a sudden, or constant absorption of such atmosphere. Those who are ignorant of the anatomy, physiology, and chemistry of respiration, can only deduct from analogy; but all are more or less aware of the effects which follows the inhalation of chloroform; of carbonic acid gas from burning charcoal; of the aroma of wine in large vaults, and of the deadly results from concentrated sewer gas.

The public however are not aware, or rather perversely remain apathetic about the effects of diluted sewer emanations, or of tainted atmosphere arising from putrifying organic matter. Such emanations will not only destroy life immediately, but, as Dr. Letheby states, will, when mixed with common air, cause asphyxia and narcotism: in smaller quantities will induce nausea, delirium, and general insensibility; and in still further dilution cause general prostration of vital powers; failure of appetite; *diarrhæa* of a chronic character; *exhaustion*, and *low fever*. The latter, let it be remarked, are the very symptoms of *Hill Diarrhæa*.

The history of the Mahammurree, or Indian Plague, which formerly ravaged the Himmalayas, from the Snowy-Range downwards, affords an example of what will arise from defective sanitation, and Hygiene on Indian Mountain Ranges, and also a striking instance of the success of preventive measures in arresting the progress of epidemic disease.

Without attaching undue importance to the septic theory of disease or venturing to ascribe the occurrence of any particular malady to any peculiar decomposition, there is ample evidence that dirt and filth, particularly the "slow rottenness of decaying excrement" not only acts insidiously and injuriously on the constitution, but also affords a "local habitation" to those mysterious atmospheric, or electric changes, which so frequently precede or accompany epidemic disease. As Mr. Simon (The Fifth Annual Report to the Commissioners of Sewers) wrote—"Through the unpolluted atmosphere of cleanly districts it migrates without a blow: that which it can kindle into *poison* lies not there. To the foul damp breath of low-lying cities it comes like a spark to powder. Here is contained that which it can swiftly make destructive, soaked into soil,—stagnant in water—griming the pavement—tainting the air—the slow rottenness of unremoved excrement, to which the first contact of this foreign ferment brings the occasion of changing into new and more deadly combinations."

The researches of the late Dr. Snow; of Pettenkofer of Munich; of Thiersch of Berlin; of Dr. Bidie of the Madras Service; of Dr. Acland of Oxford; and others, incontestably demonstrate that one at least, of the modes in which cholera is propagated, is by the choleraic discharge, either through the medium of water, or otherwise.

Dr. Budd (*Lancet*, July 23, 1859) states "like malignant cholera, dysentery, yellow fever, and other diseases which could be named, Typhus is one of the great group of diseases which infect the ground;" and Mr. Simon (*Times*, June 17th, 1861) endorses this assertion.

Pettenkofer (Investigations into the Propagation of Cholera, 1855) entertains the opinion that cholera never prevails epidemically on rock, and explains this supposed fact on the ground that excrement cannot penetrate the soil, and that the rock neither takes or gives off moisture. If this be true, as we have every reason to suppose, it accounts for the exemption from cholera which some of our Indian Hill Stations have afforded, and it likewise illustrates the occurrence of the disease after a continued occupation of the place, after excrement has been allowed to accumulate "stratum super stratum" on the surface of the soil. As Mr. Mackay forcibly writes (Sanitary state of Ootacamund, *Madras Journal Med. Science*, Vol. 5. 1861.) "Every convenient bush is made use of to deposit filth under....." "Should the preparations for its (Cholera) reception continue, in the way of a disregard of all sanitary arrangements, there is every reason to fear that cholera will some day exhibit its virulence on the Neilgherries as it has done in other temperate climes." Prophetic words! but, like Cassandra's voice unheeded! The *Neilgherry Star* of November 13, 1861 reports—"Another case of cholera terminated fatally in the Dispensary last Wednesday. The dreadful disease has now unmistakably made its appearance among us!!"

We have already seen the ravages which the "Mahammurree" or Indian Plague has committed on the Himmalayas—a disease which appears to be closely allied to Typhus fever in its most prominent characteristics: and by a continued delay in attending, *most scrupulously* to the conservancy of our mountain stations, *a generation will not pass away before we shall have to record the epidemic prevalence of other zymotic diseases with even greater violence than is at present the case.*

I shall now proceed to give a few extracts from published reports, &c. showing the present sanitary condition of some of the Hill Sanitaria and their buildings.

According to Mr. Grant (*Indian Annals, Med. Science*, 1852), "nothing could be worse than the state of the conservancy at "Simla." He describes the smells along all the by-paths as being

"most disgusting, from accumulations of human ordure, offal, and dead animals in the numerous deep, close ravines that intersect the Station": in fact a native population amounting to 10 or 12 thousand people were scarcely restrained by any police rules, and hence an amount of nuisance scarcely credible.

That the sanitary condition of Simla is not much improved in the year of Grace 1862, is evident from the subjoined information afforded me by Assistant Surgeon J. J. Clarke, now in medical charge.

Dr. Clarke writes (10th Jan. 1862). "The native bazaar is built of tiers of houses on the south side of the Hill, and cuts the station of Simla in two, with about the same number of European houses on the eastern as on the western side of it. Its main street which is a thoroughfare, and the high road from Chota Simla to Boileau Gunj is kept clean, and is drained by the means of open drains which flank it on either side. Its lower streets are for the most part filthy; badly drained and with no well adapted means for clearance. It is densely populated, and the nuisances of this large population are allowed to ooze and dribble forth of themselves, finding their way into the several nullahs which run down the side of the hill. So that in truth the whole filth of this extensive bazaar lies hoarded in these several cesspools during the hot season until the rains, impregnating the air with emanations most detrimental to health."

"There is no Conservancy office here, and neither the local nor municipal authorities appear to have instituted any measures for providing for a complete system of drainage."

"If in years past the welfare of the European community had been duly considered, some authority or other might have prevented the growth of the bazaar to such an enormous and unnecessary extent. It is now a great central evil militating against the sanitation of the station, and instead of being, as it should be, a clean, regularly built native city, with only a sufficient number of shop-keepers and servants, to minister

“to the wants of health-seeking Europeans, with suitable measures adopted for its clearance and drainage, it is an irregularly built, unsightly collection of houses ;—a bazaar, in fact, many times longer than need be,—harbouring the lowest dregs of native society ; and radiating from it, in all directions, are drains and cesspools, offensive and filthy to a degree.

Dr. Mackay (*Madras Journal Med. Science*, Vol. 5, 1861), reports of Ootacamund. “The station is divided by a deep valley, a large portion of which is filled with water forming a lake. At the upper extremity of this the large station bazaar is situated : the houses there are crowded together—those in the lower street are built close to the water, many of them on a foundation formed by the rubbish thrown out from the houses above, and the filth washed down by the rains from the upper street. With every natural facility for doing it effectually, drainage has been totally neglected, not only in the bazaar, but throughout the whole station. It will hardly be believed that undrained swamps still intersect this important sanitarium. The invalid may shoot snipe in some of those without leaving the compound of his house. Some of the best houses are built on these swamps, some over them, and not a few on a lower level than the swamp itself. The potato cultivation, the noxious weeds, nettles, brambles, giant thistles and lobelias are described as most luxuriant and objectionable. In short the whole station is a strange mixture of neglected compounds, bogs, and neat flower gardens. Every convenient bush is made use of to deposit filth under of every description. The sweepings and refuse of each dwelling are thrown where they can be conveniently disposed of. It is argued that the station has been healthy ; that such things are better left as they are, and that no injurious consequences can result in this region !”

It has already been demonstrated in this paper that such a region, partaking of both temperate and tropical climates, is just the locality where the most fearful diseases of both climes meet!

It has already been shown that Dr. Mackay's prophetic voice, "That should the preparations for the reception of Cholera continue; in the way of a disregard of all sanitary arrangements, there is every reason to fear that Cholera will some day exhibit its virulence on the Neilgherries," has already come true!

When this is the condition of our principal Hill Sanitaria—only so in name—no wonder that Dr. Mackinnon, Deputy Inspector General of Hospitals, should remark—"Of late years Simla has rather retrograded in public opinion as a Sanitarium." (Report on the Extent and Nature of Sanitary Establishments for European Troops, p. 73.)

Of Nynee Tal it is stated—"The Aya Palta side of the lake is dreadfully damp: hundreds of trees might be felled with advantage to those who live on that side. A place so shut in by nature, as is Nynee Tal, requires no superabundance of trees, and still less of jungle, to make it unhealthy, and those who have passed a rainy season there can hardly forget the one drawback to a residence in that beautiful spot; the cold damp smell that arises before sunset, and continues throughout the night, which a dozen sharp hatchets might remove in a short time." (Kumaon and its Hill Stations, *Calcutta Review*, June 1856).

A later writer—(*Times of India*, Sept. 7th, 1861), states of the same station—"Let the brushwood and jungle be cleared away, leaving only so much timber as is necessary for fire-wood, and for scenery. If any one doubts how unhealthy Nynee Tal is becoming, let him go into the grave-yard, and count the number of new graves, and then let him go into the soldiers' hospital and see the pale yellow faces of men in whom hope has died away, who are rather worse than when they came up..... Another great nuisance of Nynee Tal I have alluded to, I mean the rank state of the weeds in the lake, and the jungle round the lake. To walk round the lake on the lower mall is quite enough to give a weak man a dangerous fever, so great is the malaria."

Of Ootacamund again, it is written in the *Neilherry Star*, November 13, 1861—"Let any one reflect for an instant what "must be the state of the upper portion of the lake. We know "not what may be the exact population of the Bazaar, but we "should certainly estimate it at upwards of 2,000. What effect "then must be produced by the dirt, refuse, and filth, of this "large number of human beings cast daily into the head of the "lake. Let any one compare the water of this part with that "where the lake overflows the lower bund, and empties itself. "The one will be found filthy in the extreme, the other quite "clear. The lake is our filter. We cast in our dirt at the top, "and draw off the clear water at the bottom. The only unfortunate part of it being, that the clear water goes from us while "the filth remains to poison the lake and breed disease."

The Hills describes Darjeeling as a "dismal hole," subject to fever "on the spot." Small-pox is stated to be there an indigenous disease, and is described by Dr. Collins as the scourge of these Hills. It may be recollected that Miss Nightingale, at page 19 of her "Notes on Nursing," while dissenting from the doctrine that a disease having once originated is handed down from one generation to the other, declares that she has *seen and smelt* variola forming in various localities, the abodes of filth, and destitute of sanitary arrangements.

Of Dugshai, Dr. Bradshaw writes (9th January 1862).—"There are two barracks for married men, each intended for "30 families. They are at the south-western corner of the "station, and separated by the parade ground from the other "station buildings. Their positions are very good indeed, but "the plan upon which they are built is remarkable for its want "or defiance of common sense. Each barrack is the ordinary "ugly barn surrounded with a verandah, and divided lengthwise in the interior, by a long tunnel-like passage, which "communicates with the verandah at each end, and on each "side by two narrow passages. In this tunnel are six fire "places, and into it open the doors of all the rooms. These "rooms are small, incompletely divided one from the other,

"by make-shift partitions, and insufficiently lighted. The women use the fire-places for cooking and other purposes, and ordinarily the passage is quite dark from smoke, and unpleasant from culinary odours."

"These quarters may not be unhealthy owing to the counter-acting healthy climate, but their arrangement certainly is most defective. None of the rooms communicate directly with the verandah, and this is closed at each end by rails. Imagine 30 families in a house with only four narrow passages as outlets. Should a fire occur, the inmates would almost certainly lose everything, and even life might be endangered before exit could be made. Besides, from the smallness of the rooms, absence of opening in the roof for ventilation, and the close, narrow, middle passage, the houses can hardly be other-wise than unhealthy, or deserving of any other name than kennels, or other fate than being pulled down and rebuilt."

Dr. Mackinnon, reports of the Hospital at "Dugshai" that it is "so dark and gloomy that its effect on the sick cannot be otherwise than unfavorable." (*Report on Sanitary Establishments*, p. 71.)

All the sanitary defects which have been noticed as existing at other places, are present on Mount Aboo. Holes and pits abound in the station. Marshy spots radiate from the centre to any extent. Drainage is almost unknown. Deciduous vegetation arises and decays, with but little check on its progress: there is no one endowed with magisterial powers resident during the whole year; *and there is not, nor ever has been, a single public scavenger employed for the station!*

Public latrines also are much required. In consequence of their absence the natives use the ravines and bushes as their temples of Cloaca, and the refuse of the bazaars accumulates somewhere in the immediate neighbourhood. Until latterly also every house had its dunghill attached, but these having been made the subject of complaint have now generally been removed.

With regard to the Aboo public buildings little commendatory can be stated. The barracks are situated in one of the lowest and most malarious valleys in the place, on an oozy, porous soil, overhung by rocks 1,000 feet high, and communicating with the miasmatic lake by two ravines. In order to add to the unhealthiness inherent in the site, the buildings have been built gable end on to the prevailing breeze! And with what would appear a desire to do things opposite to the requirements of health, the latrines, wash-houses, and urinals of No. 1 Barrack have been placed directly to windward of the latter building!

It is, however, an ungrateful task to chronicle the sanitary defects existing in the various Hill Stations. Enough has been stated to demonstrate that these matters call loudly for reform; otherwise faults might be referred to as persistent at Murree, Subathoo, Kussowlie, and other places. (See "Report on the Extent and Nature of Sanitary Establishments for European Troops.")

It therefore affords pleasure to bring forward an instance of a Hill Station which has some pretensions to be a SANITARIUM.

Dr. Sparrow writes to me from Landour (Jan. 6, 1862)—"From the natural position of Landour, being on the summit of a long ridge with abrupt declivities on either side, water runs off freely into the nullahs, about a thousand feet below the hill: it is but thinly wooded: there is scarcely any underwood. During the rainy season an extra conservancy establishment is entertained. To my belief there is not a better drained or cleaner station in India. The bazaar is well kept, well drained, and clean; this is owing, in my opinion, to the fact of its being under military and not *civil* control.

Doubtless any person who takes the trouble to read the foregoing remarks, and descriptions of sanitary defects, will be lost in amazement and conjecture why matters so self-evidently destructive to health are allowed to continue, and especially in picked localities having the name of Sanitaria. The reason however, just stated in Dr. Sparrow's communication, affords the

explanation why many of the sanitary stations are in so unhealthy a condition.

A number of our Hill Stations are the resort of civilians, officers in civil employ, and others, during the hot season, and in some instances during the rains also, and are under Political or Civil control. During the hot months the causes of disease—as is the case on the plains—are not so rife as in the cold season. Before the former period marshy spots have become dry, vegetation has decayed, or been eaten by foraging bullocks or goats, and the greater power of the sun scorches and dries up ordure and excrement—certainly to a much smaller extent than is the case on the plains but still sufficient to prevent, in a great measure, that decomposition “*viá humidá*” which takes place during the cold season, and immediately after the rains.

Thus, individuals making Hill Stations a residence during the hot weather only, cannot fully appreciate those causes of disease which are in existence at a different period. Such persons arriving from the heated plains into a temperature some 10 or 12 degrees lower; finding themselves free from the plagues of heat, flies, and mosquitoes; getting refreshing sleep at night; and able to take exercise during the day, imagine the change delightful, and the place, in comparison with the plains, a “perfect Paradise.” They see at this season little disease present; they imagine it is always the same; or, if told otherwise, they congratulate themselves that *they* will not be “*here*” during the unhealthy period.

It cannot be expected that the establishment of servants as scavengers, &c. attached to any body of military which may be present at a Sanitary station, should keep the whole locality clean and in good order. Neither can it be expected that Government should pay for this necessary work being done. The great majority of individuals who resort to Hill stations do so for their own pleasure and amusement, either to escape the heat of the plains or for a change of scene and society, and it is by such temporary residents, or by those who make a profit of letting houses to such visitors, that the expenses of sanitation should be

paid. At the same time sick officers—at all events not in receipt of a certain monthly pay—might be exempted from the tax.

Until something of this kind is effected, those sanitary stations, where civilians and military are both located, and where the former have magisterial power, will only be Sanitariums by name. The former during their short stay heap dirt “stratum super stratum” for the benefit(?) of the latter, during the cold and damp season; their brief residence renders them indifferent to drainage or any other sanitary regulation; and as I stated in a certain official communication on the subject,—“it is of little use to keep the neighbourhood of the Barracks and Hospital in a satisfactory sanitary condition, if the inhabitants of those buildings are exposed to the causes of disease, when they walk abroad, or have them wafted to them as they sit or sleep at home.”

Dr. Mackay in his description of the “Sanitary Condition of Ootacamund” already referred to, states that, “it is argued such has always been the case, that it is better to leave such matters alone, that no evil can possibly result in such a climate!” I also have heard much the same argument used with regard to Mount Aboo, and can only remark “*Ignorantia facti excusat.*”

When one gentleman exclaims—“Such has always been the case;” another, “These doctors are always bothering about Sanitary Reform;” a third, “Why should I clean my compound when I am only here for a few months?” a fourth, “Wait till the rains and all the dirt will be washed away;” a fifth, that the abandoned commencement of a well being filled with débris is no nuisance; a sixth (ignoring the fact that each year the place becomes dirtier), “How do you think we managed to enjoy such good health before all this fuss about Sanitary Reform?” When these expressions constitute the feelings of a community on such matters, nothing but *orders* from superior authority will cause an alteration; nothing but orders will place the inhabitants of such a locality on a level, as regards sanitation, with the Israelites of

old, who, under the Mosaic Law, were obliged to remove and bury their excreta.

Either there is truth in the teachings of Sanitary Art, or there is no truth. If there be no truth; if the teachings of Hygiene are fictions; if physiological laws are the day-dreams of a speculative philosophy;—then let our Sanitary Stations remain as they are. If, however, Sanitary Art leads to vigour of health and intellect, to economy of life, and therefore, of the State exchequer, then let us have our Hill Sanitaria made Sanitaria in every sense of the word.

The establishment of a thorough system of sanitation in Hill Stations is sufficiently easy. Let a couple of hundred prisoners from one of the crowded jails on the plains, with a few sepoy as a guard, be brought up the hill: let them first hut themselves, and afterwards set to work, cleaning away vegetation, making drains, building bunds to tanks, enlarging roads, &c. &c. Afterwards let a tax be levied *by authority* on each landlord or tenant—exempting of course the Military on duty, and officers present on sick certificate. Let the proceeds of this tax be spent in keeping in repair what the prisoners have effected, and in the maintainance of a public conservancy and clearing establishment. Let the Medical, as (by Regulations for the Medical Officers of the Army, para. 22, p. 681) is now the case in all cantonments in the plains, be the ex-officio Sanitary Officer, with certain well-defined powers. Let some such plan as this be carried out, and our Hill Stations will then be Sanitaria all the year round, instead of being, as many of them now are, simply refuges from heat during the hot months of the year.

What appears to have been done for the town and cantonment of Kurrachee may be easily effected for our Hill Stations. Dr. Grierson in his Report on Cholera in Sind during 1861 (read at the Meeting of the Bombay Medical and Physical Society held in December last) states—“The regularly paid, well-fed troops suffered but little. The other inhabitants comparatively little. For in these stations, and others to some extent, Hygiene has not been unknown. It is due to Sir Bartle Frere, K.C.B.

“to state, that in Kurrachee first, and afterwards elsewhere, he originated changes and improvements in this direction, which only require extension, improvement, and supervision, to give Sind a character for excellence in this respect, and to protect in a great measure its inhabitants from the ill effects of epidemic states of the air. Not simply the removal of refuse, offal, waste, filth of all descriptions is insisted on, but the disposal of all noxious matters by inhumation and incremation in furnaces constitutes the peculiar features of the Hygienic measures adopted in the Province.”

The following Tables relate to the Statistics of Disease on Mount Aboo during the last five or six years.

I. ALL DISEASES.

A. ANNUAL SICKNESS AND MORTALITY.

TABLE I.—*Exhibiting the Annual Sickness and Mortality from all Diseases among the Convalescents and Men at the Aboo Sanitarium, during 1855, 1856, 1857, 1858, 1859, 1860.*

Years.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of		
				Admissions to Strength.	Deaths to Strength.	Deaths to Admissions
1855	87·33	254	..	2908·57		
1856	80·25	231	..	2878·50		
1857	67·83	164	1	2417·97	14·75	6·09
1858	120·75	408	3	3378·88	24·84	7·35
1859	145·91	258	4	1768·21	27·48	15·54
1860	139·91	177	5	1265·74	35·74	28·19
1855 to 60	642 *	1,493	13	2323·98	20·24	8·71

* Decimals rejected to facilitate future calculations.

We learn from this table that the *maximum* sickness to strength took place in 1858, when it reached 3378·88 per 1,000; the *minimum* occurred in 1860, when 1265·74 per 1,000 came under treatment, whilst the average annual ratio during the six years ending 1860, positively reached 2323·98 in the thousand. This ratio would have stood still higher, if the entire strength of 642 had consisted of convalescents only: at least 240 of this number were effective soldiers stationed on Aboo, on Detachment or Garrison duty. The mortality to strength amounted to 20·24 per thousand. Of the 13 deaths noted in the table—

1	took place from	Carditis	in	1857
2	"	"	Variola	} 1858
1	"	"	Sun-stroke	
1	"	"	Remittent	} 1859
1	"	"	Peritonitis	
1	"	"	Acute Dysentery	
1	"	"	Phrenitis	} 1860
1	"	"	Carditis	
1	"	"	Hepatitis ch.	
2	"	"	Phthisis	
1	"	"	Syphilis	

Whilst the *mortality* is smaller than at any of the Sanitaria in the Himalayas, *the sickness is greater*; the former perhaps because more judgment has been exercised in the selection of men suffering rather from functional than organic disease in important viscera: the latter because the site of the Aboo Barraeks is unquestionably bad, and has not been improved by sanitary art. Also because the whole station is destitute of thorough drainage; contains numbers of holes for the accumulation of filth; is never sufficiently cleared of deciduous vegetation; presents at the margins of the "Mukkee Talao," a large evaporating surface; and *never has had a single public scavenger attached*.

The difference between the sickness and mortality on Mount Aboo, and at Himalayan stations is illustrated in

TABLE II.

Stations.	Periods of observation.	Ratio per 1,000 of		Height above the level of the Sea.
		Admissions to Strength.	Deaths to Strength	
* Rawul Pindee.	6 years ending 1854-55	1820·0	27·6	
* Dughshai. . .	5 „ 1854-55	1772·8	29·8	6,000
† Kussowlee. . .	11 „ 1854-55	1658·6	41·2	6,400
† Subathoo. . .	11 „ 1854-55	1788·6	59·1	4,000
Mount Aboo. . .	6 „ 1860	2323·98	20·24	4,500

It has been remarked by Mr. Murray ‡ and others that those Hill Stations which are inter-tropical, are much more exempted from disease, than are the Himalayan Sanitaria. The above table does not endorse this idea. It shows that disease of the zymotic character (which it will be presently shown constitutes nearly the whole of the admissions) is much more prevalent at Mount Aboo than in the Himalayas : but at the same time, it also demonstrates that such disease is of a less intense type, has a less fatal termination, and therefore would appear to be more amenable to *Sanitary Regulations*.

* *Vide Ewart's Vital Statistics of the Indian Armies*, p. 15.

† The year 1849-50 not included.

‡ *Practical Observations on the Nature and Effects of Hill Climates*. Trans. Bombay Med. and Phys. Society, 1844.

B. SICKNESS AND MORTALITY DURING TWO PERIODS.

TABLE III.—*Exhibiting the Sickness and Mortality from all Diseases among the Convalescents and Men of the Aboo Sanitarium during two distinct triennial periods.*

Periods.	Admissions.	Strength.	Deaths.	Ratio per 1,000 of		
				Admissions to Strength.	Deaths to Strength.	Deaths to Admissions.
1855 to 1857	649	236	1	2750·0	4·23	1·54
1858 to 1860	843	406	12	2076·35	29·55	14·23

Down to the end of 1857 the strength was constituted almost exclusively of convalescents despatched from the stations of Deesa and Ahmedabad in Gujarat, and of Neemuch and Nusseerabad in Rajpootana; but from 1858 to the end of 1860, the strength has been augmented by including an effective European Company of 80 men, a fact which should be borne in mind in accounting for the manifest diminution of general sickness during this, as compared with the former period. The *mortality* was very high during 1858-60. A large portion of this period was marked by disturbances and uncertainty throughout Gujarat and Rajpootana, and from whatever cause, the cases do not appear to have been so carefully selected as during the three years ending 1857.

C. EFFECT OF SEASON ON THE SICKNESS AND MORTALITY.

TABLE IV.—*Exhibiting the effect of Season upon the Sickness and Mortality from all Diseases, among the Convalescents and Men at the Aboo Sanitarium, arranged according to Months and Quarters.*

Months and Quarters.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of		Months and Quarters.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of	
				Admissions to Strength.	Deaths to Strength.					Admissions to Strength.	Deaths to Strength.
6 Januarys.	508	75	1	147·6	1·9	6 Julys.	763	129	1	169·0	1·3
6 Februarys.	385	56	1	145·4	2·5	6 Augusts.	720	113	..	156·9	..
6 Marchs.	470	82	2	174·4	4·2	6 Septembers.	731	127	..	173·7	..
6 Quarters.	454	213	4	469·1	8·8	6 Quarters.	733	369	1	500·0	1·3
6 Aprils.	792	94	..	118·6		6 Octobers.	685	196	1	286·1	1·4
6 Mays.	831	124	5	149·1	6·0	6 Novembers.	561	241	1	429·6	1·7
6 Junes.	798	133	..	166·6		6 Decembers.	439	124	1	282·4	2·2
6 Quarters.	807	351	5	434·9	6·1	6 Quarters.	562	561	3	998·2	5·0

April thus appears the healthiest month, and November the unhealthiest month of the year. During the quarter commencing April, the ratio of admissions per 1,000 of strength amounted to 434·9. But during the quarter embracing October, November, and December, it reached the high figure of 998·2. Nearly the whole of the men at the Sanitarium passed through Hospital in this quarter from (as will be demonstrated by and by) the same diseases that fill the Regimental Hospitals on the plains at this season. There is more sickness experienced during the quarter ending December, than during the half year from January to June.

We now leave the subject of the sickness and mortality of all diseases, and exhibit the annual average prevalence of malarious fevers, and the influence of season on the same diseases.

II.—FEVERS.

D. ANNUAL AVERAGE PREVALENCE OF MALARIOUS FEVERS.*

TABLE V.—*Exhibiting the Sickness and Mortality from Malarious Fevers among the Convalescents and Men at the Aboo Sanitarium, during the Six years ending 1860.*

Periods.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of		
				Admissions to Strength	Deaths to Strength.	Deaths to Admissions.
1855 to 1860	642	785	1	1,222·74	1·55	1·27

Thus 1,000 men have supplied 1222·74 fever admissions to the Hospital! But the mortality has only reached 1·55 in the thousand—a very low rate indeed. This shows that the type must have been mild and manageable, as is at present the case.

In a Paper headed “Remarks on the proposed site for new Barracks and Hospital at Mount Aboo,” and also in my “Annual Report of the Sanitarium for 1861,” I mentioned the fact that men suffering from intermittent fever contracted in the valley where the Barracks are located, on being brought to the more elevated site of the Hospital, do not generally suffer from above two or three recurrences of the paroxysm, whatever is the treatment adopted.

It is reported that M. Levy at the Military Hospital at Lille, treated most of his patients suffering from intermittent fever with water labelled *Protoxide of Hydrogen*, and that in these patients, removed from the malarious locality, where they had contracted the disease, the paludal manifestations quickly declined. Something of this is the case in the present Aboo Sanitarium Hospital, which fact speaks volumes for the salubrity of the site, now the immediate locality is kept scrupulously clean.

It may probably be the mild type of fever which exists on Aboo, which allowed my fever patients to progress most favourably when treated with nitric acid instead of quinine. An American Physician in 1854 (*Western Lancet*) first recommended

this acid as an anti-periodic, and stated that its action was that of a strong decarbonizing agent, contributing to the oxidation of the venous blood. This gentleman likewise asserted, that while other periodics act on the nerves, nitric acid attacks the "fons et origo mali" the blood, and thus is a primary agent.

Dr. Robert Hunt (*Med. Times*, Feb. 9, 1861) also recommends nitric acid as a remedy, but contends that an excess of alkali in the blood predisposes the system to disease: that it causes various changes in the system which result in the generation or retention of noxious matter: and that the acid neutralizes this alkaline condition.

However this may be, my experience of the remedy enables me to state, that although like quinine and arsenic—sometimes failing altogether, still nitric acid is frequently of great efficacy, and a valuable addition to our list of anti-periodics. The strong acid in doses of 10 to 12, or 15 drops, three times a day, should be administered in a sufficient quantity of water.

The great frequency of malarious fevers, and the small proportion of mortality therefrom, among the convalescents and men at the Aboo Sanitarium, as compared with the averages of the three Anglo-Indian Armies during the most recent periods available, is well demonstrated in the following:—

TABLE VI.*—*Exhibiting the Sickness and Mortality from Malarious Fevers among the Men of the three Anglo-Indian Armies during recent periods.*

Presidency.	Periods.	Strength.	Fever Admissions.	Deaths from Fever.	Ratio per 1,000 of		
					Admissions to Strength.	Deaths to Strength.	Deaths to Admissions.
Bengal.	1850 to 53-4	84,143	84,357	849	1002·5	10·8	10·6
Bombay.	1850-1 to 53-4	37,516	23,707	186	631·9	4·9	7·8
Madras.	1848 to 51	37,493	10,673	63	284·6	1·6	5·9

* *Vide* Table XII., Ewart's Vital Statistics of the Indian Armies, page 46.

Viewing the results embodied in this table in connection with those obtained in Table V., we find that the annual average prevalence of fevers at Mount Aboo has exceeded the average among the European troops in Bengal by 220·24, in Bombay by 590·84, and in Madras by 938·14 in the thousand! It is, however, satisfactory to be able to prove, as before stated, that the fevers of this Sanitarium are much more readily amenable to successful treatment than those occurring on the plains below. The mortality to strength is $6\frac{1}{2}$ times less than in Bengal; $3\frac{1}{10}$ less than in Bombay; and a fraction less than in Madras.

E. PREVALENCE OF FEVERS DURING TWO PERIODS.

TABLE VII.—*Exhibiting the Sickness and Mortality from Malarious Fevers among the Convalescents and Men at the Aboo Sanitarium during two triennial periods.*

Periods.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of		
				Admissions to Strength.	Deaths to Strength.	Deaths to Admissions.
1855 to 57.	236	291	..	1,233·05	..	..
1858 to 60.	406	494	1	1,216·74	2·46	1·10

If it be recollected, that during the latter period 240 of the strength were effective soldiers, the sick of which have been included in one general Sanitarium Hospital Return, along with the sick of the convalescents, it must be inferred, that in reality malarious disease has undergone no diminution whatever during 1858 to 1860. For decrement of 16·31 in the 1,000 is doubtless owing to the smaller number of attacks which took place among the men of the detachment than the convalescents, and not to any decrease of fever among the latter. The causes which gave rise to so much miasmatic fever in 1855 to 1857, were quite as rife in 1858-60, indicating that Sanitary Science has not been practically recognised at Mount Aboo.

F. EFFECT OF SEASON ON THE PREVALENCE OF FEVERS.**TABLE VIII.**—*Exhibiting the effect of Season upon the prevalence of Malarious Fevers among the Convalescents and Men at the Aboo Sanitarium, arranged in Months and Quarters.*

Months and Quarters.	Admissions.	Deaths.	Ratio per 1,000 of Admissions to Strength.	Months and Quarters.	Admissions.	Deaths.	Ratio per 1,000 of Admissions to Strength.
6 Januarys.	38	..	74·80	6 Julys.	53	..	69·46
6 Februarys.	14	..	36·36	6 Augusts.	45	..	62·50
6 Marchs.	17	..	36·17	6 Septembers.	63	..	86·18
6 Quarters.	69	..	151·98	6 Quarters.	161	..	218·15
6 Aprils.	23	..	29·04	6 Octobers.	151	..	220·43
6 Mays.	37	1	44·52	6 Novembers.	206	..	367·20
6 Junes.	51	..	63·90	6 Decembers.	97	..	220·95
6 Quarters.	111	1	137·54	6 Quarters.	454	..	803·52

This table is very instructive. It portrays in telling language the real reasons why Mount Aboo has hitherto failed as a Sanitarium except during the hot months of April, May, and June. In fact, it points out emphatically that malaria is generated around the oozy and marshy margins of the lake (Mukkee Talao), and in the undrained, spongy, and swampy ravines, which intersect the Hill in all directions—more particularly during those months when identically the same phenomenon is observed at every station on the plains below.

It may be contended that the convalescents bring up with them to the Sanitarium, not only fevers contracted elsewhere, but a strong predisposition to relapsing attacks. Nor can it be ques-

tioned that in some instances men do so arrive with the seeds of disease strongly implanted in their systems, and that in many cases there is a proclivity to recurrences produced by previous seizures, and the vital prostration consequent thereon. Still, admitting all these things, it must nevertheless be acknowledged that the foregoing table affords the strongest testimony in favour of the opinion that the portion of Mount Aboo inhabited by the soldiers is characterized by a well marked malarious, and non-malarious season.

The correctness of this view is further established by the revelations embodied in the subjoined statement, showing the prevalence of malarious fevers for 9 months among the men of a Detachment of H. M.'s 33rd Regiment, not composed of convalescents despatched thither for the restoration of their health, but of *effective soldiers* stationed here on garrison duty.

TABLE IX.

Months.	Strength.	Admissions with Fever.	Ratio per 1,000 of Admissions to Strength.
May 1860	80	4	50.0
June „	80	2	25.0
July „	80	1	12.5
August „	80	0	„
September „	80	4	50.0
October „	68	6	88.2
November „	67	13	194.0
December „	67	25	373.1
January 1861	67	22	328.3
Average.	72.1	77	1,079.7

There cannot be a doubt that almost every one of these 77 cases of fever were contracted here by malaria generated on the spot. The ratio of admissions to strength amounted in the 1,000—that is to say, that in an effective detachment the number of ague attacks exceeded the average number of men by 79·7 in the thousand.

A comparison of the results above exhibited with those comprised in Table VII., fully justifies the conclusion that by far the largest proportion of the fevers which prevail among the convalescents at the Sanitarium must be credited to local causes.

Ratio per 1,000 of admissions to strength among convalescents, <i>vide</i> Table VII	} 1,233·05.
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Ratio per 1,000 of admissions to strength among the men of Detachment 33rd Regiment	} 1,079·70.
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Difference attributable to previous attacks on the plains, and to predisposition.....	} 153·35.
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Ponder these facts as we may, we cannot help admitting that the Hill climate of Mount Aboo, in its present neglected condition, is not only not curative of, but is not preservative against, primary invasions of ague, in those who have been cured, or in those who have never suffered from the disease in their lives before ! Fevers are less mortal, it is true, than on the plains, but their frequency interferes, or indeed negatives, the restorative powers of the climate, and neutralizes to a great extent the advantages of elevation : coolness of temperature of air, and water ; purity of the latter ; and freedom of the former from the scorching winds.

Let it however be borne in mind that malarious fever on Mount Aboo is susceptible of prevention, or at least, mitigation !

The following table which I have brought down one year later than those which Dr. Ewart's opportunities allowed him to compile, demonstrates in forcible language the truth of the foregoing, and also points out those months, where Mount Aboo in its present condition affords the greatest benefit as a Sanitarium. During the last two months enumerated in the table, *duty men only* have been presented, and yet a still greater amount of malarious fever is observed.

TABLE X.

Average of the under-mentioned Months in the 5 years 1857-61 inclusive.	Average Strength.	Average No. of Fever Admissions.	Ratio of Fever Admissions to 1,000 Strength.
5 Januarys.	77·8	8·0	102·83
5 Februarys.	88·4	5·0	56·56
5 Marchs	95·4	3·2	33·54
5 Aprils	134·4	5·4	40·18
5 Mays	145·8	8·2	56·24
5 Junes	143·2	10·6	74·02
5 Julys	126·2	7·8	61·81
5 Augusts	136·0	8·0	58·82
5 Septembers	120·2	7·4	61·56
5 Octobers	101·8	21·4	210·22
5 Novembers	94·8	30·2	318·57
5 Decembers	88·0	21·8	247·73
Average	112·6	11·4	101·33

This table I considered so important in its signification that I took the liberty of forwarding it to the Deputy Inspector General of Hospitals, Northern Division, and also begged permission to record my opinion that soldiers should be sent to Aboo at the latter end of January, and allowed to leave before, or immediately after the first fall of rain in June, certain cases of course being excepted, at the instance of the Medical Officer.

III.—BOWEL COMPLAINTS.

G. PREVALENCE OF BOWEL COMPLAINTS AT MOUNT ABOO, CONTRASTED WITH THAT IN THE BENGAL, MADRAS, AND BOMBAY PRESIDENCIES.

TABLE XI.—*Exhibiting the Sickness and Mortality from Bowel Complaints among the Convalescents and Men of the Aboo Sanitarium during 6 years; among the European Troops in Bengal for 21 years; in Bombay for 25 years; and in Madras for 10 years.*

Station or Presidency.	Periods.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of	
					Admissions to Strength.	Deaths to Strength.
Aboo.	1855 to 60	642	127	1	197·9	1·55
*Bengal.	1833 to 53-4	3,31,775	90,691	6·140	273·4	18·5
*Bombay.	1828-9 to 52-3	1,82,462	47,267	2·700	259·0	14·7
*Madras.	1842 to 1851	1,10,156	24,540	1·116	222·7	10·1

Thus, at Aboo, where choleraic diarrhœa has never prevailed epidemically, to swell the admissions from bowel complaints, *one-fifth* of the strength has passed through hospital on account of dysentery and diarrhœa combined. The prevalence, however, of these diseases is much less than the average among the European Troops in the Bengal, Bombay, and Madras presidencies. The mortality is also inconsiderable. The comparatively small prevalence of, and the insignificant Death-rate from bowel complaints, are to be explained, in great part, by the scrupulous care which has, generally, been exercised by despatching medical officers, whose main object has been to recommend for change of air and scenery to the Sanitarium, only such cases as,

* Ewart's Vital Statistics, p. 100.

according to the best of their judgment, were likely to be benefited by a residence thereat. Hence, all soldiers known or suspected to evince a strongly marked predisposition to, or to be labouring under, organic disease of the alimentary canal, or abdominal viscera, are not considered eligible subjects for removal to a climate characterised by coldness, great humidity, and an attenuated or diluted malarious taint during the monsoon: and by a more concentrated malarious contamination, great thermometric variations, during September, October, and November. Moreover, the medical officer in charge of the Sanitarium, immediately he satisfies himself that cases of this description are not receiving, or likely to receive, the desired benefit by prolonged sojourn on the hill, loses no time in advising their removal. "During the hot season," says Dr. Lownds, "diseases of the stomach and bowels are not at all common; but, as might be expected during the change to the rains, and during the rains, diarrhoea is a common disease. In general, slight and easily treated; but among those patients who have suffered from dysentery to a considerable extent at other places, it must occasion anxiety, as likely to produce a serious form of the latter disease. I think I may, from two years' experience, say decidedly, that such cases should not remain at the Sanitarium during the south-west monsoon."* The cautious selection of appropriate subjects for transfer to Aboo, no less than the anxious solicitude of the officers responsible for their early restoration to health and efficiency, to retain those convalescents, and those only that are receiving palpable benefit by the change of climate and scenery, must be borne in remembrance, when the nominal mortality set forth in the foregoing table is taken into consideration. For, there cannot be a doubt that, if convalescents had been despatched from the plains, or retained on the hill, without the scrutinizing discrimination alluded to; or if men previously prostrated by the fevers and fluxes consequent on harrassing War-service, and protracted residence at hot and

* Remarks on Mount Aboo: Bombay Trans., No. III., New Series, p. 173, 1855-56.

malarious stations, had been suddenly transported to the Sanitarium, a much higher ratio of mortality from bowel disorders, would have been demonstrated.

H. EFFECT OF SEASON ON THE PREVALENCE OF BOWEL COMPLAINTS.

TABLE XII.—*Exhibiting the effect of Season upon the prevalence of Bowel Complaints, among the Convalescents and Men at the Aboo Sanitarium.*

Months and Quarters.	Admissions.	Deaths.	Ratio per 1,000 of Admissions to Strength.	Months and Quarters.	Admissions.	Deaths.	Ratio per 1,000 of Admissions to Strength.
6 Januarys.	2	..	3·9	6 Julys.	22	..	28·7
6 Februarys.	2	..	5·2	6 Augusts.	17	..	23·6
6 Marchs.	6	..	12·7	6 Septembers.	32	..	43·7
6 Quarters.	10	..	22·0	6 Quarters.	71	..	96·2
6 Aprils.	2	..	2·5	6 Octobers.	7	..	10·2
6 Mays.	14	..	16·8	6 Novembers.	9	1	16·0
6 Junes.	11	..	13·7	6 Decembers.	3	..	6·8
6 Quarters.	27	..	33·4	6 Quarters.	19	1	33·8

TABLE XIII.—*Exhibiting the ratio of admissions with Fever and Bowel Complaints, during Quarterly periods, among the Convalescents and Men at Aboo, and the daily range of the Thermometer, Rain-fall, and the number of Rainy days during corresponding Divisions of the Year.*

Quarters.	Fever. Ratio per 1,000 of Admissions to Strength.	Bowel Complaint. Ratio per 1,000 of Admissions to Strength	Temper- ature.	Daily Range.	Rain- fall.	No. of Rainy days.
6 Quarters January to March.	151·08	22·0	64·8	19·8	1·00	1
6 Quarters April to June.	137·54	33·4	77·7	14·9	4·29	10
6 Quarters July to September.	218·15	96·2	68·7	4·4	64·49	60
6 Quarters October to December.	803·52	33·8	67·8	18·4	..	..

During the quarter comprising the cold, frosty months of January and February, and the mild, comparatively cool, spring month of March, the convalescents and men are able to take abundance of exercise in the open air, at most periods of the day. Then, the admissions with bowel complaints amounted to 22·0 per 1,000.

April is the driest and least malarious month. May is characterized by dense morning fogs, and frequently raw moist winds. These continue more or less till the beginning of the rains, about the 20th of June, when the effect of the first good fall is to scour out the filth deposited (during the preceding eight months of the year) in and near the water-courses, and to give renewed vigour to vegetable growth, by which means putrifying organic matter is oxidized and vitalized. During this quarter 38·4 per 1,000 of strength were attacked with bowel complaint.

During the very rainy months of July, August, and a portion of September, the admissions rose to 96·2 per 1,000; more men entered Hospital during this quarter with bowel complaint than during all the other three quarters of the year put together. The reasons of this are not difficult to explain. At this season if rain is not falling, the atmosphere is "dripping wet," the clouds are literally driven through the houses, bedewing every article of bedding and wearing apparel unprotected. Clothes, and boots, &c., unless repeatedly aired, and dried over a fire, remain damp, and quickly become mouldy: the walls of houses have to be protected externally, by grass work "tatties," and the interior kept dry by burning charcoal or the common fire-grate; the winds blow raw, cold, and chilly; the sun rarely penetrates with vigour, the dense vapoury masses enveloping the mountain; the atmosphere is contaminated by diluted malaria partly generated on the spot, and partly swept upwards from the numerous deep ravines communicating with the plains, and is also freely impregnated with animal and vegetable organisms; and it is almost impossible, in the absence of a well cultivated soldiers' garden, to obtain for the men a sufficient quantity of anti-scorbutic vegetables and fruit.

During the quarter embracing the rainless, cloudless, drying, months of October, the cold month of November, and wintry December, only 33·8 per 1,000 are noted as having been admitted into Hospital. But there is a fallacy here; a disturbing agency at work; which has artificially depressed the ratio of admissions. This is the season when 803·52 per 1,000 of the average quarterly strength, pass through Hospital, with one or other of the forms of malarious fever, and when the daily range of the temperature is 18·4. Partly therefore, to avoid this, but chiefly to benefit the convalescents, many are, at the commencement of this period, sent down the Hill, including of course all cases of flux which threaten to become serious or dangerous. Had this practice not existed, diseases of the bowels would have figured much more prominently than they do in the returns during the quarter under review.

Nearly all the causes which, according to Mr. Grant,* produced so much sickness and mortality from bowel complaint at Subathoo, Dughshai, and Kussowlie in the Sub-Himalayan ranges are in existence at the Aboo Sanitarium during the monsoon period—such as comparative coldness or depression of the mean temperature, malariousness, and great humidity.

The comparative coldness is demonstrated in Table XIII., from which it will be observed that the mean temperature during the rainy quarter is 9° lower than that of the hot season—in the latter the average temperature was 77·7, in the former 68·7.

The malariousness of the Sanitarium has been already evidenced, and may be again placed beyond question; for the ratio of the admissions with fever was 218·15 in the 1,000 in the *rainy* season when bowel complaint is most frequent; whereas they only amounted to little more than half that ratio during the *hot* season.

* Grant "On Hill Diarrhoea and Dysentery," *Indian Annals Med. Science*, No. 1, p. 316.

The remarkable humidity during the monsoon period is also well shown, for during the three months there fell 64·49 inches of rain, and there were 60 rainy days.

Mr. Grant lays some stress on vicissitudes of temperature, as exciting causes of abdominal disease at the Himalayan Sanitaria before referred to; nor can it be doubted that where great ranges of temperature exist, in conjunction with other causes mentioned, these vicissitudes must increase the proclivity to, and the severity of, intestinal disease.

But at Mount Aboo the average range is less during the monsoon than at any other season. From July to September it amounts to 4·4°, whilst from October to December, when the humidity is greatly diminished, it reaches 18·4°, and from April to June it amounts to 14·9°.

Mr. Grant also considers that a scorbutic taint of the constitution which may exist without visible affection of the gums is an important predisposing cause; where this deteriorated condition of the blood does exist, it must not only facilitate the encroachments of bowel complaints, but increase their virulency, and lessen the chances of recovery from the more serious forms. As officially brought to notice on several occasions, the scorbutic diathesis is engendered on Mount Aboo, by a not sufficiently diversified diet, both as regards the animal and vegetable constituents.

Superadded to all these agencies must be mentioned the impregnation of the atmosphere during the monsoon, with animal and vegetable organisms. It is not at all improbable that bowel complaints are in some degree dependant upon the ingress of these into the alimentary canal. Drinking water contaminated with organic matter—and much of the water is so polluted in the rainy season—may also be alluded to as a probable cause of diarrhoea and dysentery. That this may be the case at Mount Aboo, in the absence of scavengers, is certainly not a far-fetched idea.

I. DYSENTERY.

I. PREVALENCE OF DYSENTERY AT ABOO, CONTRASTED WITH THAT IN THE BENGAL, MADRAS, AND BOMBAY PRESIDENCIES.

TABLE XIV.—*Exhibiting the Sickness and Mortality from Dysentery, among the Convalescents and Men at the Aboo Sanitarium during 6 years; among the European Troops in Bengal during 21 years; in Bombay during 25 years; and in Madras during 10 years.*

Stations or Presidencies.	Periods.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of	
					Admissions to Strength.	Deaths to Strength.
Aboo ..	1855 to 1860	642	45	1	70·0	1·55
* Bengal .	1832 to 53-54	3,31,775	50,355	4,769	151·7	14·3
* Bombay.	1828-9 to 52-53	1,82,462	25,587	2,348	129·2	12·8
* Madras.	1842 to 1851	1,10,156	13,151	922	119·0	8·0

If the previous observations regarding the careful selection of cases for transportation to, and the speedy return of, all those for which the climate appears unsuited, from Aboo, be recollected, the comparative infrequency of, and small mortality from, dysentery, will be intelligible enough. There is none of that delay in procuring carriage, providing adequate shelter, and medical aid for the journey to or from the hill, which, at one time marred the utility of some of the Bengal Sanatoria. As a general rule, patients convalescing from dysentery, at any of the stations of Gujarat or Rajpootana, are not sent to Aboo, but to the sea-coast, experience having proved long ago, that they derive more benefit from a change of this kind, than from removal to a hill climate; and not only so, but when a soldier contracts dysentery for the first time, or sustains a relapse of an old dysentery at the Sanatarium, it has been discovered that speedy transfer to the plains or to the coast, offers a far better chance of recovery, than retention on the hill.

• Ewart's Vital Statistics of the European and Native Armies in India, p. 93.

ACUTE AND CHRONIC DYSENTERY.

J. RELATIVE PREVALENCE OF ACUTE AND CHRONIC DYSENTERY.

TABLE XV.—*Exhibiting the prevalence of Acute and Chronic Dysentery, among the Convalescents and Men at the Aboo Sanitarium during 6 years.*

Type.	Period	Strength.	Admissions.	Deaths.	Ratio per 1,000 of	
					Admissions to Strength.	Deaths to Strength.
Acute Dysentery.	} 1855-60	642 {	33	1	51·40	1·55
Chronic Dysentery			12	..	18·69	

We learn from this table that acute dysentery has been nearly three times as frequent as the chronic form of the disease.

K. EFFECT OF SEASON ON THE PREVALENCE OF DYSENTERY.

TABLE XVI.—*Exhibiting the effect of Season on the prevalence of Dysentery among the Convalescents and Men at the Aboo Sanitarium.*

Months and Quarters.	Admissions.	Deaths.	Ratio per 1,000 of Admissions to Strength	Months and Quarters.	Admissions.	Deaths.	Ratio per 1,000 of Admissions to Strength.
6 Januarys ..	2	..	3·9	6 Julys	3	..	3·9
6 Februarys ..	2	..	5·1	6 Augusts ..	1	..	1·3
6 Marchs ..	4	..	8·5	6 Septembers.	19	..	25·9
6 Quarters ..	8	..	17·5	6 Quarters ..	23	..	31·1
6 Aprils	1	..	1·2	6 Octobers ..	4	..	5·8
6 Mays	1	..	1·2	6 Novembers .	4	1	7·1
6 Junes	3	..	3·7	6 Decembers .	1	..	2·2
6 Quarters ..	5	..	6·1	6 Quarters ..	9	1	16·0

The quarter ending September yields the largest number of admissions with dysentery (31·1 per 1,000); that ending March stands next (17·5); then follows the quarter ending December (16·0), and last of all that ending June which gives a ratio of 6·1 per thousand of strength.

2. DIARRHŒA.

L. PREVALENCE OF DIARRHŒA, AT ABOO, CONTRASTED WITH THAT IN THE BENGAL, BOMBAY, AND MADRAS PRESIDENCIES.

TABLE XVII.—*Exhibiting the Sickness and Mortality from Diarrhœa, among the Convalescents and Men at the Aboo Sanitarium during 6 years; among the European Troops in Bengal during 21 years, in Bombay during 25 years, and in Madras during 10 years.*

Station and Presidency.	Periods.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of	
					Admissions to Strength.	Deaths to Strength.
Aboo.	1855 to 1860	642	82		127·72	
* Bengal.	1833 to 53-54	3,31,775	40,336	1,371	121·5	4·1
* Bombay.	1828-29 to 52-53	1,82,462	23,680	352	129·7	1·9
* Madras.	1842 to 1851	1,10,156	11,389	194	103·0	1·7

Thus the prevalence of diarrhœa, at Aboo, has exceeded the average, among the European Soldiers of the Bengal and Madras Presidencies; and is only 1·98 per 1,000 below that which obtained in the European Army of Bombay.

* Ewart's Vital Statistics of the European and Native Armies in India, p. 98.

M. EFFECT OF SEASON ON THE PREVALENCE OF DIARRHŒA.TABLE XVIII.—*Exhibiting the effect of Season on the prevalence of Diarrhœa among the Convalescents and Men at the Aboo Sanitarium.*

Months and Quarters.	Admissions.	Ratio per 1,000 of Admissions to Strength.	Months and Quarters.	Admissions.	Ratio per 1,000 of Admissions to Strength.
6 Januarys	..		6 Julys	19	24·77
6 Februarys ..	..		6 Augusts	16	22·22
6 Marches	2	4·25	6 Septembers ..	13	17·78
6 Quarters ...:	2	4·40	6 Quarters	48	65·04
6 Aprils	1	1·26	6 Octobers	3	4·37
6 Mays	13	15·64	6 Novembers ..	5	8·91
6 Junes	8	10·02	6 Decembers ..	2	4·55
6 Quarters	22	27·27	6 Quarters	10	17·79

Diarrhœa therefore, like dysentery, prevails most abundantly during the monsoon quarter, 65·04 in the thousand having been admitted to hospital during that season.

IV. HEPATITIS.

N. PREVALENCE OF HEPATITIS.

TABLE XIX.—*Exhibiting the prevalence of Hepatitis among the Convalescents and Men at the Aboo Sanitarium during 6 years, as also the relative frequency of the Acute and Chronic forms of the disease.*

Forms.	Period	Strength.	Admissions.	Deaths.	Ratio per 1,000 of	
					Admissions to Strength.	Deaths to Strength.
Acute Hepatitis.	1855 to 1860	642	10	..	15·57	..
Chronic ditto..			29	1	45·17	1·55
Hepatitis		..	39	1	60·74	1·55

Chronic hepatitis is therefore almost *three times* as common as the acute form of the disease. Out of the 60·74 in the thousand that passed through hospital, 15·57 were acute, and 45·17 chronic cases.

O. PREVALENCE OF, AND MORTALITY FROM, HEPATITIS, AT MOUNT ABOO, CONTRASTED WITH 19 OTHER STATIONS OF THE BRITISH ARMY.

TABLE XX.—*Exhibiting the Ratios of Sickness and Mortality from Hepatitis among European Soldiers, at 19 Stations.*

Stations,	Period of observation.	Ratio per 1,000 of	
		Admissions to Strength	Deaths to Strength
Canada	20 years	7·5	0·1
Nova Scotia and New Brunswick	20 "	8·2	0·2
England	10 "	8·4	0·3
Jamaica.....	20 "	10·4	0·9
Gibraltar	19 "	12·5	0·3
Corfu	10 "	13·6	0·8
Bermudas.....	20 "	14·3	0·5
Ionian Islands	20 "	16·6	0·8
St. Helena	9 "	19·0	2·6
Malta	20 "	20·9	1·1
Cape of Good Hope	19 "	21·8	1·1
Windward and Leeward Command ..	20 "	22·4	1·8
Ceylon	20 "	55·4	4·9
Bengal	42 "	60·2	4·1
Tenasserim Provinces	10 "	71·5	4·2
Bombay	51 "	79·3	4·0
Western Africa	18 "	81·3	5·9
Mauritius	19 "	82·1	3·9
Madras	20 "	89·2	4·0
Mount Aboo.....	6 "	60·74	1·55

Thus, out of the 19 stations above noted, 14 give a lower ratio of prevalence of, and 10 a lower ratio of mortality from hepatitis than Mount Aboo, at which Sanitarium this disease was actually more frequent in proportion to strength, than in the Bengal Presidency or Ceylon. This is the more remarkable, when it is remembered that men suffering from hepatic derange-

ments are *not* recommended to be sent to Aboo; because the cold, damp atmosphere, &c. of that place is not favourable to recovery for obvious reasons.

P. PREVALENCE OF, AND MORTALITY FROM, HEPATITIS, AT MOUNT ABOO, CONTRASTED WITH THOSE AMONG SEPOYS AND PRISONERS.

TABLE XXI.—*Exhibiting the ratios of Sickness and Mortality from Hepatitis among Sepoys and Prisoners in the three Presidencies.*

Presidency.	Class.	Periods.	Ratio per 1,000 of	
			Admissions to Strength.	Deaths to Strength.
Bengal	Sepoys.	1826 to 1852-53	1·0	0·07
Bombay		1803-4 to 53-54	1·8	0·19
Madras		1827 to 51-52*	1·2	0·13
Bengal	Prisoners.	1833 to 1854	1·39	0·15
Bombay		1831-2 to 1854	5·7	0·67
Madras		10 Years.	0·5	0·11

By a little calculation it will therefore be found that the proportion of sickness from hepatitis among Europeans at Aboo, as compared with Sepoys and Prisoners—

	<i>E. S.</i>
Is in Bengal as	60 : 1
„ Bombay „	33 : 1
„ Madras „	50 : 1
	<i>E. P.</i>
„ Bengal „	43 : 1
„ Bombay „	10 : 1
„ Madras „	121 : 1

* Exclusive of 1836—1837—1838—1839—1840 and 1841.

Again the proportion of mortality from hepatitis at Aboo as compared with Sepoy and Prisoners—

	<i>E.</i>	<i>S.</i>
Is in Bengal as	22	: 1
„ Bombay „	8	: 1
„ Madras „	11	: 1
	<i>E.</i>	<i>P.</i>
„ Bengal „	10	: 1
„ Bombay „	2	: 1
„ Madras „	14	: 1

Hence we conclude that hepatitis has been 60, 33, and 50 times as frequent among Europeans at Aboo, as among the Sepoys of the Bengal, Bombay, and Madras Presidencies; that it has been 43, 10, and 121 times as common among Europeans as in the prisoners of the three Presidencies; that the mortality from hepatitis has been 22, 8, and 11 times higher among Europeans at Aboo than among the Sepoys of Bengal, Bombay, and Madras; and 10, 2, and 14 times greater than among the prisoners of the corresponding Presidencies. From a careful consideration of all the foregoing facts, it may be safely asserted, that Aboo is not a favourable refuge for those Europeans possessing a proclivity to, or actually afflicted with, organic disease of the liver.

Q. EFFECT OF SEASON ON THE PREVALENCE OF HEPATITIS.

TABLE XXII.—*Exhibiting the Distribution of 39 cases of Hepatitis in Quarterly Periods.*

Quarters.	Admissions.	Ratio per 1,000 of Admissions to Strength.
6 Quarters January to March	8	17·8
6 Do. April to May	17	21·0
6 Do. July to September	6	8·1
6 Do. October to December	8	14·2

This shows that hepatitis has been most prevalent during the hot months, and least abundant during the rainy season ; 21·0 per thousand are admitted during the former, and only 8·1 during the latter ; 14·2 per 1,000 are treated during the quarter ending December, and 17·8 in that ending March. It is curious to note the infrequency of hepatitis during the rains. Does the diarrhoea, so common then among all classes of the community, act as a prophylactic by relieving the distention and congestion of the portal circulation ?

V. RHEUMATISM.

B. PREVALENCE OF RHEUMATISM AT THE ABOO SANITARIUM.

TABLE XXIII.—*Exhibiting the Sickness from Rheumatism among the Convalescents and Men at the Aboo Sanitarium during 6 years.*

Forms.	Period.	Strength.	Admissions.	Ratio per 1,000 of Admissions to Strength.
Acute Rheumatism....	} 1855 to 1860	} 642	16	24·9
Chronic Rheumatism..			57	88·7
Rheumatism			73	113·7

Out of a ratio of 113·7, 24·9 per 1,000 were acute, and 88·7 chronic cases of rheumatism. A large proportion of the chronic cases is of a neuralgic, or of a syphilitic character ; and ought under a correct system of nomenclature, to have been classified as “Neuralgia,” or “Syphilitic Rheumatism.” No death occurred under this head during the six years.

S. PREVALENCE OF RHEUMATISM AMONG THE EUROPEAN TROOPS IN THE BENGAL AND MADRAS PRESIDENCIES.

TABLE XXIV.—*Exhibiting the Sickness and Mortality from Rheumatism among European Soldiers in Bengal and Madras.*

Presidency.	Periods.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of	
					Admissions to Strength.	Deaths to Strength.
Bengal ..	1846-47 to 53-54	1,56,139	14,519	56	92·9	0·35
Madras ..	1842 to 1851	1,10,156	10,454	54	94·9	0·49

It follows, therefore, that the ratio of admissions with Rheumatism at Mount Aboo exceeds that of the Bengal and Madras Presidencies by 20·8 and 18·8 in the thousand, respectively.

VI.—VENEREAL COMPLAINTS.

T. PREVALENCE OF VENEREAL COMPLAINTS.

TABLE XXV.—*Exhibiting the Sickness and Mortality from Venereal Complaints among the Men and Convalescents at the Aboo Sanitarium during six years.*

Period.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of	
				Admissions to Strength.	Deaths to Strength.
1855 to 1860	642	67	2	104·3	3·1

The ratio of admissions with Venereal disease has, therefore, amounted to 104·3 in the 1,000; and of deaths to strength, to 3·1. Of the 67 cases noted above, fifty-one are recorded under the head "Syphilis," with one death; and 16 under the head Gonorrhœa, with one death.

U. PREVALENCE OF VENEREAL COMPLAINTS AMONG EUROPEANS IN BENGAL AND MADRAS, AND IN THE BOMBAY 1st FUSILIERS.

TABLE XXVI.—*Exhibiting the prevalence of, and Mortality from, Venereal Complaints among the European Troops in the Bengal and Madras Presidencies, and in the Bombay Fusiliers.*

Presidency or Regiment.	Period.	Strength.	Admissions.	Deaths.	Ratio per 1,000 of	
					Admissions to strength.	Deaths to strength.
Bengal	1846-47 to 53-54	*1,56,139	34,438	86	220·5	0·56
	1850-51 to 55-56	†		..	174·0	0·30
Madras	1842 to 1851	1,10,156	23,633	57	211·0	0·57
1st Fusiliers	1846 to 1853	7,406	1,943	1	262·2	0·13

Venereal Diseases are not half so frequent at Aboo as in the Bengal, Madras, and Bombay Presidencies, but they are common enough here, in the absence of "married regiments," to warrant the recommendation of the organization of periodical inspections of the bazaar women, or even the establishment of a "Lock Hospital" as preventive institutions of primary importance. So long as only 12 per cent. of the soldiers are allowed

* *Hugh Macpherson's Analysis.*

† *Chevers' Indian Annals, Med. Science, No. xiii., p. 298.*

‡ *Waring's Vital Statistics of the Madras Army; Indian Annals of Medical Science, vol. V., p. 114.*

§ *Arnott's Report on the Health of the First Fusiliers; Bombay Med. and Phys. Soc. Trans., No. 11, New Series, p. 209.*

to marry, well-regulated, well-organized, and well-conducted institutions of the kind should be established wherever European troops are located.

It appears that "Lock Hospitals" were first ordered to be established for the reception and cure of "Diseased Women" at Dinapore, Berhampore, Cawnpore, and Futtighur in 1795, and that subsequently to this, they were formed at all stations throughout India, which were garrisoned by European Troops. In 1830 Lord William Bentinck, acting on the suggestion of the Medical Board, commanded their abolition, but it was not until 1835, that they were finally dispensed with in Madras, and perhaps also in Bombay. "An outcry," writes Deputy Inspector General Arnott, C.B., "was raised against them on account of "their supposed demoralising tendency, and some even argued "that instead of removing they increased the evil," and accordingly in 1835 they were abolished. Many of these "Lock Hospitals" were not well conducted, and the bazaars were badly attended to, but even under the worst management, it would be difficult to explain how they could increase the evil. The petty officials connected with them certainly took advantage of their position, and were often guilty of gross interference, and imposition; but under better regulations these irregularities might be avoided.

The question of morality is one on which there will always be difference of opinion, but in its consideration, it must be borne in mind that Government does not encourage marriage, and only allows 12 per cent. married men in each regiment, and that this is the root of the evil. The point to be considered is, whether it is better to preserve the soldier's health and efficiency, and to save the country from the loss of his services, under well-conducted and efficient establishments, or to let him be exposed to the effects of sun and climate, in seeking a gratification which entails disease and renders him useless to the state for months together, besides aiding the heat and malarious atmosphere inherent in the climate, in inducing that "Cachexia Loci" and systemic degeneration, which renders him an easy prey to

“ epidemic constitutions of the atmosphere.” There is not a better use to which the often times ample canteen funds could be applied. From these funds, under proper management, arrangements (which it is unnecessary to specify in detail) might be carried out, which would ensure protection from disease, and the preservation of the health of the men generally (*see* Arnott’s Report on the Health of the Fusiliers, previously quoted).

Dr. Chevers writes, “ We feel no shadow of a doubt, or moral scruple in applying a well-regulated prophylaxis to syphilis— while those who are wiser and more powerful than we are, are engaged in elevating the character of our soldiery and our populace above the instinctive frailty of humanity. We believe that we have read carefully nearly all that has been written upon the subject, and the result is a conviction that a well-arranged and conducted system of preventing syphilis, will always tend with certainty to repress prostitution.” That it does lessen the consequences of promiscuous co-habitation is plainly demonstrated in the subjoined.

TABLE XXVII.—*Exhibiting the prevalence of Venereal Complaints among the European Troops in the Madras Presidency for 20 years (arranged in Quinquennial periods).*

Periods.	Strength.	Admissions.	Deaths.	Ratio of Admissions per 1,000 of Strength.	Remarks.
1829 to 33	54,559	7,992	20	146·4	Lock Hospital.
1834-38	48,871	13,448	43	275·3	No Ditto.
1842-46	61,234	11,503	30	187·8	Ditto.
1847-51	48,919	15,130	27	309·0	Ditto.

Hence it may be concluded that during 1829-1833, when even a wretchedly-managed Lock Hospital existed in each station held by Europeans, the ratio of admissions per 1,000 was 146·4, little more than half that of the succeeding quinquennium,

during four years of which, Lock Hospitals had been abolished. During 1842-1846 the ratio fell to 187·8, but in 1847-1851 it rose to the high figure of 309 in the 1,000.

VII.—OPHTHALMIA, BRONCHITIS, PLEURITIS, PNEUMONIA, PHTHISIS, AND OTHER DISEASES.

V. PREVALENCE OF EYE AND CHEST AND OTHER DISEASES.

TABLE XXVIII.—*Exhibiting the Sickness and Mortality from Eye and Chest, and other Diseases among the Convalescents and Men at the Aboo Sanitarium during 6 years.*

Periods.	Diseases.	Admissions.	Deaths.	Ratio per 1,000 of	
				Admissions to Strength.	Deaths to Strength.
1855 to 1860.	1. Ophthalmia ..	16	1	24·9	1·55
	2. Bronchitis	15	0	23·3	0·00
	3. Pleuritis ...	3	0	4·6	0·00
	4. Pneumonia	1	1	1·55	1·55
	5. Phthisis	5	3	7·7	4·6
	6. Other Diseases.	346	5	538·7	7·7

During the above period the admissions for Ophthalmia only reached 24·9 in the 1,000; Bronchitis yielded 23·3; Pleuritis 4·6; and Pneumonia 1·55; while Phthisis gave 7·9 admissions for 1,000 men. Phthisis is much less frequent but more fatal in proportion to given strength at Aboo than among the Europeans of the Bengal and Bombay Presidencies, but much more common and mortal than among the Sepoys and Native Prisoners in these dependencies. These facts are well brought out in the subjoined statement.

TABLE XXIX.—*Exhibiting the Admissions and Deaths for 1,000 strength amongst Europeans, Sepoys, and Prisoners in Bengal and Bombay during the periods mentioned.*

Caste.	Presidency.	Periods.	Ratio per 1,000 of Strength of Admissions with Phthisis.	Ratio per 1,000 of Strength of Deaths from Phthisis.
Europeans.	Bengal ..	1812 to 53-4	20·6	2·2
	Bombay ..	1803-4 to 53-4	29·9	1·2
Sepoys	Bengal ..	1826 to 52-3	2·0	0·2
	Bombay ..	1803-4 to 53-4	2·6	0·3
Prisoners ..	Bengal ..	1833 to 53-4	2·9	1·3
	Bombay ..	1831-2 to 53-4	4·5	0·7

A diminution in the superincumbent weight of the atmosphere is sufficient in some instances to bring on hæmoptysis, as has been sufficiently demonstrated at Mount Aboo, in instances where men have come to the Sanitarium with diseased lungs, either with vomicæ, or studded with tubercular matter. It is very probable that removal from the heated air of the plains, to the twelve or fourteen degrees cooler atmosphere which exists on Mount Aboo in the hot months, has as great an influence in the excitation of hæmoptysis in the phthisical patient as the more rarified atmosphere. To these two exciting causes must be added also, the fog and damp of the monsoon season. The idea that “an ague in the spring is physic for a king,” or that an intermittent is a cure for phthisis (being now exploded, although it has been entertained by some eminent authors), sending men to Aboo who have any predisposition to chest affection *cannot be sufficiently deprecated*. The records show that many instances of this kind do not occur, but they also demonstrate that men have been sent up the mountain, both in an advanced stage of consumption, and with the disease but partially developed. Disease of the lungs if at all advanced cannot be mistaken by a tyro for aught else, and it cannot be too broadly made known that Hill Sanitaria are not fitting localities for those affected with pulmonary complaints.

TABLE XXX.—*Exhibiting the Weights of 26 men at the time of arrival and departure from Mount Aboo after a residence of one year on the Hill, more or less.*

No.	Length of Residence.	Weight on arrival.		Weight on departure.	
		st.	lb.	st.	lb.
1	Upwards of one year.	9	8	11	3
2	Ditto	8	11	8	12
3	Ditto	9	1	9	4
4	Ditto	8	10	8	8
5	Ditto	8	7	8	6
6	Ditto	9	3	9	1
7	Ditto	8	4	8	8
8	Ditto	9	6	9	4
9	Ditto	9	3	9	7
10	Ditto	8	11	8	9
11	Ditto	10	4	10	0
12	Ditto	9	0	9	0
13	Ditto	8	8	8	6
14	Ditto	9	3	9	0
15	Ditto	11	0	11	4
16	Ditto	9	12	9	0
17	Ditto	9	12	9	5
18	Ditto	10	0	9	8
19	Ditto	10	0	9	10
20	Not one year.	9	4	9	0
21	Ditto	7	13	8	1
22	Ditto	9	8	9	4
23	Ditto	10	4	9	5
24	Ditto	10	4	10	1
25	Ditto	8	7	8	10
26	Ditto	10	0	9	8

From this table we find that 10 men only out of 26 gained in weight during their residence at the Sanitarium, and only one man of these ten (No. 1 in the list) gained to any considerable extent; while some lost eight or more pounds, and although it has

been shown by Mr. Macnamara (of the Home Establishment) that sudden fattening among soldiers, is to be regarded with suspicion, still it may be taken for granted that when a body of men of the soldiers' ages *lose weight*, there must be something exerting a deleterious influence over them, either with reference to their diet, mode of life, or climate in which they exist.

The conclusions which may be drawn from the foregoing, appear to be those which it was stated would be attempted to be proved.

That preventible, or mitigable disease, is more prevalent on mountain ranges than it should be.

That the natural advantages of the climate are negated by such prevalence of disease.

That such disease may be removed or mitigated by Sanitary arrangements.

That until such arrangements are carried out, the most we can expect from Hill Sanitaria is a refuge from intense heat during the hot months of the year.

ON THE PREVALENCE OF TYPHOID FEVER IN THE BOMBAY PRESIDENCY.

By JOHN PEET, M.D., F.R.C.P., Professor of Medicine, Grant College.

[Papers read September and December 1862.]

The attention which has been given during the last three or four years to the prevalence of typhoid fever in tropical countries, makes it desirable that additional facts should be recorded. Not that the experience of any one person will afford even an approximation to the immediate settlement of the question, but rather in the hope that the aggregate of a large number of separate and distinct observations will supply data, for ultimately placing it beyond the pale of controversy. Until the year 1854, as is well known, writers on tropical diseases either denied or ignored the occurrence of typhoid fever in the sense in which the term typhoid is now generally understood. Some* have in terms expressed their entire disbelief in the prevalence within the tropics of any form of specific or contagious fever, whilst others have passed the subject over without comment.† An attentive study of the works which were published about the end of the last or beginning of the present century on the diseases of hot climates will, to say the least, raise the suspicion that typhoid fever was occasionally met with and confounded with malarious fevers or other diseases. Thus, Mr. Annesley, in describing the post-mortem appearances in fever, states that "the duodenum jejunum and ileum, especially the duodenum and *termination of the ileum* very frequently are diseased on their mucous surface,

* Annesley on the Diseases of India, pp. 513-514.—Clinical Illustrations of the Diseases of India, page 195.

† McKinnon on Public Health, Hygienic and Prevailing Diseases.

which is inflamed in patches, sometimes covered with a mucopurulent secretion, and *studded with small ulcerations, particularly the termination of the ileum.*"* Case ccxv. at page 477 of his large work would, no doubt, now be considered typhoid fever. It is headed "*Continued fever, inflammation of the bowels supervening with peritonitis from perforation of the small intestine.*" The patient, an European soldier, was admitted with continued fever, of what duration is not stated. He was attacked with peritonitis and died seven days after admission. "On laying open the ileum at its entrance into the cæcum, its internal and external coats were found much inflamed, but the latter most particularly, and two ulcers were observed, through which the contents of the bowels had escaped." There is difficulty in tracing the progress of the symptoms, by reason of the treatment that was adopted, the patient having taken in seven days 1 emetic, 6 purgatives, and 140 grains of calomel; in addition to which 46 Madras leeches were used and 2 blisters applied.† Mr. Twining's insidious congestive fever of the cold season in Bengal,‡ in some of its characters, certainly resembles typhoid fever. Thus, the early symptoms were slight and obscure, of slow progress, and long duration. Delirium was common, and often of long continuance. The abdomen was distended and tense. All classes of persons were attacked, and those who lived in the best houses, and were but little exposed to the supposed cause of malarious fevers, were frequently affected. On the other hand, diarrhœa is stated to have been a rare symptom, and superficial ulceration of the mucous membrane of the small intestines was found after death in only a small proportion of the cases. The examples which Mr. Twining gives were so actively treated by

* Annesley on the Diseases of India, page 547.

† As an illustration of the treatment then thought proper, it is curious to observe that even these were not considered by Mr. Annesley sufficiently energetic measures. He says—"This case was treated by one of the Assistant Surgeons of the Regiment, and it is evident he had not a clear view of its nature and complications. Bleeding should have been used more decidedly from the commencement, but particularly on the evening of the 27th, when he first felt acute pain." Op. Cit. p. 479.

‡ Twining on the Diseases of Bengal.

blood-letting and drastic purgatives, as to lessen the value of any inferences that may be drawn from them. It is quite impossible, for example, to determine whether the looseness of the bowels, which was sometimes present, was due to the disease, or to the remedies that were given for its cure. As to the nature of this fever there has been much discussion. Mr. Twining himself says, with reference to the condition of the small intestines—"If more extended observations should "prove that these ulcerations of the small intestines exist "generally, in the cases which terminate fatally, and that such "a pathological condition is rarely met with, in the inspection "of subjects that have died of other descriptions of fever in "Bengal, I should be inclined to adopt the opinion of Dr. "Boot, that a peculiarity of the disease would be thus ascer- "tained, which combined with the exclusive prevalence of this "fever in the cold season, its insidious symptoms, slow progress, "and protracted course, attended with prolonged stupor and "delirium and the organic changes at its latter stages, might "establish a resemblance to some modifications of European "typhus, although the resemblance be not strictly correct in "all its details."* This very sensible remark was written by Mr. Twining twenty-seven years ago, and I am not aware of a single observation of any value having been made to settle the important question to which it relates. Was this typhoid fever or not? Dr. Goodeve thinks that it was—† Dr. Morehead that it was not.‡ Dr. Ewart, also, says that it is not at all reconcilable with the typhoid or typhus fever which he met with in the Ajmere Jail, nor, as observed in the present day, in the British and Continental hospitals§ He lays stress on the success of the depletive treatment adopted by Twining, which would be homicidal in the cases seen by him. But, in truth, we do not know whether Twining's treatment was suc-

* Twining on the Diseases of Bengal; 1835, pp. 353, 354.

† Indian Annals, No. xi., p. 141.

‡ Disease in India, p. 65.

§ Indian Annals, No. vii., p. 65.

cessful or not; he nowhere gives us any statistics on this point, and if we are to disbelieve in the identity of diseases from a comparison of the treatment now, and thirty years ago, I fear our views of their diversity will be very extended. For reasons which have been stated, no very decided opinion can be given as to the exact nature of this fever. On the whole, however, from its insidious commencement, the tendency to depression, the duration of the delirium, the tympanitic abdomen, and the ulceration of the ileum sometimes observed, it appears to me more to resemble typhoid than any other form of fever. Twinning, it is true, mentions that the bowels were more often constipated than loose, but this must refer to the early stage of the disease, or to the time when he commenced the treatment of it, inasmuch as he was in the habit of giving a purgative of some kind nearly every day, and, of course, could not know how much of the looseness of the bowels was due to the medicine, and how much to any disease of the small intestine, that might have been present.

Sir Ranald Martin* states that "natives of Bengal were daily brought into the Native Hospital at Calcutta, in the most advanced and neglected stages of this form of fever," (of 15 or 20 days' duration.) They had "tumid abdomens, and were in a "state of stupor, with tongues black and dry as charcoal." Many of them recovered under the most simple treatment. Quinine does not appear to have been given in these cases. He also says (p. 201) "This latter condition (ulceration of the "mucous digestive surface) I found to be very prevalent amongst "the labouring classes of natives, whom I had continually to "treat at the Native Hospital at Calcutta on account of neglected "fevers of 15 or 20 days' duration." Dr. Morehead, in the first edition of his work, expressed his belief that typhoid, typhus, and relapsing fevers were unknown in India,† but in the second edition‡ he qualifies this statement and admits the occasional

* Influence of Tropical Climates 1856, p. 202.

† Disease in India, 1st Edition, Vol. I., p. 20.

‡ Page 160.

occurrence of typhoid fever. Amongst the cases of fever recorded by Dr. Morehead, there are two (cases 199, 200) which were probably typhoid. Mr. Cornish, in a very excellent paper in the 8th No. of the *Madras Quarterly Journal*, gives the result of his examination of the cases of deceased officers, Civil and Military, in the Madras Presidency, the deaths extending over a period of 12 years. Of the total deaths 62 were due to fever, 7 of these are believed to have been *certainly* typhoid fever, and several cases of *probably* the same disease were discarded because a *post-mortem* examination had not been made. Mr. Rankin mentions that he has gone over the post-mortem examination reports of the Regiment of which he has the medical charge—2nd Madras European Light Infantry—and that he has found undoubted evidence of the occurrence of fever attended with the anatomical characters which would now be held to be truly characteristic of typhoid fever.*

Without wishing to attach more weight than they deserve to the facts just stated, enough has, I think, been advanced to make it at least *probable*, that typhoid fever has at all times occasionally occurred within the tropics, and been confounded with remittent fever, or other diseases.

The first cases of typhoid fever, recorded as such, are by Mr. Scriven.† They happened in Burmah, and are three in number. One was an officer, the two others were European soldiers. None of these cases appear to me typical, and the diagnosis was founded chiefly upon the morbid appearances. In one indeed, no symptoms are recorded. These cases, with three others, are included in a paper on Indian Fevers in the 8th No. of the *Indian Annals of Medicine* (p. 511). In one of the latter cases there is merely the statement that the patient was admitted delirious, and with fever far advanced. But in one case the symptoms were traced throughout and were very character-

* Madras Quarterly Review.

† Medical Gazette, January 28th, 1854.

istic—the rose-coloured spots being quite distinct. The post-mortem appearances were equally well marked. That this was typhoid fever there can be, I think, no reasonable doubt. In the 7th No. of the *Indian Annals* (p. 72), four cases of so-called typhoid fever, are recorded by Dr. Ewart as having occurred in the Ajmere Jail; three were fatal, and in each a post-mortem examination was made. In all there were ulcers in the ileum. The rose-coloured spots were not seen, and Dr. Ewart thinks they are not generally visible in the natives of India. Mr. Greenbow in his report of the health of the garrison during the siege of Lucknow, describes a low form of typhus (typhoid?) which was not uncommon both amongst Europeans and natives. He details one case—a fatal one—in which the symptoms of typhoid fever were well marked, but no post-mortem examination was made. Dr. Goodeve has published in the XIth number of the *Indian Annals* (p. 141), a Clinical lecture on typhoid fever, in which the subject of its occurrence within the tropics is very ably discussed. He states that the twenty-one day or three-week fever is well known to unprofessional persons in Bengal; that he has seen cases of what he is certain were “typhoid fever” in persons under 30 years of age, amongst the European, East Indian and Armenian population, in Calcutta, and he is nearly sure that he has seen it amongst natives. Dr. Goodeve then details seven cases which he had met with in hospital and private practice. They were all European or East Indians—three of them were children—the rest under 30 years of age: none were fatal. Diarrhœa and a tympanitic abdomen were present in all: in two only was the rose-coloured eruption observed. All the cases were of long duration. Many other examples seem to have fallen under Dr. Goodeve’s notice. In the last *Madras Quarterly Journal of Medical Science* there are two papers on typhoid fever—one by Mr. Rankin, the other by Mr. Cornish. Mr. Rankin relates six cases, two of which were fatal. In these, ulcers were found in the ileum—the rose-coloured eruption was observed in three of the cases. Mr. Cornish details two cases of typhoid seen by himself, which appear to have been well marked; and then relates seven cases from the records in the office of the Principal

Inspector General. They were all fatal, and in all, ulcers were found in the ileum: the rose-coloured eruption was not noticed in any of these seven cases. But in my judgment, the most valuable report upon the subject of typhoid fever in India, is by Mr. Hanbury, of H. M.'s 33rd Regiment.* The cases recorded by him occurred whilst the regiment was stationed at Deesa, and were thought to be traceable to defective sanitary arrangements.

My attention was first directed to the occurrence of typhoid fever in Bombay, in the year 1859. In January of that year, I was asked by Mr. Merwanjee Sorabjee, a graduate of the Grant College, to see a Parsee girl, about 12 years of age, suffering, it was said, from looseness of bowels, which was supposed to depend upon intestinal worms. The child was emaciated, the skin hot, dry, and harsh, the abdomen tympanitic, the tongue florid, and the pulse above a hundred. There were about four copious feculent stools, in the 24 hours, unmixed with mucous or blood. I was told that the child had been ill three weeks, that the disease came on with fever and looseness of bowels, and that the stools at first contained blood. There were imperfect remissions of the fever during the first few days of the attack, when quinine was freely given, but without effect. Latterly, these remissions were less distinct; indeed, the fever was described as continued,—the pulse rarely falling below a hundred. There was daily loss of strength after I saw the patient, and death occurred in about a week from asthenia; the duration of the attack having been in all about twenty-eight days.

The febrile symptoms were out of proportion to the local derangement, and, therefore, I concluded it was not a case of muco-enteritis; the appearance of the evacuations was opposed to the idea of its being dysentery. That it was not remittent fever seemed evident, from the imperfect nature of the remissions, the failure of quinine, and the long duration of the

* Transactions of the Medical and Physical Society of Bombay, No. VII., New Series, p. 144.

disease. Then in favour of its being typhoid fever there was the persisting diarrhœa, the tympanitic distension of the abdomen, and the slow progress of the disease. The symptoms absent, or not noticed, were the rose-coloured eruption, the tenderness and gurgling of the abdomen, deafness and delirium. Some of these symptoms may have been present and not noted; indeed my notes of this case are very meagre, and I do not by any means wish to adduce it as a typical example, but merely allude to it as the case which first led me to believe, that typhoid fever might prevail in Bombay. A few weeks after this child died, I saw with Mr. Carvalho, in the same house, a young man suffering from fever and diarrhœa. There, also, the febrile symptoms predominated, but the diarrhœa was persistent. I had not an opportunity of watching this case throughout its progress: the result was fatal. During the year 1860, I saw with the Graduates of the Grant College several cases of, what I believed to be, typhoid fever, but my visit was often a single one, and although I may have seen enough to satisfy my own mind, it cannot be expected that such cases would be satisfactory to others; I do not, therefore, use them. The first *typical* case, which I had an opportunity of watching during a considerable part of its course occurred in the year 1861.

CASE 1.—C., aged 11, a delicate looking boy, son of a Parsee gentleman residing at Mazagon, first seen with Mr. Ardaseer Jamsetjee, on the 18th July 1861. "Face pinched, and dull in expression, lips dry and parched. Is very deaf; skin hot, dry and harsh; pulse 110, easily compressible; tongue moist and florid; bowels loose and copious, pea-soup looking evacuations. Abdomen swollen, tympanitic and tender in left iliac region; no gurgling, no eruption on the skin." I learnt that he had been ill 18 days; that the looseness of the bowels and fever came on at the same time; that the stools had at first a dysenteric appearance and that the fever was continuous. There was no delirium, but he never spoke unless spoken to, and never asked for food but took readily enough what was given to him. Quinine had been freely administered during the first week of the attack. For the first five days after I saw him, there was but little change; there was neither remission nor exacerbation of the fever; the pulse ranged between 110 and 115. He passed about three or four stools in the 24 hours, copious and of a pea-soup appearance. The abdomen continued as tympanitic and as

tender. On the morning of the 23rd July several rose-coloured spots were observed on the forehead. On the following day they were gone, and did not return, and no others made their appearance; 4 days after this (July 27th) he became drowsy, the pulse was 108, and had lost strength. A blister was applied to the nucha, which seemed to remove the drowsiness; but the night of the 28th was passed with much restlessness, and a good deal of muttering delirium; the stools were more frequent and of the same character, and the tympanitic distension of the abdomen greater. Six minims of turpentine were given every third hour. On the 30th there was less febrile heat, and he sweated at times, but the pulse had risen to 118. There was no drowsiness, and the bowels continued loose. From this time he began slowly to improve; the skin became cool; the appetite returned, and the looseness of the bowels very gradually diminished. The pulse, however, did not fall much in frequency. It continued over 100 for many weeks. The convalescence was much prolonged, and it was nearly two months after the fever left him before he was restored to health. This young gentleman is now in England.

REMARKS.—There are several points in this case, which are worthy of notice: 1st—*The long duration of the symptoms.* From the commencement of the attack, viz. about the 1st July, until the first sign of amendment, 30 days elapsed; this is about the usual period, when in severe cases of typhoid fever a favourable change may be looked for. 2nd—*The long convalescence.* This also accords with what is observed in typhoid fevers. 3rd—*The deafness, the apathy, the slight delirium, the absence of anything like a perfect remission, the florid tongue, are symptoms which are consistent with its being typhoid fever.* 4th and lastly—What may be considered the pathognomic symptoms were present, the tympanitic distension of the abdomen, the persistent diarrhœa, and the rose-coloured spots.

I attended with Mr. Bhawo Dhajee in the early part of the present year a cousin of the above (but not living in the same house or neighbourhood) with very similar symptoms. About the 21st day of the disease, the patient (a boy about 13 years of age) became drowsy and comatose; dyspnœa followed, and he died in a few hours. I regret that I have mislaid my notes of this case.

CASE No. 2.—Mr. K., European, aged 23, employed in a druggist's shop in the Fort, where he was resident. I saw this case with Dr. Hunter, January

29th, 1862. The patient had been ill three weeks, but about seven days after the attack he appeared to be convalescent, and continued free from fever for eight or ten days. He then had a relapse, and the fever was more or less continuous and attended with looseness of the bowels. He was stated to be delirious at night, and not quite rational in the day. When seen by me, the skin was a little above the natural heat, the pulse 118, small and easily compressible, the tongue dry and red, and the lips parched and cracked. The face was dull in expression, and he did not apprehend what was said to him very readily, but there was no deafness. The abdomen was much distended, very tympanitic and tender in the right iliac region, but there was no gurgling. The bowels were stated to be loose, and the stools copious. Upon the front part of the abdomen, 15 rose-coloured spots were counted. They were a little raised above the surrounding skin and disappeared on pressure, but immediately returned on the pressure being removed. They measured from about half a line to a line in diameter. I did not see this patient again, but Dr. Hunter has favoured me with the following note:—"I was first called to Mr. K. on the 2nd January. He had been feeling unwell for a day or two, and complained of pain in the back, a general sense of uneasiness, disturbed sleep, and loss of appetite. The tongue was coated. Three or four days after, fever set in with bilious derangement, depression, and a dryish coated tongue. These symptoms subsided in about four days, and convalescence appeared to be established; but on the 22nd January there was a relapse, the skin became warm, dry and harsh, the tongue dry and brown, and sordes collected about the teeth. The face was flushed; there was extreme apathy, muttering delirium at night, and a constant tendency to slide towards the foot of the bed. Pressure of the abdomen, particularly in the right iliac fossa, caused the patient to flinch. The bowels were loose, evacuations varying in colour, and foetid. On the 29th, an eruption made its appearance over the body, especially over the abdomen, rose-coloured, raised, becoming pale but not entirely eradicated by pressure. On the 3rd February the eruption had disappeared. On the 7th there were profuse foetid, dark, grumous looking evacuations, after which the improvement was steady and rapid."

REMARKS.—This seems a typical case: 1st—*The slow and insidious invasion.* 2nd—*The relapse which is so often observed in typhoid fever as to be almost one of its characteristics.* 3rd—*The persisting diarrhœa, the tympanitic distension and tenderness of the abdomen.* 4th—*The long duration (more than 30 days) of the fever.* 5th—*The well-marked rose-coloured eruption.*

CASE No. 3.—Miss D'C., aged 15, Portuguese, resident at Kalbadavie. First seen with Mr. Lisboa, a Graduate of the Grant College, on the 1st

February 1862, when the following account was given of her illness. After six or seven days' lassitude and loss of appetite, fever came on without shivering or chills, and was more or less continuous with perhaps a very imperfect remission in the morning, of which advantage was taken, and quinine freely given for two or three days without effect. The bowels were easily acted upon by aperients, there having been four or five copious stools after one drachm of sulphate of magnesia had been given. When I saw her, she appeared dull and apathetic and could not be made to answer questions, and only with difficulty to protrude the tongue, which was moist, florid at the tip and edges, coated and white in the centre. The skin of the trunk was above that of the extremities, below the natural heat. The pulse was 130, small and easily compressible. The abdomen was tympanitic, and tender in the right iliac region; there was no gurgling. An eruption was carefully looked for but not found. She was said to be at times delirious. On the following day she became collapsed and drowsy, and partially comatose, but was roused by a blister to the head, application of heat, and use of stimulating enemata. Two days after this, I again saw her; she was then sensible, but dull and slow in answering questions: the tympanitic state of the abdomen continued, and the bowels were loose, the evacuations being feculent, of a yellow colour, without mucous or blood. I did not again see her until she was convalescent, but was informed by Mr. Lisboa, that several days after my last visit she gradually began to improve; the skin became cool, the bowels more quiet, and the appetite returned.

CASE NO. 4.—F. A., Portuguese girl, aged 11; seen with Mr. Mosquito, a Graduate of the Grant College, July 14th, 1862. She had been ill seven days with fever, (continued) and purging; the stools were described as being copious and of a yellowish colour. Quinine had been given. When I saw her she was deaf and delirious; the skin hot and dry; the pulse 120, small and easily compressible; the tongue dry, and the abdomen tympanitic and tender. There was no eruption,—it was carefully looked for. I did not see her again, but Mr. Mosquito informed me that she became weaker, the purging continued, the low muttering delirium passed into drowsiness, followed by coma, and death two days after I had visited her.

CASE NO. 5.—Abdool Kurreem, age 18, was admitted into the Clinical Ward Jarnetjee Jejeebhoy Hospital on the 2nd February 1862, said to have been ill with fever, more or less continuous for 15 days. There was neither diarrhoea nor tympanitic distension of the abdomen. After his admission he became delirious and violent, then drowsy and comatose, and died the day after admission.

Post-mortem appearance.—Left lung consolidated from fibrinous effusion; the lower part of the ileum of a dark colour externally. On opening the intes-

tine, Peyer's glands were found to be extensively diseased. The lower patches were ulcerated, those a little above had a sloughy appearance, and patches still higher in the intestine, were congested and swollen.

Besides these cases I have seen others where the symptoms of typhoid fever seemed to me sufficiently marked to warrant that disease being diagnosed; but, as before explained, my opportunity of watching these cases was not such as to justify me in recording them.

DIAGNOSIS OF TYPHOID FEVER.*

It may be stated with confidence that there is no one symptom, the absence of which in itself invalidates the existence of typhoid fever. The diagnosis rests upon a consideration of the symptoms as whole, on the mode of commencement, the progress and duration of the attack, and the long convalescence. The rose-coloured eruption, which Dr. Jenner seems, to have very generally noticed in persons under 30 years of age is now well known to be frequently absent. Often overlooked, it cannot, even when carefully sought for, always be found. Dr. Peacock states that out of 71 cases, it was unmistakably present in 50 only, having been absent in nearly one-third of those observed.† I cannot indorse the opinion that the rose-coloured spots would not be visible in natives,‡ nor that they might readily be mistaken for flea-bites or prickly heat.§ Their elevation above the skin, their change of colour on being pressed, the absence of any central distinctive point either of colour or acunination, their situation and evanescence, are to my mind, sufficiently characteristic to render their recognition a matter of

* There can be no question that the use of the term typhoid has been an obstacle to correct diagnosis. Typhoid or dynamic symptoms are perhaps as common in remittent as in typhoid fever so called, and if this is overlooked and undue weight given to them, the prevalence of the latter will be exaggerated. On the other hand, if no case of fever is to be considered "Typhoid," in which these symptoms are absent, our estimate of the relative frequency of this form of fever will be too limited.

† Medical Times and Gazette, 1856, Vol. II., p. 56.

‡ Indian Annals, No. vii., p. 65.

§ Transactions Medical and Physical Society of Bombay, No. viii., New Series, p. 144.

no difficulty.* Whether there is ground for believing that the eruption is a less frequent accompaniment of typhoid fever in this country than elsewhere, must be left for further investigation. Admitting the presence of the eruption as an important positive sign in diagnosis, its absence has little negative significance. The condition of the abdomen affords, perhaps, more reliable information. Tympanitis appears to be rarely absent, and gurgling and tenderness in the right iliac region are generally present. Looseness of the bowels is a very variable symptom; sometimes, it has so much prominence as to fix the attention upon the abdomen and lead to the belief that dysentery or diarrhœa, is the primary, or perhaps, only disease; at other times the bowels have been regular or constipated, and this, when a post-mortem examination has revealed very considerable disease in the small intestines. Much weight should be given to the attitude and expression of the patient, and the state of the mind, &c. The decubitus on the back, the dull and apathetic expression of face, the unwillingness to engage in conversation, though questions are readily answered, the dry parched lips, the occasional delirium, the deafness, are, taken together, very characteristic of the disease; and when the attack is slow and obscure at its commencement, has resisted quinine in full periodic doses, and has a duration of from twenty-five to thirty days, very little doubt need remain of the disease being typhoid fever, notwithstanding that the eruption is absent, and the abdominal complication little marked. My own belief, however, is that the cases are very exceptional in which with the symptoms just stated, the abdomen is not tympanitic, and the bowels, if not loose, acted upon by far too readily by even the mildest aperient. The mode of commencement of the attack is certainly different from that of the malarious fevers. From the first sign of deranged health, many days often elapse before the febrile symptoms are developed. In remittent

* The remark that "the rose-coloured eruption cannot be seen through the dark-coloured layers of the native integument" would not apply to Parsees in Bombay, and yet in this class of persons I have very rarely seen it; but this may have arisen from my opportunities of watching for it having been few.

fever, on the contrary, the attack is often sudden and the symptoms well marked within a few hours ; and in like manner these fevers are equally dissimilar as regards their duration, and the period of their convalescence. Remittent fever lasting for twenty-five or thirty days, has been in my experience an unusual occurrence, and when thus prolonged recovery very rarely observed.

As regards the morbid anatomy of typhoid fever, it is of much interest to determine the importance that should be attached to ulceration of Peyer's glands. It is well ascertained that the amount of ulceration and the febrile symptoms are in no way related. In the worst cases, when death takes place at an early period, the evidence of glandular disease is very slight. But the question of most importance to be determined is, the weight that should be given to such ulceration as a positive or exclusive sign. Some writers appear to view it when febrile symptoms have been present as absolute proof of the previous existence of typhoid fever, and in many of the cases recorded, as having occurred in India, the diagnosis was founded upon this morbid appearance. Others, again, believe it to be a common pathological change. Morehead states* that turgescence or ulceration of Peyer's glands occurs in cholera, in protracted diarrhœa, in acute muco-enteritis, as an occasional complication of remittent fever, and a frequent one of phthisis pulmonalis. Putting out of consideration phthisis and dysentery, my belief is that Peyer's glands are seldom ulcerated in the diseases of tropical countries. Comparatively few cases are recorded, and in my own experience, I have rarely observed it, except in connection with the diseases just mentioned. This observation, if true, is calculated to negative the frequent occurrence of intestinal complication in remittent fever, as, from the mortality, and frequency of this form of fever in India, ulceration of Peyer's glands should be a common, in place of being a rare, phenomenon. It is true that from time to time, cases of so-called remittent fever are

* Researches on Disease in India, p. 161.

recorded, in which glandular ulceration is noticed. Some of these cases, however, more nearly resemble typhoid than remittent fever. But whilst I am quite satisfied that Peyer's glands are rarely ulcerated in malarious fevers, I am not prepared to assert that they never are. Further investigation upon this point would seem to be required, and in the meantime, the existence of such ulceration, in connection with fever, should lead to a very careful inquiry into the symptoms, mode of invasion, and progress of the case during life. The rarity of enteric ulceration in tropical fevers, tends to show that if typhoid fever does exist, it is either an uncommon, or at all events not a frequently fatal disease: at the same time it must not be overlooked that fatal cases of typhoid fever are met with in which, should death have taken place in the early stage, the glands may not present any appearance of ulceration, and but little of turgescence. The inference to be drawn from the negative facts just stated, is not that typhoid fever is unknown in this country, but simply that it is not often fatal in the advanced stage.

Lastly, it is important to remember that there is not the marked distinction, in tropical countries, between *remittent* and *continued* fevers, which their designation would imply. The sympathetic fever in compound fracture or other severe injury, is often as distinctly remittent as is that which results from malaria. This has been so frequently observed by my colleagues and myself in the Jamsetjee Jejeebhoy Hospital as to be quite certain. Whatever the influence may be which favours remissions in sympathetic fever, it is more than probable that it will be equally operative in giving a remittent character to fevers, which in other countries would be of a continued type. Hence, in this country one of the distinctive characters between fevers of the remittent and continued type is wanting, and this increases the difficulty of diagnosis between typhoid and the malarious fevers, and renders it necessary that every circumstance in the history and progress of the attack should be fully weighed.

PREVALENCE OF TYPHOID FEVER IN THE BOMBAY PRESIDENCY.

Assuming that the facts which have been recorded are sufficient to place the occasional occurrence of typhoid fever beyond reasonable doubt, it may be of interest to inquire to what extent it prevails in the Bombay Presidency. The nominal returns of diseases from hospitals throw no light on this point, as there is no heading in them, by which typhoid may be distinguished from other fevers. It occurred to me, however, that it might be sometimes returned under other headings, and that it was, consequently, desirable to examine the diaries of the cases, and the records of post-mortem examinations, forwarded by medical officers, to the head of the Medical Department. By the kind permission of the Principal Inspector General, I have been permitted to read over the fatal cases received in his office during the last 3 years, of officers, Europeans soldiers and sailors, and patients in the European General Hospital. They amount in all to 692, viz. 54 officers, 288 soldiers, 40 sailors, and 310 inmates of the European General Hospital. From amongst the former, the following case (summarised) is the only one, which bears any close resemblance to typhoid fever.

Ensign ———, age 19½ years; 2 years in India; 31st Regt. N. I., Deesa; admitted 29th May, died 20th June.

Was first seen May 29th 1859, at 5 P.M. He had been feeling feverish for 2 days, but had attached no importance to it, beyond taking a few doses of saline medicine. When seen he was lying on his cot complaining of headache and thirst; the skin was slightly hot, but not dry, the tongue moist and a little coated in the centre, the bowels free, and the pulse excited (frequent). It was believed that he had exposed himself a good deal to the sun, walking about without his hat. Salines were given, and on the morning (May 30th) 4 grains of quinine, which were repeated every 3 hours, until 3 P.M., when a febrile exacerbation came on. At 5 P.M. the fever was said to be going off. The bowels had been moved three times during the day. The tongue was red at the tip, coated in the centre; the pulse not so full as the day before; the skin hot and slightly moist. There was no nausea, nor abdominal tenderness. He complained of throbbing pain in the temples, and of thirst. Leeches were applied to the temples, and the quinine continued. On the following evening he felt better, the febrile exacerbation having been slight, but he complained of giddiness on attempting to move. The bowels continued loose.

The quinine was repeated. On June 1st he had a slight febrile accession, and he still complained of much giddiness. On the following day he is described as doing well, and until the 8th he appears to have had but little fever, but his bowels continued loose and he gained no strength. On the evening of the 8th he was suddenly seized with severe pain and tenderness of the abdomen a little above the symphysis pubis; this was preceded by profuse purging. On the following morning the skin was somewhat cold and the pulse feeble. By the use of fomentations and turpentine stupes the pain was somewhat relieved, but the abdomen became tympanitic, and nausea and vomiting set in. On the 11th the tongue was dry and coated; abdomen much distended and tender; pulse feeble (about 72?); aspect sunk and anxious; bowels not loose. The night of the 11th was passed in quiet sleep. On the following day, the pulse was 96; tongue dry and florid at the tip and edges. The abdomen was much distended from tympanites. During the day he vomited frequently, and in the evening the skin became cold and clammy, the pulse rising to 108. For several days there was but little change in his symptoms. On the 14th he was thought to be a little better. On the 16th the abdomen is said to have been softer but still tympanitic, and on moving from side to side a gurgling sensation was felt. The tongue was somewhat coated and dry. A bad sore had formed on the right hip and shoulder, and another was forming over the sacrum. On the 20th the pulse was rapid and feeble (114), abdomen tympanitic; bowels had been irregular for some days, sometimes two or three stools and then none until an aperient or enema had been given. On the 21st had passed a very restless night, was troubled with dyspnoea and palpitation, which were attributed to the tympanites having increased so much as to encroach upon the chest. The pulse was 120 and very feeble. He died at 6 A.M. of the 22nd June—a large quantity of stercoraceous matter having been vomited just before his death.

Inspection.—General adhesions of the convolutions of the intestines by lymph effusions; these were best marked near the lower part of the ileum. About 3 feet from the caput coli, several livid marks were observed on the peritoneal surface of the ileum, of a gangrenous appearance; these became more numerous towards the lower end. About 12 inches from the cæcum a slough was noticed, passing through the whole of the coats and permitting of the escape of faecal matter. The mucous membrane of the large intestine was quite healthy.

The fatal cases of Soldiers and others occurred in the European troops of the late East India Company, serving in this Presidency, amongst the Soldiers of the Indian Navy, and the patients in the European General Hospital: they are distributed as follows:—

Artillery	114	Cases
Cavalry	11	"
Infantry	134	"
General Hospital	310	"
Indian Navy	40	"
Ordnance and Engineer Depart- ments	11	"

I have been able to find 4 cases only which are sufficiently well marked to entitle them to be recorded : they are summarised below.

Charles Dennett, age 28 years; 2 years in India; Private, 3rd European Regiment. Admitted into Hospital January 7th, died 14th January 1861.

He had been suffering from fever for three days before his admission, and when first seen complained of headache, and had a furred tongue: the bowels were not loose, and no tympanitic distension was noticed. On the day following his admission he was free from fever, when quinine was given in 3 grain doses; the next day he was also without fever, but on the day after that it returned and never left him up to the time of his death. The symptoms during this period were great uneasiness, restlessness, and delirium at night, looseness of bowels, a dry and furred tongue, sordes about the teeth, suffused eyes, hurried breathing and subsultus tendinum. No eruption is mentioned, nor is the state of the abdomen noted.

Inspection.—Nothing of importance observed in the head or chest. The small intestines were healthy except the ileum, in the mucous membrane of which, and in the cæcum, there was turgescence, with small patches of ulceration.

Remarks.—This case was returned as common continued fever. It appears to have presented many of the characters of "Typhoid," and if this is considered in connection with the state of the ileum, little doubt as to its nature will probably remain. If it was not typhoid fever it must have been "Remittent," but certainly no distinct remissions are noted in the diary of his case. Quinine was given in 5 grain doses and repeated every 3 hours.

John Cooper, age 20 years; 3 years in India; Private, 3rd European Regiment. Admitted 18th, died 26th May 1860.

A weakly looking lad, who had been for some time out of health without appetite, was admitted with fever which came on without rigors. On the day following his admission, there appeared to be a remission, when quinine was given, but the fever returned with diarrhœa, and the tongue became

parched and dry, and the pulse small and weak. On the 25th he passed stools of a reddish-brown colour, from the presence of blood. On the 26th he rapidly sunk.

Inspection 2 hours after death.—There were crude tubercles in the left lung. At the lower part of the ileum there was a deeply excavated ulcer about the size of a crown-piece.

William King, age 23 years; 9 months in India. Admitted 21st July 1859, died 6th August 1859.

When admitted he was feverish and complained of pains of the limbs. After an emetic and purgative had been taken, the febrile symptoms subsided, and quinine was given, but the fever returned four days after admission, and gradually became more severe, with dry and brown tongue, restlessness and delirium. On the 1st and 2nd August, the heat of skin was less, but the dryness of the tongue and the frequency of pulse continued. Diarrhœa set in on the 2nd August, and continued till his death. On the evening of the 3rd he was drowsy with a tendency to coma, but rallied from this on the following day. On the 6th there is the following note:—"Is much worse this morning and in a low sinking state: bowels were moved three times in the day, and the same number of times in the night, stools fluid, feculent, and deeply tinged with blood. Has now wandering delirium—subsultus tendi—num; small weak pulse, scarcely appreciable." In the evening of this day he became comatose, and died at 4 o'clock the following morning.

Inspection 5 hours after death.—With the exception of some serum at the base of the brain, that organ, as well as the organs of the chest, were healthy. The liver and spleen were somewhat enlarged. At the lower part of the ileum, the mucous membrane was injected, and there were three dark excavated ulcers. There was no ulceration in the large intestines.

Remarks.—The post-mortem appearances were those usually found in 'Typhoid Fever,'—the symptoms were quite consistent with this view of the case, though one of the characteristic symptoms is not noted.

Samuel Florence, age not stated, Private 3rd European Regiment; 1 year and 6 months in India. Admitted 13th May, died 7th June 1860.

When admitted he is said to have had fever, which subsided after the action of an emetic and purgative, but returned in 9 or 10 days with looseness of the bowels. The skin is described as dry, and the tongue furred. There were four or five fluid feculent stools, and on two occasions they contained blood. Tenderness was felt in both iliac regions. Afterwards the tongue became furred and dry, and the stools more frequent, and he was delirious at night. He did not become comatose, and appeared to die from exhaustion.

Inspection 6 hours after death.—Head not examined. Thoracic organs healthy. The mucous membrane of the ileum at its lower part was much congested and covered with several patches of ulceration, the longest being close to the ileo-cæcal valve. The colon was healthy, except at its junction with the ileum, where the mucous membrane was injected.

Remarks.—This case was entered as common continued Fever at first, and afterwards as Enteritis.

For the last three years, I have examined nearly all the patients admitted into the Jamsetjee Jeejeebhoy Hospital, but I am unable to bring forward any case which, as regards symptoms and morbid appearances, is so characteristic, as to be free from all doubt. Many of these patients were admitted in the last stage of disease, when the symptoms of the affection from which they were suffering had, in a great measure, ceased to be apparent. I thought it was possible that instances of typhoid fever might, on this account, be overlooked, the death being returned as cachexia, diarrhœa, or malarious fever. It, therefore, seemed necessary to ascertain by post-mortem examination whether the appearances usually found in typhoid fever were often present or not. With this object I caused the 'ileum' to be examined in every fatal case that occurred during a part of the year 1861; that is, in every case where the scruples of friends of the deceased did not stand in the way. The number of bodies so examined amounts to one hundred and eleven. Peyer's glands were found to be diseased in 16 cases, as follows:—

	Disease.
1 unusually injected	Myelitis.
1 „ prominent	Cirrhosis.
1 „ „ and red	Phthisis.
5 ulcerated	Phthisis.
2 „ .	Dysentery.

Six times ulcerated in doubtful cases. Of the latter, three patients were picked up in the road by the Police. Nothing more of their history could be ascertained beyond the fact of their having suffered from looseness of the bowels. In these there were ulcers in the ileum, varying in size and number. In

one, tubercular deposit was found in the lungs. In the others no disease, except that in the ileum, could be discovered. Of the remaining three cases, one was cholera, in which there was a single large ulcer, in the lower part of the ileum; another, looseness of the bowels of 2 months' standing, wherein Peyer's glands were ulcerated, there being also some, though not much, disease of the large intestines; the third case had been long in the hospital with enlarged lymphatic glands. Granular lymph deposit was found in the ileum, the solitary glands were enlarged, and a slough, of the size of a two-anna piece, was observed near the lower end of the ileum.

It must be confessed that there is nothing in the result of these examinations to favour the view, that typhoid fever has occurred to any extent in the hospital, and been overlooked. Two of the cases, just mentioned, may have been examples of that disease, and this, perhaps, is as much as can be said. It should not be forgotten that the patients in the Jamsetjee Jeejeebhoy Hospital are, for the most part, adults, while Typhoid fever chiefly prevails in persons under 20 years of age.

In order still further to bring the experience of the Jamsetjee Jeejeebhoy Hospital to bear upon this point, I have looked through the records of the Clinical Wards, for the last ten years. The number of fatal cases examined, has amounted to two hundred, as follows:—

Fevers	..	..	..	..	..	28
Hepatic diseases	..	..	..	..	..	34
Dysentery	..	..	..	..	..	37
Renal disease	..	..	..	..	..	18
Pulmonary	„	..	..	..	..	57
Cerebral	„	..	..	..	..	5
Cardiac	„	..	..	..	..	13
Peritonitis	..	..	..	..	..	5
Tetanus	..	..	..	..	..	3
						—
Total..						200

The notes of these cases have been kept with much care, and the post-mortem appearances, for the most part fully recorded. Of these 200 cases, the ileum is stated to have been free from disease in 120; in 50 its condition is not mentioned, but it was probably healthy; in the remaining 30 cases it was diseased as follows:—

Peyer's glands were ulcerated in..	..	14 Cases.
„ „ prominent ..	..	5 „
Granular exudation on mucous membrane	7	„
Redness of mucous membrane ..	..	4 „
<hr/>		
Total..		30

With a single exception, the ulceration of Peyer's glands occurred when death had clearly been caused by phthisis. The granular exudation was found in dysentery; the prominence of the glands, without ulceration, and the redness of the mucous membrane, in bronchitis, phthisis, and remittent fever. The exceptional case above referred to, is as follows:—

Jockey Deas. Age 30 years; Native Christian, Cook. Admitted into the Clinical Ward, December 10th 1857, died on the 14th.

He had been ill with fever and cough for 5 days before admission. When admitted he was drowsy and could scarcely be got to answer questions; the skin was hot and dry; the pulse 150 and small; the tongue thickly coated white in the centre, and florid at the tip and edges. The bowels were not loose, nor the abdomen distended. He became delirious at night and diarrhoea set in, the evacuations being passed in bed. Pneumonia of the upper lobe of the left lung was detected by physical signs two days after admission. He rapidly lost strength, and died four days after admission.

Inspection.—The intestines were distended, and there was red discoloration of the mucous membrane. Two or three patches of Peyer's gland at the lower part of the ileum were ulcerated. The upper lobe of the left lung was in a state of grey hepatization. The kidneys were enlarged, the cortical part of a yellowish colour and encroaching upon the tubules.

From the foregoing facts it will be apparent that there is nothing in the experience of the Jamsetjee Jeejeebhoy Hospital, and but little in that of the European General Hospital at Bombay,

or of the hospitals of certain European corps, to warrant the inference that typhoid fever is otherwise than a very rare disease. Indeed, so far as the Jamsetjee Jeejeebhoy Hospital is concerned, it might be doubted whether it prevails amongst the class of persons who seek admission into it; for admitting that many cases end in recovery, we should still expect to find the records at least of some fatal cases. Satisfied as I am from what I have seen out of the hospital, that typhoid fever *does* exist in Bombay, I have been surprised, and somewhat, perhaps, disappointed at these negative results; still I have thought it right to bring them before the Society.

ON THE CONVERSION OF CALOMEL INTO CORROSIVE SUBLIMATE BY AMMONIACAL SALTS.

By R. HAINES, M.B., Professor of Materia Medica, Grant College.

. Read November 1862.

The instability of the sub-compounds of mercury has long been matter of common observation. One of the most powerful agents in changing their condition is light, by exposure to which the suboxide passes quickly into the state of protoxide, and the subiodide into that of protoiodide. Heat, or the influence of chemical re-agents, not necessarily oxidizing or the reverse, sometimes brings about the same change. It is to be noted however, that the change is not strictly one of oxidation. The chemical effect of light, when exerted at all, appears to be invariably that of deoxidation; thus the oxides of gold and silver are reduced to suboxides or metal, ferricyanide of potassium to ferrocyanide, perchloride of iron to protochloride, and so on. And this in reality is what occurs in the case of mercurial compounds. The primary action is the liberation of metallic mercury, but the halogen or the oxygen thereby set free, and in contact with the sub-compound still unchanged, unites with it and forms the proto-compound. Thus the total effect of such an agent as light is to break up the sub-compound into metallic mercury and a proto-compound. One of the most decided direct proofs of this being the operation of light is, that although light produces protoxide of mercury from the suboxide, the protoxide of mercury itself (the precipitated variety) is partly decomposed by exposure to sunlight, and the blackening of the powder shows that metallic mercury is set free. In view of these facts the evolution of oxygen from the leaves of plants by exposure to light may be inferred to be a simple chemical phenomenon, not connected with the vital energies of the plant further than this, that by the influence of the latter the vegetable juices are made

to circulate, and thus duly to expose themselves to the action of the sun's rays.

But my object in commencing these remarks was not so much to describe the mode in which a change of this kind is effected, as to call attention to the reality of its occurrence in mercurial compounds in less familiar instances. Calomel, the subchloride of mercury, is fortunately far less liable to conversion into metallic mercury and corrosive sublimate than other sub-compounds into their corresponding proto-compounds, the reason apparently being the far greater affinity of chlorine, than of oxygen or of iodine, for mercury. Were it not for this, calomel could not be the safe medicine which it is, and many an accident would cause in it the development of corrosive sublimate, to the imminent danger of the patient and the discredit of the prescriber.

A case has lately come to my knowledge which, although not under my own observation, is detailed by the attending medical officer with great care and minuteness, and which led at the time to a grave suspicion that calomel, internally administered, had become converted in the stomach into corrosive sublimate, for the patient ultimately succumbed under violent inflammation of the mucous surfaces of the alimentary canal. The case was this. An European soldier on a foreign station was attacked with fever of a remittent type, but of no unusual degree of severity. The patient was treated with mild purgatives and with quinine in the intervals of remission, and after a few days he was in the opinion of his attendant progressing favourably. At this juncture the senior Medical Officer of the station visited the patient, expressed his dissatisfaction with the mode of treatment, undertook the management of the case, and prescribed the following medicine :—

R

Calomel : gr. iii.

Pil : Rhei [Co.] gr. iii.

Ext : Hyoscyami gr. i.—M. ft. Pil : ii .

2ndis horis cum Haustu sequenti exhibendæ.

29 M

R

Liq : Ammon : Acet : $\mathfrak{z}_{ss}$ Mist : Camphoræ $\mathfrak{z}_{ss}$

Ammon : Sesquicarb : gr. x.—Misce.

Four doses appear to have been taken. Vomiting and acute pain in the belly followed the exhibition of the second dose, and the symptoms of gastric irritation never left the patient until his death, which happened four or five days after. An examination of the body after death showed signs of acute inflammation of the gastric mucous membrane, and several ulcers in the cardiac extremity of the stomach, besides an extensive gangrenous ulceration at the back of the pharynx.

As these morbid appearances had no seeming connection with the disease for which the patient was first put under treatment, but on the contrary was so remarkably similar to those which are produced by the action of corrosive sublimate, and as the symptoms of the inflammation which caused them came on simultaneously with the administration of medicine containing calomel, it became a matter of interesting inquiry whether the calomel might not have become converted in the stomach into corrosive sublimate. Now, as the calomel was given simultaneously with a draught containing acetate and carbonate of ammonia, it appeared not impossible that the change, if it had really taken place, was effected by the action of the ammoniacal salts.

It was noticed at the time the medicine was prepared for the patient that the solution of acetate of ammonia was highly acid to test paper, but the addition of so large a quantity of carbonate of ammonia in all probability must have reversed this re-action, and rendered the liquid highly alkaline. The formula of the London College for the preparation of the Liquor ammonia acetatis requires that nine drachms, "or as much as may be sufficient" of sesquicarbonate of ammonia be dissolved in their diluted acetic acid, until the latter is saturated. This last direction is in practice little attended to, but the prescribed

quantities are mixed without further trouble. Now the strength of the diluted acetic acid is stated to be such that one fluid ounce is exactly saturated by 57 grains of crystallized carbonate of soda (NaO , CO_2 , 10 aq :). A pint will therefore saturate 1140 grains, which is equivalent to 466.7 grains of pure, fresh sesquicarbonate of ammonia ($2\text{NH}_4\text{O}$, 3CO_2). But the quantity specified as that probably requisite is 9 drachms, or 540 grains. If then the sesquicarbonate of ammonia be perfectly fresh, by using this quantity there will be in each pint of solution of acetate of ammonia an excess of 73.3 grains of sesquicarbonate, or in each half ounce, the dose on the present occasion, 1.8 grains. But by keeping and exposure the sesquicarbonate is constantly losing ammonia and passing into the state of bicarbonate. If this transformation should be quite complete, the salt will have a composition expressed by the formula NH_4O , HO , 2CO_2 , so that there will be required for each pint of dilute acetic acid 590 grains, instead of 540. There will thus be in each pint a deficiency of 50 grains, or in each half ounce 1.25 grain, equivalent to .93 grain of sesquicarbonate. Thus, according to the condition of the ammoniacal salt, there may be in each half ounce a maximum excess of 1.8 grain of sesquicarbonate, or a deficiency of .93 grain, but in practice these extremes will seldom be reached. It is evident then, that unless very great errors indeed had been committed in the compounding, the addition of 10 grains of sesquicarbonate of ammonia to half an ounce of the solution, even if this were originally acid to the full extent of the equivalent of nine-tenths of a grain of the sesquicarbonate, must have substituted for the previous acidity a still more decided alkaline re-action; so that the conclusion can hardly be avoided, that in the case in question the draught given with the calomel contained a large excess of carbonate of ammonia.

The power of ammoniacal salts, and especially of the carbonate, to convert calomel into corrosive sublimate, has been already recognised.* In a case recorded in the *Journal de*

* See Gmelin's *Handbuch der Chemie*, 4te Aufl. III., 513.

Pharmacie to have occurred in Paris in the year 1840, it seems to have been acknowledged that such a conversion was effected by the agency of a neutral salt, the hydrochlorate,* but no experiments are related which show the possible extent to which the change may proceed. To determine the influence of the acetate, as well as of the carbonate, the following experiments were made:—

Two fluid ounces of the solution of acetate of ammonia were made according to the directions of the London Pharmacopœia, great care being taken to make the solution exactly neutral. It was then divided into three equal parts. To the first were added 20 minims of acetic acid, sp. gr. 1·042, to the second 13 grains of sesquicarbonate of ammonia, and the third was kept neutral. Each portion was poured into a small long-necked phial; 5 grains of calomel (previously ascertained to be pure) added to each, and the phials filled with water nearly to the mouth. They were then corked and placed for an hour and a half in a water bath, the temperature of which ranged during the time from 98° to 102° Fah. A fourth exactly similar phial, containing distilled water and 5 grains of calomel, was placed with the others in the bath. The phials were occasionally shaken, and at the expiration of the time the contents were poured out and thrown upon a filter.

In the acid liquor the calomel had acquired a pale French gray colour; in the alkaline liquid it was of a decided ash gray; in the neutral liquid a pale ash gray, and in the water it was unchanged. On examining the filtrates, the acid liquor gave with nitrate of silver a turbidity but no distinct precipitate, and with sulphuretted hydrogen an olive brown coloration but no immediate precipitate. The alkaline liquor, first acidu-

* See *Edinburgh Medical and Surgical Journal*, LIV., 250. Some powders containing calomel and sal-ammoniac were given to a child, which thereafter died with symptoms of irritant poisoning. The druggist was prosecuted for substituting corrosive sublimate for calomel, but no proof of this was adduced, and the evidence of M. Mialhe was decidedly in favour of the calomel having been changed in the stomach by the agency of the ammoniacal salt.

lated with nitric acid, gave with nitrate of silver a copious precipitate, and with sulphuretted hydrogen an immediate and copious black precipitate. In the neutral liquid the same re-agents produced similar, but less copious precipitates; the water gave no indication of either chlorine or mercury. That the mercury in solution existed in the condition of a protosalt was shown by the action of iodide of potassium, the careful addition of which to the neutral and alkaline solutions caused the formation of a precipitate at first white, and then passing through pink to a brilliant scarlet.

One half of each liquid having been reserved for a quantitative analysis, sulphuretted hydrogen in excess was now passed through the first three liquids. After boiling, the precipitates were collected, washed by decantation, and dried on a watch glass. The precipitate of sulphide of mercury yielded by the acid liquid was too small to be weighed; that from the alkaline liquid weighed $\cdot 61$ grain, and that from the neutral liquid $\cdot 15$ grain, equivalent to $\cdot 713$ and $\cdot 163$ grain of corrosive sublimate respectively. It is therefore clear, that under conditions as nearly as possible similar to those in which medicine would be placed in the stomach, $2\frac{1}{2}$ grains of calomel with solution of acetate of ammonia containing $6\frac{1}{2}$ grains of sesquicarbonate of ammonia in excess, may in one hour and a half produce $\cdot 713$ grain of corrosive sublimate, equivalent to $27\frac{1}{2}$ per cent. of the calomel employed, or if perfectly neutral $\cdot 163$ grain. Probably a prolonged action would proportionately increase the amount of corrosive sublimate, so that four doses of the kind prescribed in the case above mentioned might possibly yield some 6 or 8 grains of corrosive sublimate.

Two other and similar sets of experiments were made, but as the temperature was not maintained so regularly within the limits of the animal heat, no quantitative analysis was made. The action of the tests, however, was much the same, but there were indications that the elevation of the temperature by a few degrees caused a sensible increase in the chemical action.

In the state of a neutral salt, the action of the acetate thus far appears greatly to exceed that of most other salts of ammonia in converting calomel into corrosive sublimate, and in an alkaline condition its action is evidently so energetic, as to make it exceedingly dangerous to administer these two preparations at the same time.*

* After the reading of Dr. Haines' paper a Committee was formed, for the purpose of carrying out some experiments in elucidation of this subject: the report of the Committee is contained in the *Appendix*, Article No. 2.

ON THE OPERATION FOR ELEPHANTIASIS SCROTI; WITH CASES AND REMARKS.

By Assistant Surgeon G. R. BALLINGALL, M.D., Professor of Surgery,
Grant Medical College, Bombay.

Read October 1862.

The object of the present brief communication is to put on record my further experience of the operation for Elephantiasis of the Scrotum. Since the date of the last paper, published in the Society's Transactions (No. 4, New Series), I have removed ten tumours successfully, two of these being of considerable size. These, with eleven previously recorded, amount to twenty-one, to which must be added two formerly alluded to as operated on by Mr. Burjorjee Dorabjee, and one since removed by Mr. Cowasjee Hormusjee. There is thus a total of twenty-four cases with two deaths, a small mortality when we consider the serious nature of the operation where the tumour is large.

I have nothing to add regarding the pathology of the disease, as further observation has only confirmed the opinion formerly expressed, as to its local nature; and with reference to treatment, the only point requiring notice is the benefit derived from change of air to the interior of the country. The disease, so far as I have seen, is confined to the sea coast, and several private patients have derived benefit from a residence in Poona, though unfortunately the amendment is only temporary, the disease beginning again to progress on a return to Bombay. The affection is commonly attributed by natives to eating fish; this cannot, however, be the cause, as a large proportion of the patients have been Bunias, who never use this article of food.

Of the ten cases only two require particular notice; of these I shall give a short account: one is interesting from the great

size of the tumour which, after removal, weighed 106½ pounds; the other from its complication with hernia.

CASE 1.—N. I., a cachectic-looking Parsee, aged 45, was admitted into Hospital on 18th August 1861, with hypertrophied scrotum. The tumour was of considerable size, being about two feet long and the same in breadth. The disease was said to have commenced about fifteen years before, and during its progress the patient had suffered from repeated attacks of erysipelatous inflammation, with fever. These have latterly recurred every two or three months, and when admitted, he was suffering from one of them.

Owing to his debilitated condition I was at first unwilling to interfere, but at his urgent request the operation was performed under chloroform on 12th September. After exposing the penis the neck of the tumour was transfixed from above downwards in the middle line, the knife emerging in the perineum; a strong double ligature of cord was then passed through this incision, and the ends being brought up round each side, were fixed to an "ecraseur" by which the ligatures were tightened as much as possible. The whole mass beyond including the testicle was then rapidly removed by double flap incision. The bleeding was moderate, and after the principal vessels had been secured, the *ecraseur* was removed. While examining the wound, the right flap was raised, when a gush of somewhat turbid serous fluid took place, and on further investigation, it was found that the end of a hernial sac had been cut off, the finger passing freely into the abdomen. On the left side there was also a hernia, the sac having just escaped, and the fluid contents receiving a distinct impulse on coughing. There was considerable shock, requiring the free use of stimulants. The edges were brought together by metallic sutures. The tumour after removal was found to weigh upwards of forty pounds.

The recovery, though somewhat slow, was steady; no peritonitis followed, and the only circumstance requiring notice was the necessity of emptying the bladder by catheter, soon after the operation. Retention of urine has, I may mention, occurred in several cases. The patient was discharged well on 29th November, there being a distinct hernial protrusion on each side.

CASE 2.—P. I., a Khoja, aged 37, who had been resident for about twenty years at Zanzibar, was admitted on 20th July 1862. The tumour was of enormous size, measuring round from groin to groin 6 feet, and in transverse circumference 5 feet. The disease was of seventeen years' standing, and during its progress he had suffered from irregular febrile attacks with inflammation, these being most frequent in the wet season. Suppuration had followed tapping with a trochar, but the wound healed before admission. The patient did not seem very cachectic, though his pulse was extremely small.

The operation was performed on 26th July, exactly as detailed in the first case, except that the ligatures round the neck were tightened by two tourniquets. Much difficulty was experienced in the manipulation owing to the enormous size of the tumour, which after removal weighed 106½ pounds.

The after shock was very great, re-action not being properly established for some days, chiefly in consequence of considerable hæmorrhage on the following day. The patient suffered also from irritability of stomach, and disinclination to take food. The subsequent recovery was, however, uninterrupted, and he was discharged well on 4th September.

REMARKS.—The extreme debility of the first patient suggested the propriety of taking some steps to prevent bleeding, and the best method seemed to be the double ligature round the neck of the tumour. This can be passed without much loss of blood, as, by keeping in the middle line, the principal arteries (the external pudic and the superficial perineal) are avoided. The principle I believe to be good, but the instruments used were not very efficient, the ecraseur, owing to the fineness of the screw, tightening the cords too slowly, while the tourniquets were in the way. The best apparatus would, I believe, be a modification of the "ecraseur" with a larger screw like that of the tourniquet.

The presence of hernia was a serious complication in the first case, though fortunately no bad consequences followed the opening of the sac. The patient was most carefully examined before the operation by myself, and also by Dr. Peet, when he was on the table; but though hernia was suspected, its existence could not be positively ascertained owing to the sacs being empty. More information is desirable respecting the cases in which this complication has existed, as, though Mr. Webb of Calcutta alludes to the necessity of careful examination, I can find no mention of any instance where hernia was present. I propose shortly to operate on a patient who has reducible hernia on the right side, and shall endeavour to preserve the sac by beginning at the lower part of the testicle and dissecting carefully upwards. Should this operation be performed, I shall lay the result before the Society.

Note by the Secretary.—I avail myself of Dr. Ballingall's permission to state, in a note, the results of the microscopic examination which I made, of the large tumour removed from CASE No. 2. The surface of the tumour was tuberculated, but none of the tubercles appeared to contain lymph, having already become consolidated. The *cuticle* was little, if at all, hypertrophied, but the papillary layer of the *corium* was enormously developed; the *papillæ* being $\frac{1}{30}$ to $\frac{1}{55}$ in. in length, and of very varying shape, sometimes bifid, and once at least forming a complete loop. Similar large papillæ are found in other parts, as the leg and foot, affected with elephantiasis. All contained capillaries, sometimes filled with dark pigment. The deeper layer of the *corium* ($\frac{1}{3}$ to $\frac{1}{2}$ in. thick) had a reddish-grey tint, and was marked with vertical lines or streaks, which were owing to blood-vessels passing in an upward direction; the calibre of the latter was changed, and their walls much thickened, but in no other part did the involuntary muscular fibre seem abundant. Below this, the structure of the tumour seemed to be composed of the fibrous tissues only, diminishing in consistence, as usual, towards the centre.

Having on various occasions since the publication of my remarks on Varicose Lymphatics (Trans. Med. and Phys. Soc. of Bombay, Vol. VII. New Series) had the opportunity of examining patients affected with Elephantiasis, and also several of the tumours removed, I may add that the opinion then expressed, of the close connection (to say the least) of a varicose condition of the lymphatics and this kind of tumour, has been fully confirmed. As to the general structure of these tumours, the following is from my notebook:—When compared with the healthy scrotum, it would appear that all the tissues of this part are hypertrophied; the *dartoid* is greatly increased (at least in moderate-sized tumours, but it did not appear to be so in the very large one described above), the bundles of which it is formed being two or three times larger than those of the white fibrous tissue, which they about equal in the normal state; the *fibre-cells* are probably increased in number as well as size (just as in the uterus during pregnancy), some measured $\frac{1}{30}$ by $\frac{1}{8}$ — $\frac{1}{1000}$ in., and others were seen in course of development, being fusiform in shape and provided with oval or rounded nuclei; the contractile element is most abundant in the sub-cutaneous tissue, being absent in deeper parts, but again to be detected near the Tunica Vaginalis, corresponding to the layer described by Kölliker; the *fibrous tissues* are greatly increased in amount, the white variety does not differ from the same in health, the yellow or elastic has larger and more numerous fibres; the *cuticle* is little altered; the *vessels* are of course increased, but the *nerves*, *ducts*, &c. are apparently not so. In actual manipulation I have not found the carmine solution so uniform in action as has been stated, but it is useful in the detection of pale muscular fibre.—H. V. C.

**A COMMENTARY UPON A TABULAR STATEMENT
OF THE NUMBER OF PAROXYSMS OF MALA-
RIOUS INTERMITTENT FEVER THAT OCCURRED
IN 146 MEDICAL CHARGES IN THE BOMBAY
PRESIDENCY IN THE YEAR 1861, ARRANGED
AS DATA FOR DETERMINING THE QUESTION
OF THE MOON'S INFLUENCE UPON THESE
FEVERS.**

By HERBERT GIRAUD, M.D., Edin.; Surgeon, Bombay Army, Professor
of Chemistry and Botany in Grant Medical College.

That the Paroxysms of Ague or Malarious Intermittent Fever of Tropical Countries occur more frequently at the New and Full Moon than at other times is an opinion so generally entertained, both by professional and unprofessional people, that it is remarkable, that so small a number of actual observations, bearing upon the question, should hitherto have been recorded; and it is still more remarkable that these scanty records themselves either fail to prove the so-called Lunar Influence upon Fevers, or, in some instances, actually contribute to disprove it.

It is now nearly a century since Dr. Lind (1768) first directed attention to this subject, and from that period up to the present, almost all writers on Tropical Fevers have adverted to it: but those who have expressed their belief in Lunar Influence (and these are the majority) have founded that belief either upon general impressions, or upon the results of observations far too limited to justify the conclusions drawn from them.

In the year 1843, Dr. Peet, the present Principal of and Professor of Medicine in Grant College, Bombay, collated all that had then been written upon the subject in an Article in the 6th No. of the Transactions of the Medical and Physical Society of Bombay, entitled "An inquiry into the evidence which is recorded in relation to the Influence of the Lunar

changes upon certain forms of Disease." In that article Dr. Peet specially considers the evidence regarding the influence of the Lunar changes on Malaribus Intermittent Fevers, and he conclusively shows that the opinion so commonly entertained, that Paroxysms of Intermittent Fever occur more frequently at the New and Full Moon than at other periods of the Moon's age, is certainly not supported by *recorded evidence*, and, in conclusion, he remarks "when we consider the very general idea which prevails upon this subject, it will appear almost surprising that so few facts are recorded in its favour; as it might be thought there would be no great difficulty (by keeping records of the number of attacks of Fever in a Corps) in collecting such information as would be sufficient to prove at once, whether there is really that coincidence between the occurrence of this disease and the changes of the Moon, which the advocates of the doctrine would lead us to believe."

Since the publication of Dr. Peet's Paper the only recorded observations bearing upon the question are (so far as I am aware) those of Assistant Surgeon Day, of the Madras Medical Service, published in an article in the 10th No. of the Indian Annals of Medical Science, July 1858, entitled, "On Relapses in Tropical Fevers." In this article Mr. Day records the results of observations on the relations supposed to exist between the recurrences of Intermittent Fevers, and the seasons of the year and the Phases of the Moon: results deduced from 613 cases observed in the Deccan and Mysore. With regard to Lunar Influence, Mr. Day's conclusions are very undecided. It appears, however, that no coincidence could be traced by him between the admissions of Fever and New Moon; but that a considerable increase of admissions took place about the Full Moon.

Mr. Day admits that his cases were too few to justify any strong statement being founded upon them. Mr. Day also endeavoured to ascertain whether the severity of the attacks was in any way traceable to Lunar Influence. He decides this in the affirmative; and states that it was most remarked when

the Fever set in during the time of Full Moon. As regards relapses of Fever, Mr. Day gives a Table of 52 re-admissions, 20 of which took place at the New and Full Moon, and 32 at intermediate periods.

No one can read Mr. Day's paper without being struck with the insufficiency of the data upon which to found an inquiry into the truth or otherwise of Lunar Influence upon Disease.

The want of reliable evidence in support of the Influence of the Moon upon Periodic Fevers having been casually brought to the notice of the Commander in Chief—Sir Wm. Mansfield, His Excellency directed that records of Paroxysms of Periodic Fevers should be kept in every Medical Charge in the Presidency, with a view to determine the question by statistical evidence. The following Circular was accordingly issued to Divisional Deputy Inspectors-General of Hospitals, with the accompanying Form, No. 2000 of 1860, Bombay, 10th December 1860.

“The Principal Inspector-General Medical Department, having been directed by His Excellency the Commander in Chief to furnish data, extending over two years, to determine, if possible, the question whether Paroxysms of Remittent and Intermittent Fevers occur more frequently at the Lunar Phases* than at other periods, desires Deputy Inspectors-General of Hospitals will be so good as to request all Medical Officers in charge of Hospitals (European or Native, Civil Jail or Police) and Dispensaries to keep accurate registers of the Paroxysms of Fever occurring amongst their patients in the following form, one copy of which is to be forwarded monthly, along with other returns to Deputy Inspectors-General of Hospitals, for transmission to this office, and the other copy filed in the Hospital for inspection and reference.”

These forms were issued in time for observations to be commenced on the 1st of January 1861, and these were continued

* New and Full Moon are here meant.

throughout the whole of the year. At the end of each month the forms, duly filled in, were transmitted by Deputy Inspectors-General of Hospitals to the Office of the Principal Inspector-General, and by his permission they were forwarded to me for arrangement and tabulation. The accompanying Table presents the results thus arrived at.

In the monthly Forms the dates of the New and Full Moon were purposely omitted, in order that Medical Officers might not be biassed in their observations by the Phases of the Moon being prominently noted.

In tabulating the results of observations from the monthly Forms I first noted the dates of New and Full Moon. I considered the so-called "Springs" (the periods of supposed "Lunar Influence") to extend from two days before to two days after the days of the New and Full Moon inclusive:—making *five* days at each Lunar Period, or *ten* days in the month, so that the two Lunar Periods together occupy *one-third* of the entire month:—leaving out of consideration the extra day in the months that have 31 days. Thus we have *ten days* in the month, during which the Lunar Influence (if any) may be supposed to exist, against *twenty days*, when it may be supposed to be absent:—and therefore if there be any truth in the opinion that Periodic Fevers commence and recur more frequently at the New and Full Moon than at the other periods of the month, it is obvious that more than *one-third* of the total monthly Paroxysms should occur in the ten days of the "Springs": and further, if this opinion had so broad a foundation in facts as its general prevalence would lead us to expect, then the Paroxysms recorded in the ten days of the Springs should *very notably exceed* one-third of the total monthly Paroxysms.

Now, on examining this table, it will be seen that in each month the number of Paroxysms occurring at the "Springs" is singularly near one-third of the total monthly Paroxysms: and when all the monthly totals for the year are added together, it is seen that, out of 56,175 Paroxysms, there were 18,077 at the

Springs, and 38,098 not at the Springs; thus showing not merely no preponderance in favour of the "Springs," but actually leaving a balance of 648 Paroxysms against the doctrine of the Influence of the New and Full Moon in Periodic Fevers.*

An attempt was made in the Monthly Forms to induce observers to distinguish between First or Primary and Recurring or Secondary attacks of Periodic Fever; because, those who hold to the doctrine of Lunar Influence are generally of opinion that it is in Recurring or Secondary attacks that this influence is most marked, and it was therefore thought desirable that this point should, if possible, be decided. I found however, in tabulating the observations, that it was quite evident that, either from the explanatory note in the Monthly Form not being sufficiently clear and explicit, or from some other cause, a great many observers failed to distinguish the Primary from the Secondary attacks. Thus certain observers entered all their cases as Primary, whilst other recorded all theirs as Secondary, although it cannot be believed that, in a particular Regiment or Station, the cases of Periodic Fevers were, for a whole year, either all Primary or all Secondary. This error of observation consequently would prevent any conclusive result being arrived at regarding the relative bearing of Lunar Influence upon Primary and Secondary Paroxysms of Fever (supposing such influence to exist), but it in no way affects the value of these observations as data for the determination of the general question of Lunar Influence;—because, if from the whole observations taken collectively, the fact of Lunar Influence cannot be proved, then of course the supposed influence in Secondary cases must fail of proof also.

It must be remarked also that, in so very large a number of cases as that which came under observation, it is probable that Diagnosis was occasionally at fault, and that some of the supposed cases of Periodic Malarious Fever were in reality those

* $56,175 \div 3 = 18,725 - 18,077 = 648$.

of Inflammatory and Hectic Fevers. But as such cases must have contributed in very small proportion to the 56,175 recorded Paroxysms; and as it has never been supposed that such fevers are in any way influenced by the Phases of the Moon, their being included in the Table of Results cannot affect the question at issue either one way or the other. Nor can the question be affected by occasional errors of omission and commission in the filling in of the Monthly Forms; because such errors would not be more liable to occur at one period of the month than at another; and therefore in so large a mass of observations, they would neutralize one another and would not affect the general result. It has been asserted by some that it is only in certain localities (as for example in Sind and Goozerat) that Lunar Influence is manifested. On referring to the Table it will be seen that the returns from these Provinces give no support to this opinion; but, on the contrary, that the Paroxysms occurring within the *ten days* of the Springs are as near as possible one-third of the told monthly Paroxysms: in some months a little more, in others a little less than one-third.

The Table is a record of 56,175 Paroxysms of Fever, that occurred in 146 different Medical Charges, at 44 different Stations, throughout the Bombay Presidency. It presents therefore the results of far more extended observations than have ever been brought to bear upon this question. If, therefore, it should be admitted to be sufficiently trustworthy for the purposes of induction, it must lead to the inevitable conclusion, that Paroxysms of Malarious Periodic Fevers do not occur more frequently at the 'Springs' than at other periods of the month. Such disproof of the Moon's Influence is the conclusion that has been invariably arrived at, whenever observations, statistically recorded, have taken the place of superstitious belief and of general and vague impressions. It has been thus with the reputed Influence of the Moon on Plague, Asthma, Hysteria, Insanity, Periodical Hæmorrhages and Cholera. A most noteworthy instance in illustration of this occurred but a few years ago with regard to Epidemic Cholera, the attacks

of which were very generally believed (particularly in the Madras Presidency) to be more numerous at the New and Full Moon than at the other Lunar Periods. When, however, by order of the Madras Medical Board, cases were selected from different official records, it appeared that, out of 7,664 cases observed, 3725 were admitted during the quarters of the New and Full Moon, and 3939 during the first and last quarters : leaving therefore a difference of 214 cases against the prevalent opinion. But the pertinacity with which a belief in the Moon's Influence is generally maintained in spite of the opposing results of observation is not confined to its supposed relation to Disease. It is equally remarkable with regard to the general belief in the Influence of the Moon upon the Weather. For although some years ago Arago, from extended observations recorded in various parts of the world, came to the conclusion that there exists no relation between the Phases of the Moon and the states of the Weather, and although our own Astronomer Royal, Airey, has more recently arrived at the same conclusion from different observations, yet to this day even well-informed people confidently predicate the changes of the Weather from the known dates of the changes of the Moon. In Bombay, people will confidently tell you that on such a date the "Monsoon will burst," because that is the day or near the day of the New Moon. They seem to forget that, as a general rule, the Monsoon bursts at dates differing within a fortnight or three weeks of each other at different parts of the Coast, and that, although it may occur at some one place at the New Moon, that place cannot always happen to be Bombay : for they surely would disclaim the idea that Bombay is peculiarly under Lunar Influence. At this very time (October 1st) there is a general and very firm belief in Bombay, even amongst enlightened Europeans, that a Cyclone is to sweep over the Island on the 23rd instant, because the Moon happens to be New and in Perigee on that date. Now in the first place, it has never been proved by the observations of Reid, Piddington, Thom, or of any of the writers on the "Law of Storms," that they occur

more frequently when the Moon is New and in Perigee than at other times; and secondly, a Cyclone frequently occupies several weeks in traversing the Indian Ocean, and during this time the Moon has passed through several of her phases. Moreover, supposing a Cyclone should happen to occur at a certain place at the New Moon, it does not appear why that place should be Bombay in preference to other parts of the Indian and China Seas.*

This prevalent notice of the connexion of Diseases and of atmospheric disturbances with the New and Full Moon would appear to result from two causes: first, the known relations of the Tides to the phases of the Moon, and secondly, the fact that New and Full Moon are well marked and notable periods. I have had it said to me;—"how can you deny Influence of the Moon upon Fever, when you know that it regulates the Tides"? a question betraying such utter ignorance of the first principles of logical induction as to prevent one's wonder that it should have been put. Again, the New and Full Moon are well marked periods; so that recurrences of Fever happening at the Springs are specially noted, whilst the frequent occasions on which they take place at other periods of the Moon pass by unheeded. Some years ago, when the old slow Steamers were very irregular in the dates of their arrival, it was a prevalent belief in Bombay that the English Mail came in more frequently on a Sunday than upon any other day in the week. Sunday is more marked and notable than any other day in the week; and therefore, when it did so happen that the Steamer arrived upon a Sunday, it made a greater impression, and was associated more permanently in memory with that day, than it would have been had it arrived upon either of the other six days of the week.

This peculiar fallacy in induction was well known to and was pointed out by Lord Bacon (*Novum Organon*, Aphorism XLVI.) He says:—"Men mark the events where they are

* The predicted Cyclone did not occur.

fulfilled; but where they fail, though this happens much oftener, neglect and pass them by. The first conclusion colours and brings into conformity with itself all that came after. It is the peculiar and perpetual error of the human intellect to be more moved and excited by affirmatives than by negatives: whereas it ought to hold itself indifferently disposed towards both alike. Indeed, in the establishment of any axiom, the negative instance is the more forcible of the two."

MARCH.				APRIL.				MAY.			
A		B		A		B		A		B	
a	b	a	b	a	b	a	b	a	b	a	b
7	2	14	..	19	1	31	..	3	8	29	..
..	3	4	7	..	7	..	2	..	..	..	..
..	6	3	13	..	3	..	6	..	6	..	..
2	24	6	33	3	19	39	7	42	14	61	..
7	35	6	60	1	21	4	41	..	19	6	65
..	1	1	9	..	3	..	11	..	3	1	9
1	..	27	3	9	15	20	20	14	21	29	25
..	2	2	5	7	..	4	5	6	..	9	..
5	..	10	..	..	..	..	..	..	..	1	..
..	..	..	1	..	3	..	..	..	..	..	..
2	..	3	..	3	..	7	..	6	..	2	..
..	..	..	..	..	..	..	..	..	..	..	..
1	..	..	..	..	..	..	..	..	..	..	..
1	..	..	..	7	2	6	..	7	3	18	..
3	2	7	13	4	6	2	9	5	9	7	13
5	8	15	9	3	3	6	5	9	4	9	2
..	..	2	..	2	1	..	1	..	4	..	..
5	7	1	42	2	..	12	5	..	6	..	..
..	..	..	..	..	..	..	..	..	..	..	..
31	..	40	..	5	4	38	1	12	3	10	2
..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	1	..	1	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..
1	2	..	1	..	2	6	..	5	4	..	..
8	27	13	67	5	14	11	36	7	15	17	36
17	..	17	3	19	2	14	..	11	2	28	3
..	..	10	..	15	1	23	..	7	..	3	..
2	3	7	5	12	1	9	1	2	..	12	..
3	9	1	10	..	3	2	17	2	..	..	..
3	..	8	..	5	..	6	..	14	..	37	..
21	6	47	7	23	..	38	..	16	..	60	..
1	4	6	17	1	3	4	13	..	..	2	7
11	20	18	57	3	15	9	27	7	27	13	34
..	..	..	1	2	..	1	1	1	..	1	..
23	7	12	16	16	16	26	10	4	14	3	16
3	..	6	..	5	..	13	..	7	..	15	..
13	..	35	..	25	..	36	..	12	..	7	..
35	..	59	..	3	..	22	..	5	..	26	..
2	5	9	13	..	2	5	4	5	7	6	11
4	..	7	3	15	..	29	2	11	..	13	..
14	6	50	24	21	9	44	12	21	7	34	18
1	..	7	..	1	..	4	..	..	..	..	..
2	..	9	..	4	..	10	..	4	..	10	..
..	7	2	4	5	13	15	27	9	21	15	30
5	18	5	36	1	19	4	36	..	22	..	41
..	..	3	..	2	..	..	..	3	..	1	..
2	..	4	1	11	1	18	..	6	..	10	..
..	..	..	1	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..
..	1	..	1	..	..	..	..	..	..	..	..
3	..	2	..	..	..	6	..	..	..	..	..
..	..	1	..	..	..	..	..	2	..	1	..
1	..	3	..	4	..	3	..	3	5	4	..
3	5	8	10	3	2	3	5	4	..	10	..
..	..	4	..	2	..	6	..	..	..	..	..
14	..	27	..	3	..	6	..	9	..	10	..
..	34	2	50	..	25	4	74	..	35	..	33
..	8	3	8	..	12	2	16	..	14	8	19
13	..	36	..	34	8	98	11	5	..	42	6
19	..	29	..	22	7	41	17	12	..	37	..
3	..	2	..	5	..	14	..	..	..	3	..
..	..	1	..	..	..	1	..	..	..	..	..
9	..	23	..	17	..	16	..	5	..	10	..
15	..	21	..	10	..	31	..	3	..	21	..
..	..	1	2	..	..	..	1	..	..	..	1
..	..	..	17	..	..	36	..	20	..	17	..
..	7	..	20	..	1	..	14	..	20	2	24
3	5	1	16	3	7	3	7	2	3	3	12
..	2	..	5	..	14	..	14	..	11	..	11
..	..	2	..	..	1	1	..	..	1	..	1
..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	6	14	2	30	..	4	..	..	17
..	..	..	1	4	4	15	..	16	11	39	..
5	..	25	..	28	..	32	..	18	..	38	..
..	..	..	9	35	32	69	28	9	45	19	..
9	5	19	9	8	..	18	..	1	..	2	..
1	..	8	..	..	..	..	..	..	4	..	..

	JANUARY.				FEBRUARY.				MARCH.				APRIL.				MAY.			
	A		B		A		B		A		B		A		B		A		B	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
rt.	6	2	17	9	2	21	3	3	4	4	9	2	9	2	16	1	2	9	3	7
rt.	2	5	9	21	15	12	5	12	30	3	2	7	2	1	1	1	1	1	8	8
rt.	5	5	9	10	4	10	7	18	12	12	11	3	13	2	1	1	1	1	5	5
rt.	5	3	5	8	6	15	14	14	14	14	14	2	13	4	4	4	4	4	5	5
rt.	2	3	2	2	2	8	8	8	8	8	8	1	9	9	6	6	6	6	10	10
rt.	1	12	3	74	1	4	18	6	22	8	8	16	9	16	2	2	2	2	3	3
rt.	2	3	3	9	3	4	2	8	3	2	2	5	5	8	8	8	8	8	5	5
rt.	3	6	5	20	3	16	8	7	14	10	17	7	7	8	3	9	9	9	2	2
rt.	1	9	8	5	1	3	4	1	5	23	2	6	4	7	1	1	1	1	8	8
rt.	2	5	0	5	3	16	8	7	11	17	3	9	7	18	2	2	2	2	3	3
rt.	4	23	8	22	3	5	11	4	3	11	6	21	7	13	5	12	12	12	7	7
rt.	12	2	23	1	3	6	8	1	3	1	1	16	13	19	2	9	9	9	10	10
rt.	5	5	4	7	3	13	4	6	1	4	6	1	5	6	7	4	8	8	7	7
rt.	5	2	10	15	5	12	11	9	1	5	3	12	13	13	6	6	6	6	14	14
rt.	3	12	6	24	1	9	3	15	3	19	12	13	17	19	2	2	2	2	26	26
rt.	2	2	24	10	2	29	2	6	20	8	1	12	7	9	9	9	9	9	14	14
rt.	2	2	3	7	7	4	4	5	6	15	5	8	11	11	11	11	11	11	19	19
rt.	5	2	19	1	1	9	7	2	6	2	21	13	17	19	2	2	2	2	18	18
rt.	1	2	3	1	1	5	5	6	6	6	6	8	8	8	8	8	8	8	14	14
rt.	2	2	2	11	11	11	11	15	15	15	15	8	8	8	8	8	8	8	26	26
rt.	5	10	8	12	2	1	5	16	2	4	3	4	4	8	3	3	3	3	14	14
rt.	3	8	4	7	2	1	5	16	4	4	3	4	4	8	3	3	3	3	5	5
rt.	1	1	3	1	1	2	7	2	2	3	3	4	4	8	3	3	3	3	3	3
rt.	32	61	32	42	32	42	58	58	141	25	25	62	62	84	84	84	84	84	1	1
rt.	36	39	85	111	1	60	6	126	3	130	1	248	64	144	144	144	144	144	1	1
rt.	16	54	47	88	1	28	3	74	5	32	8	77	21	5	5	5	5	5	21	21
rt.	1	13	8	8	8	9	9	9	9	9	9	9	9	9	9	9	9	9	5	5
rt.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9	9
rt.	9	27	3	4	14	5	5	6	6	6	6	6	6	6	6	6	6	6	16	16
rt.	4	3	6	1	7	7	7	7	7	7	7	7	7	7	7	7	7	7	3	3
rt.	3	3	2	4	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4	4
rt.	2	12	1	1	7	4	4	5	5	5	5	5	5	5	5	5	5	5	14	14
rt.	1	3	3	2	9	11	19	19	20	7	7	7	7	7	7	7	7	7	23	23
rt.	2	20	3	2	9	11	19	19	20	7	7	7	7	7	7	7	7	7	23	23
rt.	4	4	7	6	6	3	3	4	4	4	4	4	4	4	4	4	4	4	2	2
rt.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
rt.	1	2	3	8	8	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2
rt.	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	1
rt.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
rt.	1	2	3	8	8	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1
rt.	2	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	2
rt.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
rt.	5	11	9	28	7	3	9	7	5	3	21	8	7	24	1	1	1	1	4	4
rt.	13	37	11	21	21	21	21	3	10	3	8	4	6	5	6	2	1	1	4	4
rt.	3	5	12	2	2	2	2	1	10	10	10	10	10	10	10	10	10	10	6	6
rt.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2
rt.	1	9	3	2	2	2	2	4	9	3	3	9	13	8	4	4	4	4	6	6
rt.	12	27	27	4	3	3	3	4	15	1	9	2	26	2	4	1	1	1	8	8
rt.	2	15	5	42	4	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5
rt.	31	3	58	1	3	11	7	1	12	5	29	29	29	29	29	29	29	29	8	8
rt.	13	27	25	40	30	30	30	59	19	17	17	17	17	17	17	17	17	17	11	11
rt.	18	11	10	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	11	11
rt.	1	5	9	6	1	1	2	3	4	17	1	6	6	11	4	4	4	4	5	5
rt.	8	16	13	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	41	41
rt.	2	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10
rt.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	10	10
rt.	3	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	6	6
Tals	872	731	1,830	1,556	562	625	1,092	1,162	529	611	1,145	1,286	610	738	1,247	1,327	541	634	1,080	1,239
Tals	1,603	3,386	1,187	2,254	1,140	2,431	1,348	2,574	1,225	2,389										
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B

JUNE.				JULY.				AUG.	
A		B		A		B		A	
a	b	a	b	a	b	a	b	a	b
..	..	..	..	..	..	..	..	..	..
..	11	..	6	..	8	..	3	..	..
..	7	..	11	..	11	..	..	..	..
..	..	..	..	..	..	..	2	..	..
..	1	2	10	..	12	..	2	..	..
..	..	..	..	..	..	..	..	..	..
..	12	..	19	..	35	..	5	..	..
..	..	..	20	20	29	43	..	..	..
5	9	11	..	2	1	3	..	..	..
..	11	6	..	..	..	15	..	34	..
..	..	2	3	3	5	..	..	2	..
3	4	7	..	..	1	..	1	3	..
8	8	11	2	3	7	9	4	6	..
..	29	..	13	..	32	..	3	..	..
4	6	2	3	..	7	6	3	1	..
25	9	27	3	20	17	64	5	10	..
10	4	5	1	3	3	7	4	15	..
4	11	28	..	8	3	15	2	7	..
..	..	..	..	..	..	..	..	..	..
..	14	..	5	..	10	1	6	..	..
3	7	2	..	..	..	..	3	..	..
..	18	..	2	..	11	..	1	..	..
..	18	..	9	..	..	..	7	..	..
6	5	15	4	4	8	11	15	4	..
..	7	..	..	..	..	..	..	..	..
..	28	..	4	..	9	..	..	..	..
1	22	4	10	..	24	6	11	..	..
..	..	..	..	..	1	..	..	..	..
1	5	3	1	..	3	..	1	2	..
..	..	..	..	..	..	..	..	..	..
4	15	3	4	..	10	1	..	..	..
25	8	242	1	70	10	172	..	23	..
28	..	82	..	32	..	74	..	73	..
16	..	40	..	21	..	38	..	2	..
..	..	..	2	..	2	..	..	..	..
..	1	..	1	..	..	1	..	..	..
..	1	1	..	..	..	..	..	..	..
1	..	1	3	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..
..	2	2	4	..	3	2	..	..	..
3	..	10	1	5	7	7	..	..	..
..	8	..	4	..	5	..	3	..	..
..	6	..	1	..	5	..	1	..	..
..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..
..	..	6	1	31	6	17	4	..	..
..	..	3	..	12	..	7	1	..	..
..	3	1	0	..	12	3	8	..	..
..	..	..	..	..	..	..	2	..	..
..	..	..	..	..	1	..	..	..	..
..	..	2	..	..	2	..	11	..	..
..	7	5	..	..	..	3	28	..	..
12	1	35	4	25	2	40	5	13	..
..	11	..	4	..	5	..	29	..	..
..	..	..	..	..	..	..	..	..	..
3	65	26	9	6	23	19	6	3	..
2	18	2	18	4	16	8	22	8	..
39	2	91	..	58	..	101	1	58	..
2	..	5	..	4	..	4	..	7	..
6	..	12	..	5	..	27	..	33	..
..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..
..	..	..	2	3	2	8	1	3	..
..	63	..	15	..	20	..	20	..	..
..	1	..	3	..	2	..	..	..	..
..	18	..	4	..	14	..	2	..	..
..	..	..	4	..	8	..	5	..	..
b	a	b	a	b	a	b	a	b	
006	1,079	1,349	692	738	1,355	1,525	741	775	1
006	2,423		1,425		2,880		1,516		
B		A		B		A			

NOTES, SANITARY AND MEDICAL, ON COLABA, BOMBAY, AS A MILITARY STATION.

By WILLIAM HANBURY, Esq., Surgeon, H. M.'s 33rd (Duke of
Wellington's) Regiment.

Presented December 1862.

In a paper published in the 7th Volume of the Transactions of the Medical and Physical Society of Bombay, I invited attention to a form of Fever known to be the direct result of over-crowding and defective Sanitary conditions, which occurred at Deesa in 1859, illustrated the marked effects produced on the health of the Troops by the removal of these causes of disease, and vindicated the climate from the charge of unhealthiness.

On the present occasion I purpose to bring forward certain facts which seem to prove that the character of insalubrity which has so long attached to Colaba as a Military Station is to be referred to causes equally preventable, and that the climate of Bombay is not in itself unfavourable to the soldier's efficiency and health.

I shall be pardoned if I introduce the subject with a few details, showing the unusual exemption from disease which the Regiment has enjoyed since the first of these papers was written.

During the year 1862 the Head Quarters of the 33rd Regiment was stationed at Colaba, while two Companies were quartered at Ahmedabad, one at Surat, one at Asseerghur and two at Sattara. The average daily strength of the Regiment was 1005, the daily average sick 44, and the number of deaths (exclusive of one case of suicide) 14; the former being in the proportion of 43·8, and the latter 13·9 per thousand of strength.

The subjoined Table shows the extent to which the sickness and mortality were determined by the different classes of disease.

	Strength 1005-75.		Annual ratio per thousand.	
	Admitted.	Died.	Admitted.	Died.
CLASS 1.				
Miasmatic diseases	952	11	} 1273.6	10.9
Enthetic "	307	..		
Dietic "	13	..		
Parasitic "	9	..		
CLASS 2.				
Diathetic diseases	1	..	} 13.9	.9
Tubercular "	13	1		
CLASS 3.				
Diseases of Nervous System	21	..	} 291.3	1.9
" Circulatory "	13	..		
" Respiratory "	10	..		
" Digestive "	115	2		
" Urinary "	6	..		
" Reproductive "	11	..		
" Locomotive "	4	..		
" Integumentary,,	113	..		
CLASS 4.				
Development diseases	4	..	2.9	
CLASS 5.				
Violence, deaths or diseases	87	..	86.5	
Total.....	1,678	14	1668.4	13.9

It should be observed that 9 of the 14 deaths recorded were the result of cholera, and I may remark that it is the occurrence of this disease alone which has hitherto caused the mortality rate in the Regiment to exceed that of the army generally in England. Were we at liberty to eliminate cholera from the returns (from which most other colonies are free) and to take into consideration diseases of endemic origin only, the mortality would be reduced to less than 5 per 1,000 of strength, whereas it was 10 per 1,000 of strength in the United Kingdom in 1860.

It appears moreover that the average sick time to each

soldier and the average duration of the cases were greater in the army at Home than in the Regiment; in a word, that the soldier in India occupying widely-distant stations proves a higher state of efficiency and greater exemption from disease than are observed in England, and if we further refer to the previous year, the same fact comes out still more strongly, for only *four* deaths occurred from *all causes* out of an average strength of nearly one thousand men.

The following Table shows the extent to which disease prevailed, and the influence of Season upon health at the different Stations occupied by portions of the Regiment during the year.

1862. Months.	Colaba.		Ahmedabad.		Asserghur.		Sattara.		Surat.	
	Average Strength 426.		Average Strength 157.		Average Strength 86.		Average Strength 204.		Average Strength 57.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
January.....	42	1	..	..	27	..	19	..	10	..
February	58	4	..	..	14	..	17	..	16	..
March	54	..	11	..	15	1	34	2	12	..
April	40	..	11	..	5	..	79	..	14	..
May	42	..	13	..	4	..	51	..	9	..
June	52	1	17	..	12	1	23	..	13	..
July	62	..	22	..	12	..	26	..	18	..
August	33	..	17	..	21	1	37	..	10	..
September	35	..	29	..	14	..	50	..	10	..
October	42	..	58	..	23	..	51	..	8	..
November	35	2	50	..	26	..	34	..	13	..
December	33	..	32	..	34	..	27	..	2	..
Total....	528	8	260	..	207	3	448	2	135	..
Proportion of average Sick to average Strength percent.	3.7		4.2		6.6		4.6		7.5	

One of the deaths not noted here occurred from cholera at the Sanitarium of Poorundhur, and I may, in passing, refer to the curious and suggestive fact, that the appearance of cholera in almost every instance since the Regiment arrived in India, has been connected with its movements from place to place. Thus in 1858 one case, the only one which occurred, took place on the line of march. In 1860, an officer contracted the disease on the march to Aboo with a detachment, and the disease broke out in a detachment which arrived at Deesa from Aboo about six weeks later, and proved fatal in 24 cases, while 20 men of the Regiment in the same year contracted cholera immediately after their arrival at Baroda from Dwarka, and lost ten per cent. of their strength. In 1862 two Companies of a Wing of the Regiment brought the disease from Surat into Bombay, where four men of the detachment died, while the other two Companies which marched back to Ahmedabad escaped cholera, though encamped on the same ground at Surat close to the 12th Native Infantry Regiment, in which the disease prevailed. A little later, some men of the two Companies which imported the disease from Surat to Bombay were sent to Sattara, and two of them died on arrival, the disease having shown itself two marches from that place. Lastly, in November 1862, ten men were sent to Poorundhur from Sattara for change of climate, and one of these died from cholera the day after they arrived at that Sanitarium.

Without further reference however to the history of the Regiment generally in this place (which is interesting enough of itself) I confine my attention at present to the Head Quarters of the Corps stationed in Colaba since the 3rd December 1861, with a view to compare the results as expressed in disease, with similar facts in the Medical history of the Station during former years. If the conclusions arrived at from the statement about to be submitted go even but a short way to rescue Colaba from the bad reputation which has so long attached to it as a Military Station, it will not be deemed altogether devoid of interest. And should it further appear that a body

of men has lived in the midst of an unhealthy community in the enjoyment of a very high standard of health, it will not be without some value as pointing to the fact that disease in Bombay is not so much the product of climate as the manufacture of our own hands, which we can put a stop to, albeit with difficulty and at some cost, if seriously-minded to do so. The question of Sanitary reform, which is now happily engaging so much attention in Bombay, may well submit to derive encouragement and support from any fact, however humble, illustrating local instances of unusual and peculiar exemption from disease; and it seems important specially to mark such an instance with reference to Colaba, for while it would appear to be the intention of Government to erect barracks in Bombay for another Regiment of European Troops, it has, I believe, been more than once under contemplation, on account of the presumed unhealthiness of the barracks at Colaba, to remove them to a more suitable locality.

On referring to the Mortuary Returns of Bombay of 1861, we find that Colaba is one of the districts in which the death rate shows an increase in the six years between 1855 and 1860, as compared with the six preceding years, but though it is known to be at all times unhealthy, it is not possible for want of a correct census to state the exact proportion of deaths to population. As we are not however concerned with this subject at present further than to indicate that Colaba generally shares the Sanitary character which belongs to other parts of the Island, I shall limit my observations to the Barracks and Troops.

The Sanitary Report of the Medical Department of the Army for 1860, framed on the recorded experience of Medical officers in previous years, contains the following notices:—

“The condition of the Barracks at Colaba and in the Fort of Bombay is of the worst, low, damp, ill-ventilated and badly constructed, they are said to be quite unfit for the purpose for which they are still used. Colaba and Bombay are malarious

to a degree that would demand their abandonment on sanitary grounds alone, if that were possible." "The old condemned Barracks at Colaba and in the Town of Bombay should give place to more appropriate buildings on a more healthy site," and adds, "the European Regiment (28th Foot) stationed at Nusseera-bad was represented as suffering from impaired health, the result of previous service in Colaba and in the Town Barracks of Bombay." His Excellency Sir H. Rose referring to the unhealthiness of the station observes: "Sometime after H. M.'s 57th Regiment left Bombay, the Brigadier Commanding at Ahmed-nuggur reported officially that one-third of this fine Regiment was still suffering from fever caught in Bombay." "When H. M.'s 28th Regiment of Foot embarked from Bombay against Beyt, they left considerably upward of one hundred men sick from the same illness."

These remarks, coming as they do from such weighty authority, the Commander in Chief-in-India, and the Head of the Sanitary branch of the Army Medical Department, carry with them their own approval; and from all I have been able to collect, I have no doubt their application might be extended over a long series of years, and to many other Corps in the Service. To refer however only to one more example, I may be permitted to observe, that the Regiment which was last quartered in Bombay suffered much from sickness, and left the Station in a very shattered condition, which has since told sensibly on the mortality rate.

Such are the facts constituting the Medical history of Colaba as a Military station in former years, and we have now to see how far they fall in with the experience acquired in the year just elapsed.

The Head Quarters of the 33rd Regiment arrived in Bombay on the 3rd December 1861, the average strength during the year was 426, the daily average sick 15·7 or 3·7 per cent. of strength, the mean sick time to each soldier 13·6 days, and the average duration of the cases 10·8 days. These results speak for themselves,

they are not only highly satisfactory and widely at variance with those of former years, but stand out in favourable contrast to those recorded of Troops in the United Kingdom, and establish the fact that the soldier has been more effective in Colaba than in the Army at Home. With regard to the mortality, it is of course obvious that it cannot for so small a number of men be made the subject of comparison with the same confidence as the amount of sickness admits of, for a slight accident, or other contingency here disturbs the result and renders it useless for statistical purposes; but as four of the eight deaths returned were caused by cholera imported by a detachment from Surat, and one of these occurred on board ship in the harbour, and the other three among *men* of the detachment two days after they landed at Bombay, it will be admitted the facts even in this particular are favourable to Colaba. Nor is this all, for of the four remaining deaths, one occurred in January 1862, the subject of which arrived at Bombay from Deesa in a dying state from dysentery and consumption, and two were the result of cholera, which was doubtless contracted from contact with the native population, since the disease found itself unable to spread in the barracks. So that the true result to arrive at is this, namely, that only one death at all referrible to the barracks and station of Colaba took place, or a proportion for the fourteen months the station has been occupied, equivalent to 2.0 per thousand of strength per annum. Moreover, so complete is the absence of disease as I now write, that there is not a single case of fever or dysentery in Hospital, not a single man confined to his bed, In a word, of the diseases under treatment all, except two cases, range themselves under the head of surgical complaints; and I have never known Troops in any climate whose physical efficiency was more satisfactory, or who enjoyed greater exemption from serious disease of every denomination.

In the presence of the facts now stated we almost involuntarily ask, to what causes is this unusually high standard of health to be referred? Was the circumstance a mere freak

of climate only not to be repeated again perhaps for many years? Is the experience of former years to be accepted as the normal state of things? or is the result in this instance to be considered the exponent, in a measure, of the degree of salubrity which the climate and locality *naturally*, and in the absence of disturbing conditions, are entitled to take credit for?

That the truth is to be found in an affirmative answer to the last of these questions I have no doubt whatever, and did I not think so, it will be easily surmised these remarks should not have been written, for on any other supposition comments on the facts would possess no importance and answer no useful purpose.

Of the conditions thus concerned in accounting for the sickness and mortality in excess of what I have thus assumed as the more natural standard of health, inadequate accommodation was the chief. For while I admit that defective drainage and ventilation were two of the conditions which hitherto to some extent affected injuriously the health and efficiency of the Troops at Colaba, and that the improvement which of late years have been made in both were probably followed by corresponding advantages, I must also at once repeat my conviction that to over-crowding in barracks *per se* was eminently due the '*unhealthy*' character for which the station has been so long notorious.

I am not in a position to muster all the facts which might be adduced as evidence of over-crowding in support of this opinion; these can only be obtained from the records of the department in the Presidency Medical Office, but I think there are details at my disposal quite sufficient for the occasion.

On the arrival of the Head Quarters of the Regiment at Bombay, I made official application to the Engineer Department for a statement or estimate of the extent and capabilities of the barrack accommodation at Colaba, and was informed in reply, that there were six barracks each 216 feet long and 22½ feet wide, and capable of accommodating 53 men, allowing 89·30

superficial feet and about 1,100 cubic feet (calculated on 12½ feet of the altitude) to each soldier. On further inquiry I learned that 4 patcheries containing 42 rooms were available for the same number of married men, and that a space sufficient to accommodate 25 men was partitioned off one of the barracks and appropriated to the Serjeants' Mess.

Thus it appears that the accommodation of barracks and patcheries taken together was only sufficient for 335 men, and no one, whose opinion is of any value, will venture to maintain that the allowance of space which on this estimate fell to the share of each soldier was excessive. Yet we find that in 1859 the barracks were occupied by an average strength of 801 men (a detachment doubtless in the Town barracks), in 1860 by an average strength of 581 men, and in 1861 by an average strength of 582 men, and it is easy to conceive that the number probably exceeded for two or three months at a time perhaps, the average strength for each of these years. It is needless to refer to periods more distant for further facts of the same kind to the dark day of ignorance and error, when the importance of a good ration of pure air to the soldier's health was little understood; they would possibly afford only more striking good examples of the extent to which the barracks were over-occupied, but I have heard, with what truth I cannot say, that beds have at times been placed not only along the side walls of these buildings, but also in the centre of the rooms and verandahs.*

Viewing these facts then in connection with the proofs of the unhealthiness of the Station in former years already given, and bearing in mind the high state of efficiency, and the extraordi-

* In turning over the pages of an old number of this Journal, I find that the 17th Regiment, while quartered in Colaba in 1841, lost 58 men from fever, or eight per cent. of strength. From these data we infer that the strength was 725, and yet the medical officer in summing up the causes of the disease makes no allusion whatever to overcrowding. The importance of a good ration of pure air to the soldier's health had not yet been fully appreciated even by the Military Surgeon. The writings and experience of a Pringle were still disregarded.

nary absence of disease enjoyed by the Head Quarters of the 33rd Regiment, in which the number of men corresponded more closely with amount of accommodation available, it will be admitted that there is much to justify the conclusion, that to over-crowding almost alone must be attributed a great part of that sickness and mortality for which the Station has been so unhappily distinguished. There are no other conditions which can possibly explain the different results exhibited. The improved ventilation and drainage were effected not last year, but a few years ago. The diet of the soldier has always probably been sufficiently varied and nutritious. The duties always more or less severe are now more so than ever, owing to the extent to which rifle practice is carried; and it is worthy of notice that the 33rd Regiment preserved its efficiency, though it became necessary, in order to extend the accommodation, to reduce the strength to such a degree by sending out detachments, that the average number of nights in bed during the year only amounted to $3\frac{1}{2}$ for each man.

It will here perhaps be objected that the experience of the Regiment is exceptional, the result merely of a particularly healthy season; if so, there is this to be said in reply—1st. They who urge this objection, to give any force to it, are bound to prove that last year was a peculiarly healthy year either in Bombay or Colaba, a thing they will find it difficult I think to do. 2nd. Climate in any locality as regards *endemic* disease at least is within very narrow limits a fixed quantity, and it is the conditions of life under our control which are subject to *variation* as agents in the production of disease.

I may here mention that I was so strongly impressed with the truth of these facts *à priori*, or previous to the experience upon which I may now appear to lay too much stress, that I wrote to the Commanding Officer on learning the limited extent of the accommodation, to the effect that grievous consequences would probably follow if the barracks were occupied by the number of men *en route* to Bombay with the left Wing from

Deesa; venturing at the same time to assure him that the men would in all likelihood maintain their high standard of health, if no over-crowding in barracks were permitted. These views fortunately coincided exactly with his own, and were put before the Commander-in-Chief. Two Companies were accordingly countermarched to Ahmedabad after their arrival at Surat, and 50 more men were detached from Bombay to reinforce two Companies which had been sent to Sattara sometime previously. Our prevision was as already shown justified by the results. These I maintain afford positive testimony that the climate of Colaba *per se* is not unhealthy, which any number of negative statements to the contrary cannot controvert; and I feel confident that had not the distribution of the Regiment been carried out in the manner just mentioned, no occasion would ever have arisen for writing these pages.

I believe, moreover, that Colaba possesses great natural advantages, in its admirable facilities for self-drainage, which demands little assistance from art, in its free exposure to the sea and land breezes, and its projection seaward beyond the influence of the densely peopled cities, and the filthy ill-drained localities so common in Bombay. So far from suggesting that the barracks should be removed to another site, I would record my opinion that they are adequate to the climate, and occupy as healthy a position as the Island affords; and in the event of additional accommodation being required in the neighbourhood, I would even recommend that the ground between the barracks and the Lighthouse on the Southern point of the Island should, if practicable (which I fear it is not), be cleared of its present occupants, and made available for the construction of new barracks. To conclude, Colaba appears to be a most eligible locality in a sanitary point of view for Military occupation, and assuming it is equally so in a Military sense, it is much to be regretted that native villages should have been allowed to grow up, and that the most desirable spots for building purposes should have fallen into the hands of private individuals.

If the conclusions thus arrived at find sufficient warrant in the facts upon which they are based, it is obvious that in order to maintain Troops at Colaba in a state of efficiency, the barracks in future should never be called upon to accommodate more than 430 or at most 450 men; but it is right that I should further mention that the satisfactory results obtained in the 33rd Regiment were, I think, partly to be attributed to the attention paid to sanitary arrangements, as well as to the fact that the purity of the barracks was preserved by lime washing the walls every week to a height of three feet above the floors. Whether the case as thus presented in these remarks may possess any importance in their application to the Island generally, must be left to the reader to decide. I think it is encouraging, and that it suggests (to say the least) the idea that sanitary improvements considered even as an investment of money and labour, likely to return good interest, is entitled to claim some confidence. Viewed in the light of science, the perversity with which we refer in popular language to the unhealthy climate of this or that place is extraordinary. Yet more than one Military Station has been abandoned at vast expense to the State on this ground alone, as far as proof is concerned. It would appear as if we assumed it to be the purpose of Providence, to render lethal and destructive to man that one condition of his life—Climate—over which he has so little control. A very little consideration of the climate and position of Bombay seems sufficient however to convince one that it is not *naturally* an unhealthy Island. The refreshing land and sea breezes, and the prevalence of the latter especially, must evidently not only serve to moderate the temperature, but carry away the atmospheric impurities which abound in large cities. The high tides give the island an obvious advantage over some cities in other warm latitudes—those of the Mediterranean for example—and provide for the effectual removal of sewerage matter. The heavy monsoon rain-fall washes off surface filth. Even the uniformly high temperature, and the small range of the Thermometer are not entirely without their merits, for they protect the resident from certain ailments which

sudden changes of climate elsewhere produce—notably consumption and other chest affections.

Experience indeed proves that persons whose comfortable condition implies the possession of good houses, and protects them from the evils of over-crowding, &c. in low, filthy ill-drained and closely-populated localities, enjoy good health for many years, provided they are careful to lead prudent and tolerably active lives, and if notwithstanding this the general mortality stands high, surely it is illogical in the extreme to connect the fact either with the climate or the geographical position of Bombay.

It is to man himself and to his violation of those laws of Nature which he has been given intelligence to interpret, or failing this, to misunderstand at his peril, that we must refer the excessive mortality in this as in many other instances, and it is to the practical recognition of this fact by the removal of these causes of disease which have accumulated by our own acts, and therefore under control, that we must look for the sanitary improvement of the Island. If, on the other hand, adopting the loose but dangerous phraseology so much in vogue we continue—whether from negligence or ignorance matters not—to libel the Author of Nature by attributing the results in a general way to climate, let us at least not be surprised if effect follows cause, with the most supreme indifference to our motives (which might even prompt us in a spirit of false humanity to leave the natives everywhere in undisturbed possession of filthy lanes and crowded hovels)—if the increasing mortality from endemic causes and more fearful invasions of epidemic pestilence demand from us still more authoritatively the instant performance of our duties.

That the necessity for such a call to duty should arise in this age of sanitary enlightenment would be disgrace to an Island in which wealth and intelligence so abound. That we have been spared hitherto the calamity of this dread warning is owing to the providential features of the climate above indicated,

I firmly believe; and for the sake of the magnitude of the interests concerned, I hope that the facts now advanced, and the remarks with which I have endeavoured to illustrate their meaning and significance, may receive more attention than they are entitled to, and that any feeble germs of instruction they contain may have the good fortune to fructify to the public benefit.

HOSPITAL STATISTICS OF EUROPEAN AND NATIVE TROOPS, PRISONERS IN JAILS, AND THE POLICE FORCE, IN THE BOMBAY PRESIDENCY, FOR FIVE YEARS, FROM 1856 TO 1860.

By W. C. COLES, M.D., (Edin.)

Presented February 1863.

The accompanying tables are in continuation of the Hospital Statistics of the Bombay Presidency heretofore published in the Seventh Volume of the Transactions, but limited to a review of the sickness and mortality amongst European and Native Troops, Prisoners in Jails, and Police. They are, however, considerably modified and condensed, compared with the series before given, and are intended to embrace at one view the sickness and mortality of the above mentioned classes. The five years over which the tables extend, relate probably to as an eventful period as ever before happened, or is likely again to occur, in the history of India. Each class referred to in the tables was affected to a greater or lesser degree by the events of the mutinies, especially the European and Native Troops of the Bombay Presidency, who not only served throughout the Persian Campaign in 1856-57, but were engaged in the operations undertaken in Central India, Oude, and Bengal, and constituted portions of the columns which led to the pacification of those Provinces.

It should be explained that although in the tables and in the commentary reference is made for the sake of convenience and brevity to the natural year, yet correctly speaking, each year alluded to commences upon the 1st of April of one year, and terminates upon the 31st of March of the following year. Hence

this series of tables embraces the five years from the 1st of April 1856 to the 31st March 1860. If this explanation is not borne in mind, some confusion will occur in comparing the data now furnished with that derived from other sources, and a charge of inconsistency or inaccuracy might be sustained. An apology is also due for the retention of a now almost exploded statistical nosology, but the tables were prepared at a time preceding the introduction of the new nomenclature; whilst leisure from other occupations has not permitted of the tables being re-arranged and adapted to the more modern classification of disease.

Tables No. 1 and 2.—EUROPEAN TROOPS.

Table No. 1 shows the strength, the sickness, and the mortality amongst European Troops during each year from 1856 to 1860, arranged according to the several Divisions of the Army.

The *strength* of the European Force in the Bombay Presidency during the five years under consideration fluctuated very considerably; thus in 1856, before the mutinies, there were only about 10,000 European soldiers, in 1857 there were upwards of 25,000, in 1858 the number decreased to 21,000, in 1859 to about 16,000, and in 1860 the strength was under 14,000 fighting men.

In Military Hospital returns no distinction can be drawn between a corps which is stationary, and another on a line of march, or only halted for a longer or shorter period; hence therefore the average annual strength of the whole computed from data liable to fluctuation is open to some degree of fallacy. Let us take for example, the years 1856 and 1857 in the Presidency Division. In *Table No. 1* it is seen that the strength of the Europeans in 1856 was 659, and in 1857 nearly 5,000 men. The figures 659 in 1856 include a wing of a Regiment always stationed in Bombay,—a Company of Artillery,—and Invalids detained for a few weeks previous to embarkation. In the following year (1857) there was a large influx of European Troops into Bombay, who were halted for some considerable time preparatory to proceeding

up-country. Some of these men came under hospital treatment, and hence the strength of their corps appeared in the Hospital Books, and is shown in these returns. It follows, therefore, that it would be an error to suppose that because 4,936 is stated as the annual average strength of European soldiers at the Presidency in 1857, there were that number of men at one time in Bombay. After the excitement of 1857 was over, the European force in Bombay fell the next and each succeeding year, so that in 1860 the strength was almost to a man exactly the same as in 1856, or five years before. This remark however is not applicable to the other Divisions of the Army, because they were all of less numerical strength in 1856 than usual, owing to the withdrawal of about 3,000 European Troops to form part of the Persian Expeditionary Force. An examination of the table will show how the strength fluctuated in each Division during the five years; how a new Division (almost) Mhow, was formed; how Aden during 1857 was left with 175 men; and what was the strength of the Persian Force, and of the Columns in Central India, Oude, and Bengal.

Let us turn however to the hospital transactions during these years. It will be seen that at the commencement of the year 1856 of European Soldiers 647 "*remained*" in hospital from the preceding year, and that at the end of the year 1860, 770 patients were "*remaining*." During these five years there had been no fewer than 159,378 soldiers "*treated*" in hospital, and that of these patients 2,424 had "*died*." It is convenient, although not perhaps strictly correct, to consider the number of patients "*treated*" in hospital, which includes both those "*remaining*" and those "*admitted*," as representing the amount of sickness, and throughout these tables the calculation of average percentage of sickness is based upon the "*treated*" in hospital, and not upon the admissions only.

If we compare then the total number of European Soldiers *treated* in hospital during these five years, with the strength of the British Forces during the same period, we find it as 159,378 is to 87,061, that is about 187 per cent., or in other words, every

1000 men passed through the hospital 1876 times. The year in which there was the largest amount of sickness was 1858, the "*treated*" in hospital amounted to upwards of 50,000, whilst the "*strength*" was about 21,500, the proportion being 223 per cent. or 2,237 per 1,000 strength.

This was the year after the mutinies, when not only was there a large number of unacclimatised soldiers, but when active operations were still going on, and when all the Field Forces were sending back their sick and wounded. But if we trace the year 1858 in the percentage columns at page 278, we shall see that the proportional sickness stood high in all the Divisions with the exception of Aden.

The average percentage of sickness for the five years shows that the Divisions can be arranged in the following order, according to the amount of sickness in each:—

Presidency..2,195 per 1,000	Rajpootana..1,765 per 1,000
Sind2,160 "	Southern....1,690 "
Northern ..2,014 "	Aden1,368 "
Poona.....1,965 "	

and that the most sickly years were as follows:—

1858 per 1,000	2,363	1856 per 1000	1,593
1859 "	2,237	1857 "	1,052
1860 "	2,131		

Mortality.—The total number of deaths for the five years was 2,424. The largest number occurred in the year 1858, viz. 776; then in 1857, viz. 547; next in 1859, viz. 482; then in 1860, viz. 425; and in 1856 only 194. Judged according to strength the total average mortality was 27 per 1,000—being in 1858, 36; in 1860, 30; in 1859, 29; in 1857, 21; and in 1856, 19 per 1,000. The highest percentage of deaths to treated was in Oude and in Bengal, where during the years 1857 and 1858, 353 European Soldiers of the Bombay Troops died; of these it will be seen, that 127 fell a prey to Cholera, and 76 lost their lives from wounds and

injuries ; the percentage of mortality to strength being 174 per 1,000, and of mortality to treated 73.

The average rate of deaths to strength is highest at the Presidency, viz. 43 per 1,000. This high rate of mortality in Bombay has been pretty constantly observed, and is said to be due to the circumstance of invalids arriving from all other stations, to proceed to England, and in many cases dying previous to embarkation. The tables notably illustrate the above remark. In 1857, when "the strain was upon every man's nerve" there were comparatively few invalids sent to Bombay, and there were only 33 deaths, whilst the influx of Europeans was so great that upon comparing the deaths 33, with the average strength 4,936, the percentage is only about 6 per 1,000 ; notwithstanding that the general average everywhere else is 27, and in Bombay alone for the five years under consideration, it amounted to 43 per 1,000. In 1858 the death rate in Bombay rose to 36 per 1,000, in 1859 to 45, and in 1860 to 68 per 1,000, thus showing that, with the exception of 1857, it must be disease imported from without, which terminated fatally and increased the rate of mortality in Bombay.*

In the Northern Division of the Army there is a mortality percentage rate above the average, the year 1858 witnessing 33 deaths per 1,000 of strength ; 1859, 30 per 1,000 ; and 1860 so high a proportion as 61 per 1,000 ; this excessive mortality having been due to the appearance of cholera in a fatal form amongst the European Troops at Baroda. It will be observed that whilst the variation in the total *average* of "deaths to strength" in five years extends only from 19 to 36 per 1,000, a wider range obtains in some Divisions. Thus, in the Poona Division, it varies from 14 to 40 per 1,000 ; in the Northern from 19 to 61 ; and in the Southern from 9 to 21. This is to be explained by bearing in mind that the liberation of Troops from

* By the establishment of the Khandalla Dépôt, and the ready access of Bombay by rail, few Invalids have since 1860 been detained in Bombay, and the effect on the rate of mortality is deserving of observation in future years.

Central India and Bengal, necessarily swelled the list of the Division to which they returned, and that it was chiefly whilst they were absent that the low comparative rate of mortality prevailed.

Aden enjoys the privilege of exhibiting the lowest death rate of any station for European Troops in the Bombay Presidency. During the five years from 1856 to 1860 the range was from 3 to 24 deaths per 1,000 of strength, the general average of the five years being 12 per 1,000. In one year, indeed, (1859) not a single death happened to an European Soldier at Aden, and in the five years under consideration there was a total of only 21 deaths, a little more than 5 per annum. Of these 21 deaths, 8 were ascribed to fever, 3 to diseases of the lungs, and 2 each to diseases of the stomach and bowels, to diseases of the brain, to dropsies, to wounds and other diseases, but there was not a single instance of cholera.

If we turn now to the registered causes of death during the five years, (Table 2) we find that out of 2,424 deaths, 547 or about 22·5 per cent. were due to diseases of the stomach and bowels; 397 or about 16 per cent. to fever; 342 or about 14 per cent. to cholera; 323 or about 13 per cent. to diseases of the brain; 239 or nearly 10 per cent. to diseases of the liver; 191 or about 8 per cent. to diseases of the lungs; 161 or about 6 per cent. to wounds and injuries; and 126 or 5 per cent. to diseases not classified.

It is worthy of notice that there were only 29 fatal instances of eruptive fevers, and that of these 10 happened in Rajpootana and Mhow, 8 in Central India, 2 in Bengal during the time the troops were there engaged, whilst in the Poona Division there was about 1 fatal case a year, in the Northern Division and Bombay 1 in five years, and in the Southern 2 in the same period, showing forcibly that in stations near home, small-pox is not so inimical or so fatal a disease as it is to troops exposed to the hardships of field service.

Summary of Sickness and Mortality of European Troops for five years, arranged in years and Divisions, according to the amount of sickness or mortality in each.

General average ratio of sickness per 1,000 men		1,876
" " mortality to ditto		27
" " " to 1,000 sick treated		15

Years in which the greatest ratio of sickness.

1858	per 1,000 men	2,363	1856	per 1,000 men	1,593
1859	"	2,237	1857	"	1,052
1860	"	2,130			

Divisions in which the greatest general ratio of sickness.

Presidency	per 1,000 men	2,195	Rajpootana	per 1,000 men	1,765
Sind		" 2,160	Southern	..	" 1,690
Poona		" 1,965	Aden		" 1,368
Northern	..	" 2,014			

Years in which the greatest ratio of mortality.

1858	36	per 1,000	men.	1857	21	per 1,000	men.
1860	30	"	"	1856	19	"	"
1859	29	"	"				

Divisions in which the greatest ratio of mortality.

Presidency	43	per 1,000 men.	Rajpootana	17	per 1,000 men.
Northern	30	" "	Southern	16	" "
Sind	23	" "	Aden	10	" "
Poona	20	" "			

Tables No 3 and 4.—NATIVE TROOPS.

The strength of Native Troops during the five years from 1856 to 1860 did not much vary. In 1856 it was a little over 35,000 and in 1860 about as much under 34,000. It increased in 1858 to above 38,000 and in 1859 to above 40,000, but fell the next year to 37,000.

The largest number of Native Troops is located in the Poona Division—about 9 or 10,000 men, then in the Northern, Southern and Sind Divisions, Rajpootana, the Presidency, and lastly

Aden, but in all Divisions a glance at Table No. 3 will show how little the strength has fluctuated. In the years 1856, 1857, and 1858, Native Troops of the Bombay Army were engaged in operations in the Persian Expedition and in Central India. The disbandment of two regiments scarcely affected the general result as the strength of other regiments was increased. At the beginning of 1856 there were 1,173 Native Soldiers in hospital, and at the close of 1860 there remained under treatment 809, being a difference less of 364. During the five years there were 222,389 admissions, which added to the remaining in hospital, constituted 229,406 patients treated, or in the proportion of 1,230 to every 1,000 men. The general average sick to strength varied little. It was highest in 1859, viz. 1,347 per 1,000, and lowest in 1860, or 1,111 per 1,000. The most sickly division for Native Troops is the Presidency, but the influences which tend to swell the list of sickness and mortality amongst Europeans are not to so great an extent in operation amongst Natives—(Bombay not being resorted to by invalids of the Native Army)—hence the causes must be sought for in Bombay itself. The average percentage of sickness to strength at the Presidency was in 1859, 2,070 per 1,000; in no year was it under 1,500 per 1,000, whilst the general average of five years reached to 1,720 per 1,000. Next to the Presidency, Sind has the highest general average percentage of sickness to strength, viz. 1,570 per 1,000; but it is singular how sickness in that province steadily abated. In 1856 the percentage was as high as 2,280 per 1,000, in 1857 it fell to 1,880, in 1859 to 1,296, in 1860 to 1,180, but rose slightly in 1860 to 1,200. After Sind, the Northern Division of the Army appears to be the most sickly, the general average percentage of sick to strength for five years being 1,423 per 1,000.

The healthiest place for Native Troops is Aden. It will be seen by the tables that only in two years the average percentage of sick rose above 1,000 per 1,000 and in the three remaining years much below; on one occasion indeed in 1859 being only 550 per 1,000. In Persia and Central India the Bombay Native Troops do not appear to have had any great amount of

sickness, but comparatively more in the latter than in the former campaign.

Mortality.—There were 2,162 deaths amongst Native Troops during the five years, which with reference to strength is about 11 per 1,000; the mortality of European Troops in the same situations and for the same periods was about 27 per 1,000 men. The chief causes of death were fevers, from which 611 casualties happened, or 28 per cent.; then cholera 339 cases, or 15 per cent.; diseases of the lungs, 287 cases, or 13 per cent.; diseases of the stomach and bowels, 280 cases, or 13 per cent.; other diseases, 206 cases, or 9 per cent.; wounds and injuries, 111 cases, or 5 per cent.

A singular immunity from small-pox seems to have occurred amongst Native Troops, as before remarked with reference to European Troops, as there were only 24 deaths in five years, the largest number occurring in the Poona and in the Presidency Divisions.

The following is a Summary of the Sickness and Mortality of Native Troops, arranged in years and in Divisions, according to the amount of sickness or mortality in each year or Division.

General average ratio of sickness per 1,000 men.	1,230
" " " " mortality	11
" " " " " " treated.	9

Years in which the greatest ratio of sickness.

1859 per 1,000 men, 1,344	1857 per 1,000 men, 1,119
1856 " " 1,245	1860 " " 1,169
1858 " " 1,244	

Divisions in which the greatest ratio of sickness.

Presidency per 1,000 men, 1,722	Rajpootana per 1,000 men, 1,387
Sind. " " 1,570	Southern " " 929
Northern " " 1,433	Poona " " 925

Aden per 1,000 men, 832.

Years in which the greatest ratio of mortality.

1858	per 1,000 men,	13	1856	per 1,000 men,	18
1857	"	12	1860	"	8
1859	"	11			

Divisions in which the greatest ratio of mortality.

Aden	per 1,000 men,	22*	Sind	per 1,000 men,	11
Presidency ..	"	20	Poona	"	9
Northern	"	12	Rajpootana ..	"	8

Southern per 1,000 men, 7.

Tables No. 5 and 6.—JAILS.

The number of prisoners confined in Jails in the Bombay Presidency and in Sind during the five years from 1856 to 1860 was a little over 6,000 per annum. In 1858 the number exceeded 6,500 and in 1860 there were fewer than in 1856. The largest number of prisoners is in the Poona and Sind Divisions, the smallest at Aden,—only from 150 to 170.

There were 379 prisoners sick in all the Jails throughout the Presidency at the beginning of 1856, and at the close of 1860 only 226 remained in hospital. During the five years there had been 45,411 admissions into hospital, and 1,218 deaths. The average ratio of "*treated to strength*" was about 1,500 per 1,000 individuals. The mortality to strength was about 38 per 1,000, and the deaths to the number per 1,000 treated about 25. The year of greatest sickness was 1856, when it amounted to upwards of 1,700 per 1,000 of strength, and the deaths to about 40 per 1000. In 1859, although there was not so much general sickness (the proportion being only 1,350 per 1,000 strength) yet the deaths reached to 43 per 1,000. It is the Jails of the Northern Division, or Guzerat, which prove most unhealthy—the average annual number of prisoners treated in hospital was 1,988 per 1,000 strength, and the mortality about 50 per 1,000. Next to the Jails in Guzerat, those in Sind have the highest sick and death ratios, the annual average

* Due to an outbreak of Cholera.

percentage of treated to strength being 1,700 per 1,000 and the death ratio 38 per 1,000.

Mortality.—The chief diseases which prove fatal to prisoners may be classified as follows: diseases of the stomach and bowels, 25 per cent.; scurvy and other diseases, about 24 per cent.; cholera, nearly 15 per cent.; fever, 14 per cent.: diseases of the lungs, 11 per cent. &c.

The following is a Summary of the Sickness and Mortality of Prisoners for five years, arranged according to the amount of sickness and mortality in years and Divisions.

General average ratio of sickness per 1,000 prisoners.	1,495
" " " mortality " "	38
" " " " " treated.	25

Years in which the greatest ratio of sickness.

1856 per 1,000 men, 1,715	1860 per 1,000 men, 1,380
1857 " 1,641	1859 " 1,356
1858 " 1,384	

Divisions in which the greatest ratio of sickness.

Northern per 1,000 men, 1,988	Southern.. per 1,000 men, 1,256
Sind " 1,702	Presidency. " 1,153
Poona .. " 1,439	Aden " 921

Years in which the greatest ratio of mortality.

1859 per 1,000 men, 43	1857 per 1,000 men, 36
1856 " 40	1860 " 35
1858 " 38	

Divisions in which the greatest ratio of mortality.

Northern per 1,000 men, 56	Pesidency. per 1,000 men, 35
Sind " 38	Southern.. " 29
Poona .. " 36	Aden " 24

Tables No. 7 and 8.—POLICE.

The Police Force has been largely increased since the mutinies. In 1856 it numbered 11,332 individuals, and it appears to have steadily risen each year since that time, being

in 1857 upwards of 16,000, in 1858 more than 18,000, in 1859 nearly 20,000, and almost that number in 1860, or 19,629. By Table No. 7 the numerical strength is seen to have increased in all Divisions, the largest force being apparently kept up in Sind, and in the Northern Divisions. Compared to other branches of the public service, sickness is not common amongst the Police. When they enter hospital it is generally for some serious or fatal illness, as is proved by the high rate of percentage of "deaths to treated" compared to the extremely low rate of "deaths to strength." The beginning of 1856 found 182 Police men under hospital treatment throughout the Presidency and at the end of 1860 there were 234 remaining in hospital. During the period of five years there had been 44,277 admissions into hospital but the average annual ratio of treated to strength amounted only to 530 per 1,000,—a wide contrast to that of Prisoners in Jails which, for the same period, was nearly 1,500 per 1,000. The explanation offered is, that in some places—Bombay for example—the Police force is always kept up to its full strength, and that if a man is merely suffering from slight sickness he is not sent to hospital, but to his native country, and a substitute found to fill the gap caused by his absence. Hence the numerical strength of the corps appears to be large and the hospital admissions to be few. From these disturbing causes the hospital statistics of the Police force possess less interest or importance than those of other branches of the public service.

The following is a Summary of the Sickness and Mortality of the Police Force arranged in years and Divisions, according to the amount of sickness or mortality in each year or Division.

General average ratio of sickness for 1,000 men				530
"	"	"	mortality	" " 5
"	"	"	"	" treated 11
<i>Years in which the greatest ratio of sickness.</i>				
1857	per 1,000 men,	599	1858	per 1,000 men, 493
1860	"	554	1856	" 467
1859	"	536		

Divisions in which the greatest ratio of sickness.

Northern ..	per 1,000 men,	664	Southern ..	per 1,000 men,	448
Sind	"	607	Presidency.	"	390
Aden	"	566	Poona	"	358

Years in which the greatest ratio of mortality.

1856	per 1,000 men,	7	1858	per 1,000 men,	4
1857	"	7	1860	"	4
1859	"	6			

Divisions in which the greatest ratio of mortality.

Sind	per 1,000 men,	7	Poona	per 1,000 men,	4
Northern ..	"	6	Southern ..	"	3
Presidency.	"	5	Aden	"	3

LINES representing the average

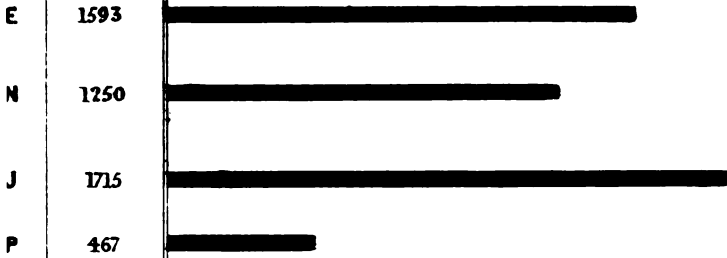
per 1000

E European Troops.

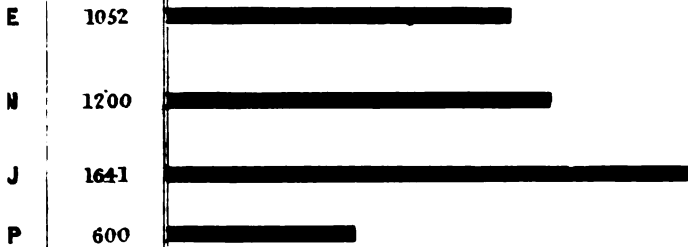
N Native Troops.

Scale one sixtieth

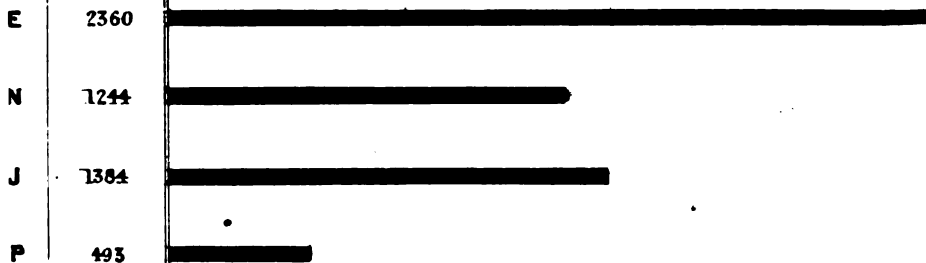
1856.



1857.



1858.



N.B.—All these Lines would require to be lengthened

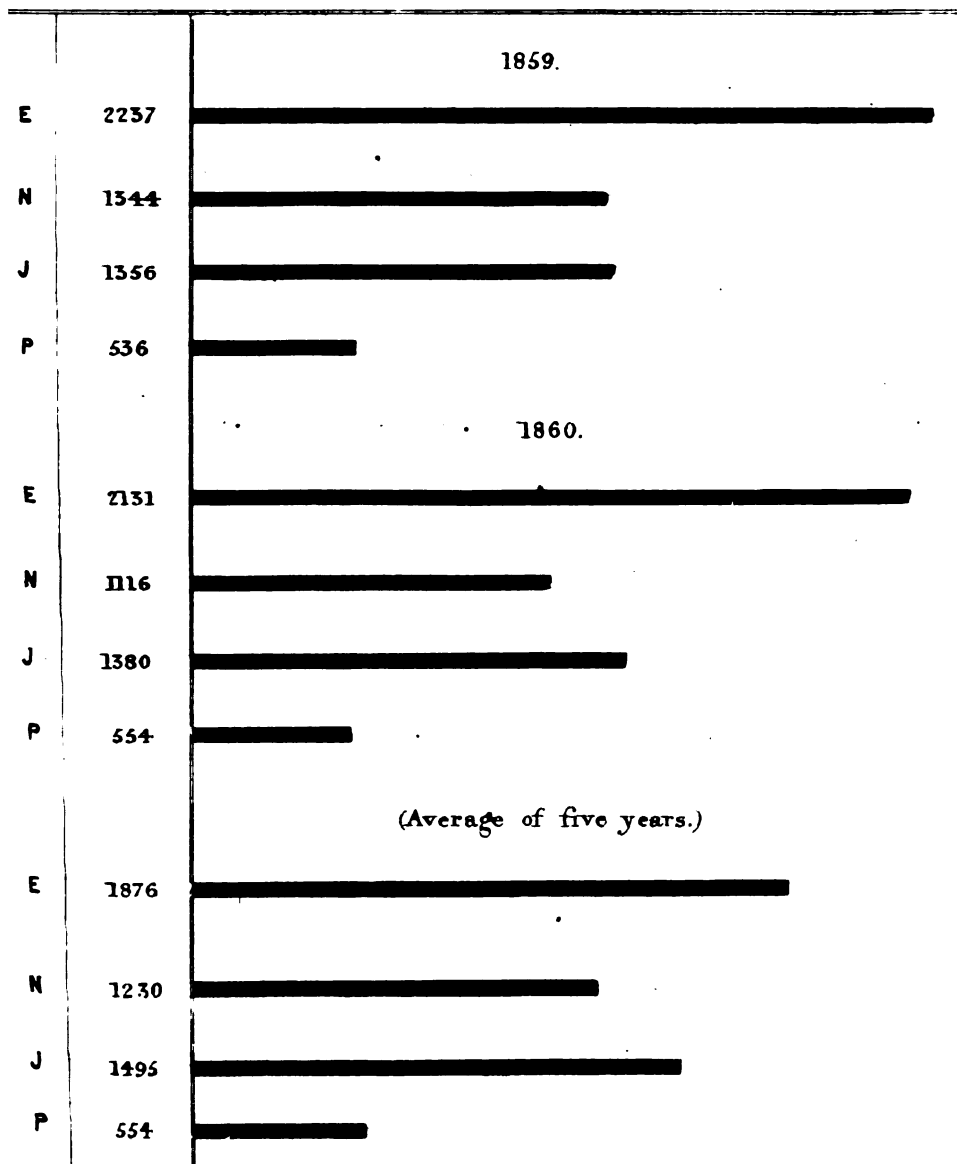
Sickness for five Years,

Strength.

f an inch.

J. Prisoners in Jails

P. Police Force

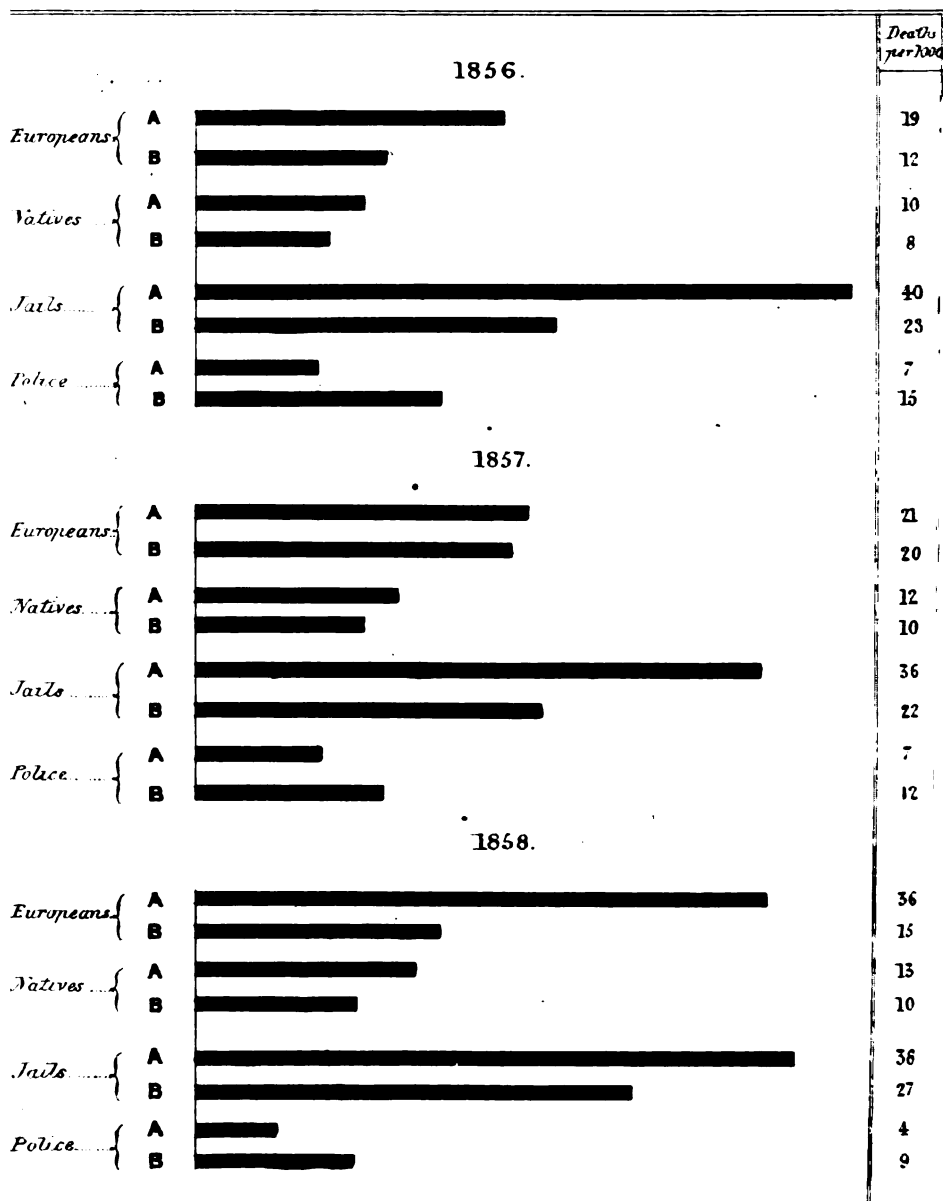


Fifty-fold to be on the same Scale as the other Diagram.

LINES representing the average

A. per 1000 Strength.

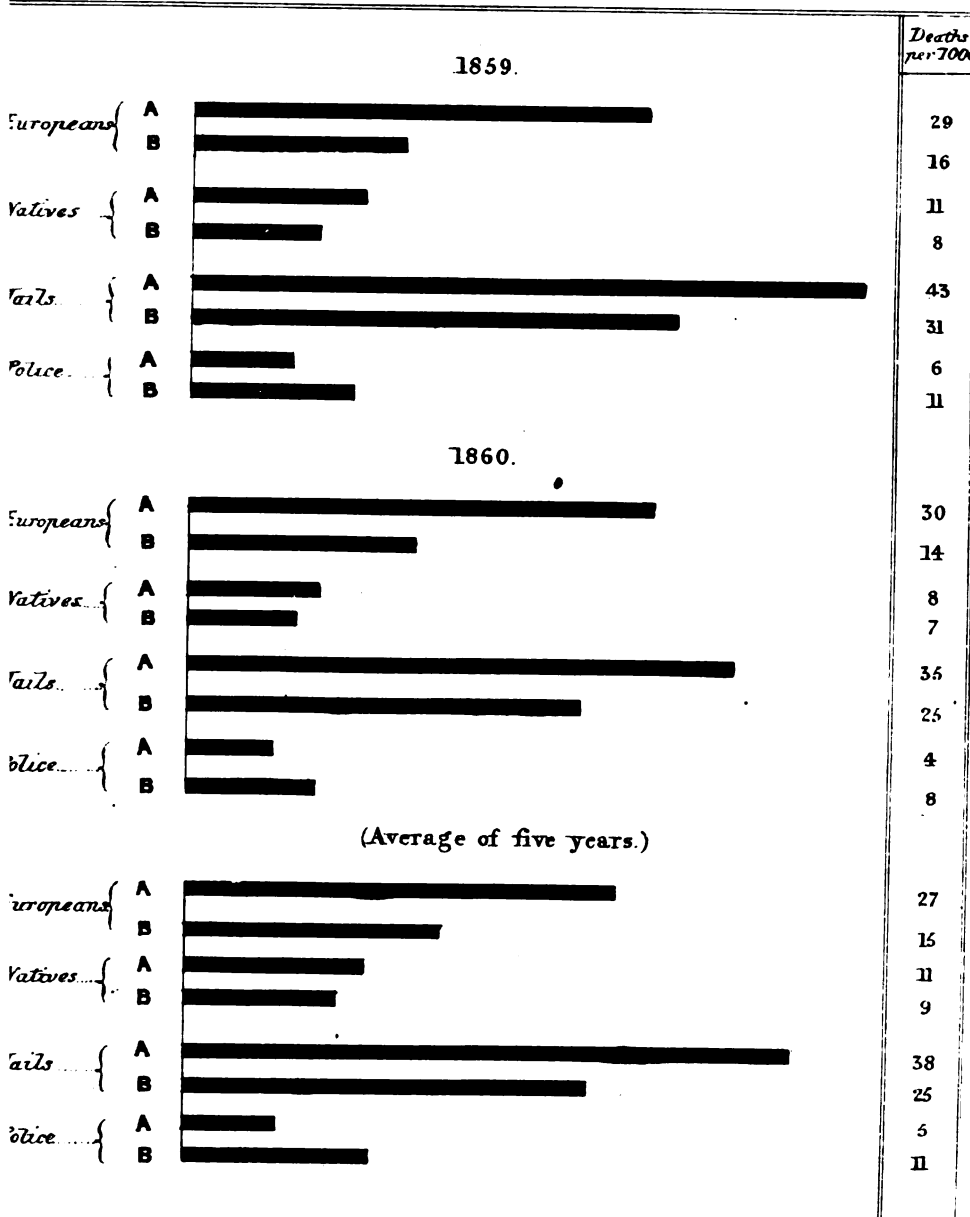
Scale one twelfth



Mortality for five Years.

B. per 1000 Sick treated.

of an inch.



TABLES 1 to 8.

**SICKNESS AND MORTALITY AMONGST
EUROPEAN AND NATIVE
TROOPS, &c.**

No. 1.

**SICKNESS AND MORTALITY amongst EUROPEAN TROOPS from 1856 to 1860
in the Bombay Presidency.**

Divisions.											
	Presidency.	Poona.	Northern.	Southern.	Sind.	Rajpootana and Mhow.	Aden.	Persian Gulf.	Central India.	Oude and Bengal.	Total.
Strength. { 1856 1857 1858 1859 1860 }	659	2,624	915	853	1,727	94	559	2,769			10,200
	4,936	4,533	2,409	1,898	4,718	2,381	175	1,016	1,634	1,700	25,400
	1,166	4,628	1,659	2,277	2,127	2,967	328		4,858	1,482	21,492
	793	4,266	2,009	969	2,149	5,499	469				16,154
	658	3,474	1,632	1,225	2,448	3,917	461				13,815
Total..	8,212	19,525	8,624	7,222	13,169	14,858	1,992	3,785	6,492	3,182	87,061
Remained. { 1856 1857 1858 1859 1860 }	90	231	45	72	183	1	25				647
	46	143	48	14	71		16	113			451
	95	261	66	152	214	176	8		202	72	1,246
	128	398	156	146	153	500	10				1,491
	97	326	90	79	220	299	26				1,137
Total..	456	1,359	405	463	841	976	85	113	202	72	4,972

Admitted.	{ 1856	1,776	3,963	1,339	1,257	3,812	130	638	2,695				15,610
	{ 1857	1,591	4,994	2,318	2,604	6,682	1,926	214	832	1,043	4,044	26,278	
	{ 1858	3,279	10,017	4,409	3,877	5,147	6,462	499		12,746	3,109	49,545	
	{ 1859	1,164	10,053	4,847	1,569	4,202	12,633	190				34,658	
	{ 1860	2,070	8,112	3,809	2,344	3,462	7,529	989				28,315	
Total..		9,880	37,139	16,722	11,651	23,305	28,680	2,560	3,527	13,789	7,153	1,54,406	
Treated.	{ 1856	1,866	4,194	1,384	1,329	3,995	131	663	2,695				16,257
	{ 1857	1,637	5,137	2,366	2,618	6,753	1,926	260	945	1,043	4,044	26,729	
	{ 1858	3,374	10,278	4,475	4,029	5,361	6,638	507		12,948	3,181	50,791	
	{ 1859	1,292	10,451	5,003	1,715	4,355	13,133	200				36,149	
	{ 1860	2,167	8,438	3,899	2,423	3,682	7,828	1,015				29,452	
Total..		10,336	38,498	17,127	12,114	24,146	29,656	2,645	3,640	13,991	7,225	1,59,378	
Died.	{ 1856	39	37	18	18	50	1	2	29				194
	{ 1857	33	58	20	18	71	34	3	1	13	296	547	
	{ 1858	43	64	56	47	69	155	8		277	57	776	
	{ 1859	36	172	62	20	36	156					482	
	{ 1860	45	82	101	12	58	119	8				425	
Total..		196	413	257	115	284	465	21	30	290	353	2,424	
Remaining.	{ 1856	46	143	48	14	65		16	113				445
	{ 1857	95	254	66	161	218	176	8		196	72	1,246	
	{ 1858	128	398	156	146	110	214	10		386	43	1,591	
	{ 1859	49	290	90	66	153	326	27				1,001	
	{ 1860	59	196	38	84	106	240	47				770	
Total..		377	1,281	398	471	652	956	108	113	582	115	5,053	

Percentage of Sickness and Mortality as shown in the preceding Table.

	F.	P.	N.	S.	S.	R. & M.	A.	P. G.	C. I.	O. & B.	Total.
Treated to Strength.	1856	283.1	159.8	151.2	155.8	231.3	139.4	118.6	97.3	...	159.3
	1857	33.1	113.3	98.2	137.9	143.1	80.8	148.5	93.0	237.8	105.2
	1858	289.3	222.0	269.7	176.9	252.0	223.7	154.5	..	214.6	236.3
	1859	162.9	244.9	249.0	176.9	202.6	238.8	42.6	..	...	223.7
	1860	329.3	242.8	238.9	197.7	250.4	199.8	220.1	..	...	213.1
Average..	219.5	196.5	201.4	169.0	216.0	176.5	136.8	95.1	160.1	226.2	187.6
Deaths to Strength.	1856	5.9	1.4	1.9	2.1	2.9	1.0	0.3	1.0	...	1.9
	1857	0.6	1.2	0.8	0.9	1.5	1.4	1.7	0.09	17.4	2.1
	1858	3.6	1.3	3.3	2.0	3.2	5.2	2.4	..	3.8	3.6
	1859	4.5	4.0	3.0	2.0	1.6	2.8	..	..	...	2.9
	1860	6.8	2.3	6.1	0.9	2.3	3.0	1.7	..	...	3.0
Average..	4.3	2.0	3.0	1.6	2.3	1.7	1.2	0.5	3.2	10.6	2.7
Deaths to Treated.	1856	2.1	0.8	1.3	1.3	1.2	0.7	0.3	1.0	...	1.2
	1857	2.0	1.1	0.8	0.6	1.0	1.7	1.1	0.1	7.3	2.0
	1858	1.2	0.6	1.2	1.1	1.2	2.3	1.5	..	1.7	1.5
	1859	2.7	1.6	1.2	1.1	0.8	1.1	..	..	...	1.3
	1860	2.0	0.9	2.5	0.4	1.5	1.5	0.7	..	...	1.4
Average..	2.0	0.1	1.4	0.9	1.1	1.6	0.7	0.5	1.6	4.5	1.5

No. 2.

CAUSES OF DEATH amongst EUROPEAN TROOPS from 1856 to 1860, in the Bombay Presidency.

Classes of Disease.	DIVISIONS.										Total.
	Presi- dency.	Poona.	Northern.	Southern.	Sind.	Rajpootana and Mhow.	Aden.	Persian Gulf.	Central India.	Oude and Bengal.	
Fevers	15	55	56	14	64	125	8	9	31	18	397
Eruptive Fevers	1	5	1	2	..	10	..	..	8	2	29
Diseases of the Lungs.	30	40	19	9	36	28	3	3	14	9	191
" Liver .	34	37	20	15	42	58	..	3	24	6	239
" Stomach											
and Bowels	56	92	40	42	75	100	2	6	65	69	547
Epidemic Cholera	20	83	64	1	10	29	..	..	8	127	342
Diseases of the Brain .	13	40	45	10	31	66	2	1	85	30	323
Dropsies	13	13	1	1	3	4	2	1	1	1	40
Rheumatic affections..	2	2	..	..	1	3	..	..	1	1	10
Veneral ditto ..	4	1	2	1	3	1	..	..	1	..	13
Abscesses and Ulcers .	..	2	1	..	1	1	..	..	..	..	5
Wounds and injuries .	4	6	..	5	2	17	2	7	42	76	161
Diseases of the skin..	..	1	..	..	..	..	..	..	..	..	1
Other diseases	4	36	6	15	16	23	2	..	10	14	126
Total...	196	413	257	115	284	465	21	30	290	353	2,424

No. 3.

**SICKNESS AND MORTALITY amongst NATIVE TROOPS from 1856 to 1860,
in the Bombay Presidency.**

Divisions.										
	Presidency.	Poona.	Northern.	Southern.	Sind.	Rajpootana and Mhow.	Aden.	Persian Gulf.	Central India.	Total.
Strength.	1856	6,900	6,762	3,912	5,116	3,177	1,014	4,373	...	35,343
	1857	10,121	6,236	5,586	5,012	2,379	1,041	4,198	526	38,585
	1858	9,931	6,138	5,474	4,926	3,702	1,196	...	6,123	40,589
	1859	10,866	6,133	5,166	6,645	5,525	1,114	...	...	37,883
	1860	9,374	5,968	4,753	5,482	4,899	1,038	...	...	33,696
Total.	15,260	47,192	31,237	24,921	27,181	19,682	5,403	8,571	6,649	1,86,096
Remained.	1856	209	271	88	245	85	42	...	...	1,173
	1857	212	238	131	206	21	29	255	...	1,365
	1858	378	289	174	170	215	28	...	83	1,483
	1859	305	287	138	230	485	25	...	...	1,649
	1860	364	222	225	183	183	29	...	...	1,347
Total.	972	1,468	1,307	756	1,034	989	153	255	83	7,017

Admitted.	1856	7,232	5,858	8,548	2,336	11,458	3,469	1,058	2,897		42,856
	1857	5,002	10,448	8,063	4,144	9,226	2,881	1,098	3,516	557	44,935
	1858	4,565	8,242	9,260	4,718	6,204	5,706	851		9,483	49,019
	1859	4,861	10,393	9,283	6,372	7,663	10,126	597			49,295
	1860	3,522	7,533	7,932	5,069	6,407	5,122	699			36,234
Total..		25,172	42,474	43,086	22,639	40,958	27,304	4,303	6,413	10,040	222,389
Treated.	1856	7,465	6,067	8,819	2,424	11,703	3,554	1,100	2,897		44,029
	1857	5,275	10,660	8,301	4,275	9,432	2,902	1,127	3,771	557	46,300
	1858	4,701	8,620	9,549	4,892	6,374	5,921	879		9,566	50,502
	1859	5,040	10,698	9,570	6,510	7,893	10,611	622			50,944
	1860	3,663	7,897	8,154	5,294	6,590	5,305	728			37,631
Total..		26,144	43,942	44,393	23,395	41,992	28,293	4,456	6,668	10,123	229,406
Died.	1856	101	62	68	15	73	16	12	27		374
	1857	70	138	73	38	78	25	15	56	4	497
	1858	62	77	85	40	39	32	91		129	555
	1859	51	99	83	78	67	53	10			441
	1860	34	57	80	37	44	39	4			295
Total..		318	433	389	208	301	165	132	83	133	2,162
Remaining	1856	293	222	249	79	206	41	29	246		1,365
	1857	135	389	320	159	170	205	28		77	1,483
	1858	179	305	287	138	230	165	25		320	1,649
	1859	112	394	238	191	166	155	29			1,285
	1860	128	221	204	105	62	70	19			809
Total...		847	1,531	1,298	672	834	636	130	246	397	6,591

Percentage of Sickness and Mortality as shown in the preceding Table.

	P.	P.	N.	S.	S.	R. & M.	A.	P. G.	C. I.	Total.
Treated to Strength.	1856	183.9	87.9	130.4	61.4	228.7	111.8	108.4	...	124.5
	1857	151.3	105.3	133.1	76.5	188.1	121.9	108.2	105.8	119.9
	1858	151.3	86.7	155.5	89.3	129.3	159.9	73.4	156.2	124.4
	1859	207.0	98.4	156.0	126.0	118.7	192.0	55.8	...	134.4
	1860	167.8	84.2	136.6	111.3	120.2	108.2	70.1	...	111.6
Average..	172.2	92.5	142.3	92.9	157.0	138.7	83.2	78.0	131.0	123.0
Deaths to Strength.	1856	2.4	0.9	1.0	0.3	1.4	0.5	1.1	...	1.0
	1857	2.0	1.3	1.1	0.6	1.5	1.0	1.4	0.7	1.2
	1858	2.0	0.7	1.3	0.7	0.7	0.8	7.6	2.1	1.3
	1859	2.0	0.9	1.3	1.5	1.0	0.9	0.8	...	1.1
	1860	1.5	0.6	1.3	0.7	0.8	0.8	0.3	...	0.8
Average..	2.0	0.9	1.2	0.7	0.7	1.1	0.8	2.2	1.4	1.1
Deaths to Treated.	1856	1.3	1.0	0.7	0.6	0.6	0.4	1.0	...	0.8
	1857	1.3	1.2	0.8	0.8	0.8	0.8	1.3	0.7	1.0
	1858	1.3	0.8	0.8	0.8	0.6	0.5	10.3	1.3	1.0
	1859	1.0	0.9	0.8	1.1	0.8	0.5	1.6	...	0.8
	1860	0.9	0.7	0.9	0.6	0.6	0.7	0.5	...	0.7
Average..	1.1	0.9	0.8	0.8	0.8	0.7	0.6	2.9	1.0	0.9

CAUSES OF DEATH amongst NATIVE Troops from 1856 to 1860, in the Bombay Presidency.

TROOPS, PRISONERS, &c. FOR FIVE YEARS.

283

Classes of Disease.	DIVISIONS.									Total.
	Presidency.	Poona.	Northern.	Southern.	Sind.	Rajpootana and Mhow.	Aden.	Persian Gulf.	Central India.	
Fevers	84	122	124	50	117	42	11	27	34	611
Eruptive Fevers	4	7	5	3	1	1	..	1	2	24
Diseases of the Lungs ..	49	58	43	20	59	26	9	14	9	287
" Liver ..	12	15	9	8	7	5	6	3	3	68
" Stomach ..	..	..	..	..	..	..	..	..	..	..
and Bowels	45	50	51	28	46	24	8	15	13	280
Epidemic Cholera	36	68	82	54	3	19	76	..	1	339
Diseases of the Brain ..	6	17	14	12	11	9	..	5	2	76
Dropsies	5	14	5	4	5	2	4	..	1	40
Rheumatic affections ..	14	8	6	4	13	1	5	3	1	55
Veneral affections	5	8	6	1	4	5	..	..	4	33
Abscesses and Ulcers ..	4	5	7	4	5	1	1	1	1	29
Wounds and Injuries ..		16	8	1	9	17	2	7	51	111
Diseases of Eye	1	..			..		..	..		1
" of the Skin.....	2	..	1		..		..	..		3
Other diseases	51	45	28	19	21	13	10	7	11	205
Total....	318	433	389	208	301	165	132	83	133	2,162

No. 5.

**SICKNESS AND MORTALITY amongst PRISONERS in JAILS from 1856
to 1861, in the Bombay Presidency.**

Years.	DIVISIONS.						Total.
	Presidency.	Poona.	Northern.	Southern.	Sind.	Aden.	
Strength.. {	1856 954	1,307	861	1,373	1,717	154	6,366
	1857 971	1,336	964	1,371	1,487	152	6,281
	1858 10,63	1,509	967	1,400	1,485	158	6,582
	1859 1,017	1,472	872	948	1,568	164	6,041
	1860 1,010	1,497	828	806	1,739	171	6,051
Total..	5,015	7,121	4,492	5,894	7,996	799	31,321
Remained.. {	1856 19	59	83	68	142	8	379
	1857 24	72	39	60	106	5	306
	1858 21	50	65	57	79	4	276
	1859 36	74	48	42	78	3	281
	1860 36	66	43	32	51	5	233
Total..	136	321	278	259	456	25	1,475

Admitted..	1856	£06	2,089	1,711	2,014	3,805	114	10,539
	1857	1,219	2,039	2,114	1,756	2,759	115	10,002
	1858	1,237	1,933	1,788	1,636	2,042	199	8,835
	1859	1,015	1,774	1,651	1,023	2,325	124	7,912
	1860	1,385	2,041	1,415	862	2,259	161	8,123
Total..		5,662	9,876	8,679	7,291	13,190	713	45,411
Treated..	1856	825	2,148	1,794	2,082	3,917	122	10,918
	1857	1,243	2,111	2,153	1,816	2,865	120	10,308
	1858	1,258	1,983	1,853	1,693	2,121	203	9,111
	1859	1,051	1,848	1,699	1,065	2,403	127	8,193
	1860	1,421	2,107	1,458	894	2,310	166	8,356
Total..		5,798	10,197	8,957	7,550	13,646	738	46,886
Died..	1856	18	51	36	29	120	5	259
	1857	24	45	47	48	59	6	229
	1858	26	70	62	35	58	3	254
	1859	28	64	68	49	49	1	259
	1860	85	31	43	12	41	5	217
Total..		181	261	256	173	327	20	1,218
Remaining..	1856	24	72	39	60	106	5	306
	1857	21	50	65	57	79	4	276
	1858	36	74	48	42	78	3	281
	1859	36	66	43	32	51	5	233
	1860	24	59	34	22	81	6	226
Total..		141	321	229	213	395	23	1,322

Percentage of Sickness and Mortality as shown in the preceding Table.

	P.	P.	N.	S.	S.	A.	Total.
Treated to Strength.	1856	86.4	164.3	208.3	151.6	79.2	171.5
	1857	128.0	158.0	223.3	132.4	78.9	164.1
	1858	118.3	131.4	191.6	120.9	128.4	138.4
	1859	103.3	125.5	194.8	112.3	77.4	135.6
	1860	140.6	140.7	176.0	110.9	97.0	138.0
Average..	115.3	143.9	198.8	125.6	170.2	92.1	149.5
Deaths to Strength.	1856	1.8	3.9	4.1	2.1	3.2	4.0
	1857	2.4	3.3	4.8	3.5	3.9	3.6
	1858	2.4	4.6	6.4	2.5	1.8	3.8
	1859	2.7	4.3	7.7	5.1	0.6	4.3
	1860	8.4	2.1	5.2	1.4	2.9	3.5
Average..	3.5	3.6	5.6	2.9	3.8	2.4	3.8
Deaths to Treated.	1856	2.1	2.3	2.0	1.3	4.0	2.3
	1857	1.9	2.1	2.1	2.6	5.0	2.2
	1858	2.0	3.5	3.3	2.0	1.4	2.7
	1859	2.6	3.4	4.0	4.6	0.7	3.1
	1860	5.9	1.4	2.9	1.3	3.0	2.5
Average..	2.9	2.5	2.8	2.3	2.2	2.8	2.5

CAUSES OF DEATH amongst PRISONERS IN JAILS, from 1856 to 1860, in the Bombay Presidency.

TROOPS, PRISONERS, &c. FOR FIVE YEARS.

287

Classes of Disease.	DIVISIONS.						Total.
	Presidency.	Poona.	Northern.	Southern.	Sind.	Aden.	
Fevers	17	59	30	22	43	4	175
Eruptive Fevers	1	1				1	3
Diseases of the Lungs ..	10	26	13	6	81	2	138
Liver ..	2	7	1		6		16
" Stomach							
and Bowels	40	55	63	54	92	1	305
Epidemic Cholera	62	27	50	36	7		182
Diseases of the Brain...	5	9		1	8	1	24
Dropsies	5	9	3	4	8	3	32
Rheumatic affections...	2	5		5	4		16
Veneral affections	1	2		1	2		6
Abscesses and Ulcers.....	4	1			6		11
Wounds and Injuries....		5	3	2	2		12
Diseases of the Eye			2	2			2
" Skin	1	4		2			7
Other diseases	31	51	91	40	68	8	289
Total..	181	261	256	173	327	20	1,218

No. 7.

SICKNESS AND MORTALITY amongst the POLICE FORCE, from 1856
to 1860, in the Bombay Presidency.

DIVISIONS.							Total.
Presidency.	Poona.	Northern.	Southern.	Sind.	Aden.		
{ Strength.. }	1856 1,872	1,725	2,408	1,945	3,382		11,332
	1857 2,249	1,955	3,386	3,561	4,901	165	16,217
	1858 2,721	3,279	4,107	3,865	4,324	167	18,463
	1859 2,331	3,408	6,158	3,017	4,838	185	19,937
	1860 2,678	3,455	5,906	2,453	4,919	218	19,629
Total..	11,851	13,822	21,965	14,841	22,364	735	85,578
{ Remained.. }	1856 13	43	41	35	50		182
	1857 22	12	27	64	56		181
	1858 21	23	52	72	125	4	297
	1859 23	61	107	65	116	1	373
	1860 7	53	158	100	72	8	398
Total..	86	192	385	336	419	13	1,431

Admitted..	1856	792	637	947	800	1,943		5,119
	1857	1,045	673	2,315	1,783	3,666	57	9,539
	1858	895	950	2,456	1,460	2,964	84	8,809
	1859	750	1,315	4,611	1,424	2,100	118	10,318
	1860	1,011	1,155	4,799	902	2,469	156	10,492
Total..		4,493	4,730	15,128	6,569	13,142	415	44,277
Treated..	1856	805	680	988	835	1,993		5,301
	1857	1,067	685	2,342	1,847	3,722	57	9,720
	1858	916	973	2,508	1,532	3,089	88	9,106
	1859	773	1,376	4,718	1,489	2,216	119	10,691
	1860	1,018	1,208	4,957	1,002	2,541	164	10,890
Total..		4,579	4,922	15,513	6,705	13,561	428	45,708
Died..	1856	11	8	28	3	33		83
	1857	16	12	17	20	53		118
	1858	14	16	20	9	24	1	84
	1859	16	16	40	18	30	2	122
	1860	8	10	38	3	32	1	92
Total..		65	62	143	53	172	4	499
Remaining..	1856	22	12	27	64	56		181
	1857	21	23	52	72	125	4	297
	1858	23	61	107	65	116	1	373
	1859	7	53	158	100	72	8	398
	1860	14	50	94	16	59	1	234
Total..		87	199	438	317	428	14	1,483

Percentage of Sickness and Mortality as shown in the preceding Table.

	Treated to Strength.					N.	S.		A.	Total.
	P.	P.	N.	S.	S.					
{ 1856 1857 1858 1859 1860	43.0	39.4	41.0	42.9	58.8					56.7
	47.4	35.0	69.6	51.8	75.9				34.5	49.9
	33.6	29.6	61.0	39.6	71.4				52.6	49.3
	33.1	40.3	76.6	49.3	45.8				64.3	53.6
	38.0	34.9	84.0	40.8	51.6				75.2	55.4
Average..	39.0	35.8	66.4	44.8	60.7				56.6	53.0
{ 1856 1857 1858 1859 1860	0.5	0.4	1.1	0.1	0.9					0.7
	0.7	0.6	0.5	0.5	1.0					0.7
	0.5	0.4	0.4	0.2	0.5				0.5	0.4
	0.6	0.4	0.6	0.5	0.6				1.0	0.6
	0.2	0.2	0.6	0.1	0.6				0.4	0.4
Average..	0.5	0.4	0.6	0.3	0.7				0.3	0.5
{ 1856 1857 1858 1859 1860	1.3	1.1	2.8	0.3	1.6					1.5
	1.4	1.7	0.7	1.0	1.4					1.2
	1.5	1.6	0.8	0.5	0.7				1.1	0.9
	2.0	1.1	0.8	1.2	1.3				1.6	1.1
	0.7	0.8	0.7	0.3	1.2				0.6	0.8
Average..	1.3	1.2	1.1	0.6	1.2				0.6	1.1

**CAUSES OF DEATH amongst the POLICE FORCE, from 1856 to 1860,
in the Bombay Presidency.**

TROOPS, PRISONERS, &c. FOR FIVE YEARS.

291

Classes of Disease.	Divisions.						Total.
	Presidency.	Poona.	Northern.	Southern.	Sind.	Aden.	
Fevers.....	25	27	29	16	51	1	149
Eruptive Fevers.....	1	...	2	3	3	...	9
Diseases of the Lungs..	5	10	28	4	49	...	96
" Liver..	4	2	4		1	1	12
" Stomach							
and Bowels.....	10	7	17	8	22	1	65
Epidemic Cholera	9	7	36	17	6	...	75
Diseases of the Brain....	...	1	6	2	4	...	13
Dropsies.....	...	1	2	1	6	...	10
Rheumatic affections	1	...	...		1	...	2
Veneral ditto.	...	1	...	1	3	...	5
Abscesses and Ulcers....	2	1	1	...	2	...	6
Wounds and Injuries....	...	1	3		5	1	10
Other diseases	8	4	15	1	19	...	47
Total....	65	62	143	53	172	4	499

THE RELATION OF DYSENTERY TO ABSCESS OF THE LIVER, AS SHOWN BY THE CLINICAL RECORDS OF THE EUROPEAN GENERAL HOS- PITAL, BOMBAY.

By W. J. MOORE, L.R.C.P. (Edin.) Assistant Surgeon.

Presented December 1862.

The numerous cases in which Abscess of the Liver and Dysentery are concomitant induced Annesley ¹ to go so far as to make a distinction between what he designated "Simple Dysentery," and "Hepatic Dysentery." Since Annesley's time, all authors, I believe, with two exceptions only, namely, Drs. Henoch ² and Morehead, ³ have inclined to the opinion that the intimate connection of cause and effect exists between these two forms of disease. Thus Parkes, ⁴ Martin, ⁵ Machpherson, ⁶ Macnamara; ⁷ the French authorities, as Pascal in Algeria; and even pathologists in Europe, as Budd, ⁸ Andral, ⁹ Abercrombie, ¹⁰ and Cheyne, ¹¹ have all noticed the occurrence of Hepatic abscess, *or other disease of the liver*, during the progress of Dysentery.

The plausible theory brought before the profession a few years

¹ Annesley's Diseases of India, p. 485.

² Henoch on Dysentery and Abscess of the Liver, British and Foreign Med. Ch. Review, 1846.

³ Morehead's Researches, Vol. II. p. 10.

⁴ Parkes, Remarks on Dysentery and Hepatitis in India, 1846.

⁵ Martin's Influence of Tropical Climates, p. 226.

⁶ Machpherson, Indian Annals Medical Science, Vol. VI.

⁷ Macnamara, Ibid, Vol. XV. On the Pathology of Hep. Abscess.

⁸ Budd on Diseases of the Liver, p. 62.

⁹ Andral, Medical Clinique Obs. p. 25.

¹⁰ Abercrombie, Diseases of the Stomach, p. 266.

¹¹ Cheyne, Dublin Hospital Reports, Vol. III.

since by Dr. Budd,¹ that hepatic abscess in dysentery was occasioned by absorption, or by conveyance of pus by a vein, communicating with an ulcer in the intestines; or by inflammation in such vein; or by deterioration of the (portal) blood (especially)—in short by pyæmia—has done much to confirm the opinion, that dysenteric inflammation is the usual cause of abscess in the liver.

Notwithstanding the evidence of so many authorities, and admitting the occasional truth of Dr. Budd's theory, it would appear that the intimate connexion of cause and effect, supposed to exist between these two forms of disease, cannot be so general, as many have presumed. As evidence of the truth of this remark, it will be demonstrated that the two diseases themselves are not so very frequently found in the same individual as has been previously reported.

That such is not the case in Europe is admitted on all hands, otherwise Dr. Baly's evidence regarding dysentery as it occurred in an epidemic form, in the Milbank Penitentiary, might be adduced.² In semi-tropical climates we have the recent testimony of Dr. Marston, who states that out of a great number of soldiers who came under his care in the Malta Hospital, for different forms of dysentery, contracted in the Crimea, only *two* were the subjects of liver disease.³

Amongst the patients in the European General Hospital, Calcutta, Dr. Machpherson⁴ found out of 160 cases of dysentery the liver "altered in 84"; and this has been quoted as an argument in favour of the frequent sequence of abscess of the liver on dysentery,⁵ yet Dr. Machpherson himself states that abscess was only found in 21 cases, or about 13 per cent. !

Again, in 157 cases noticed by French Surgeons in Algeria,

1 Budd on Diseases of the Liver, p. 62.

2 Lancet, December 1851. Indian Annals Medical Science, Vol. XV.

3 Medical Times, 1856.

4 Indian Annals Medical Science, Vol. II.

5 Martin on Tropical Climates : Macnamara, Indian Annals Medical Science, Vol. XV.

65 livers were found diseased, in one manner or other; including ¹ only 20 examples of abscess or 12·7 per cent.

The Principal Inspector General's "Statistics of more important diseases admitted into the European General Hospital during 10 years," show 129 cases of dysentery, among which the liver was diseased in 71; but only 25 or upwards of 19 per cent. were affected with abscess. ²

Dr. Leith's reports of the same institution give 92 cases, with 14 of abscess, and during one year, 1859, in 47 cases of dysentery, there were only 4 instances of abscess observed, giving the still smaller ratio of 8 per cent. ³

In 196 well recorded cases of dysentery in the European General Hospital, I find 35 or 17 per cent. were affected with abscess; but nearly one-third, or 30·6 per cent. were noticed to have had other affections of the organ as enlargement, cirrhosis, old chalk-like formations, &c.

Mr. Eyre reports 27 cases of abscess in 118 cases, but the liver was diseased in 49. ⁴

Mr. Waring gives 633 instances of dysentery, with 149 of abscess. ⁵

Some other observers have however recorded a much greater percentage of abscess. Thus Dr. Parkes ⁶ mentions 7 cases of abscess of the liver occurring in 25 cases of dysentery in Burmah. Marshall ⁷ gives the same ratio as occurring in Ceylon. Macnamara ⁸ gives in the Madras Presidency 26 cases in 51: and Dr. Morehead is frequently quoted as having observed 12 in 30. ⁹

¹ Quoted by Martin, p. 262.

² Bombay Med. Phys. Soc. Trans.

³ Op. cit. No. 10, New Series.

⁴ Indian Annals Medical Science, Vol. V.

⁵ Waring, Statistics and Pathology of Abscess of the Liver, p. 54.

⁶ Parkes' Remarks on Hepatitis and Dysentery in India.

⁷ Quoted by Martin, p. 227.

⁸ Indian Annals Medical Science, Vol. XV.

⁹ By Martin and Macnamara, Op. cit.

The following table exhibits the ratio of Abscess of the Liver to Dysentery, according to different observers.

Observer's Name.	Where observed.	No. of cases.	No. of cases in which disease of Liver was observed.	Proportion.	No. of cases in which Abscess was observed.	Proportion.
Machpherson.	European General Hospital Calcutta.	160	84	52.5	21	13.1
French Surgeons.	Algeria.	157	65	41.4	20	12.7
Eyre.	Madras Fusiliers, &c.	118	49	41.6	27	22.8
Waring.	Various localities.	633	Not stated ..	..	149	23.5
Stovell.	European General Hospital Bombay.	129	71	55.0	25	19.3
Leith (one year).	Ditto	47	Not stated ..	..	4	8.5
Leith (several years).	Ditto	92	Ditto	..	14	15.2
Moore.	Ditto	196	60	30.6	35	17.8
Parkes.	Burmah	25	Not stated ..	..	7	28.8
Marshall	Ceylon.	25	Ditto	..	7	28.8
Macnamara ..	Madras.	51	Ditto	..	26	50.9
Morehead ...	Bombay	30	Ditto	..	12	40.0

If the first eight observers' figures are taken, it will be seen, that in 1,532 cases there were but 295 examples of abscess, or 18 per cent. If the last four only are considered, there is found to be 131 cases, with 52 instances of abscess, or approaching 40 per cent.

My own impression is, that the former is the correct ratio, and it would appear probable, that the cases referred to, by the latter authors, were not all instances of abscess of the liver, but, that like Dr. Machpherson's, and the French Series, *all diseased conditions* found in the organ, have been taken into the account.

Indeed, it would appear certain that hepatic abscess follow-

ing dysentery is *not* the rule, but that the liver disease when it does so occur, is mostly caused by the same excitants (as climate, cold, vicissitudes of temperature, &c.) promoting the dysentery. Otherwise we might expect abscess of the liver in every case of the former affection, and also during the progress of ulcerations of typhus, of phthisis, and of those following severe burns, which assuredly is not the case. Of course, in a tropical climate, the liver during dysentery, as in the progress of any other disease, or during health, is more disposed to become affected, than it is in a colder latitude, which possibly may alone account for the number of cases in which liver diseases and dysentery are co-existent.

It has been supposed by many authors, as Sir Ranald Martin¹ for instance, that an intimate connection exists, between inflammation or ulceration of the cæcum, and liver disease. This idea however, is not confirmed by the results of the *post mortems* I examined. In only 22 instances or in 11·2 per cent. of the whole number, is this part of the intestines, noted as particularly affected in connection with liver abscess, while the total of cases noticed as having the cæcum affected, is 72 or 36·7 per cent.

The other points of interest remarked in connection with these cases, were, that perforation is noted to have occurred in 23 instances (11·7 per cent.) ; and extension of the inflammation to the small intestines in 26, or 13·2 per cent.

The following table exhibits these latter points.

No. of Post Mortems.	No. of cæcums recorded affected.	Proportion.	No. of cases of Liver Abscess and cæcal disease.	Proportion.	No. of cases of Perforation.	Proportion.	No. of cases of extension of inflammation to small intestines.	Proportion.
196	72	36·7	22	11·2	23	11·7	26	13·2

¹ Martin on Tropical Climates, p. 228.

APPENDIX.

APPENDIX.

No. 1.

Notes of three fatal cases in which Fibrinous Coagula were found in the Heart.—By Dr. PEET, Surgeon to the Jamsetjee Jeejeebhoy Hospital, Bombay.

CASE 1.—Senoo Myam, age 25, Hindoo, Cart driver, Native of Janpoor in Northern India, lately arrived in Bombay, after a long journey, during which he was badly fed, was admitted into the Clinical Ward on the 5th February 1862. It was stated that his illness commenced ten days before; that it set in with cough, fever, and dyspnœa, without any apparent cause, and continued to increase up to the time of his admission. The cough was at first dry, but latterly he spat up a little adhesive mucus untinged. The dyspnœa throughout was very severe, and the fever more or less continuous.

When first seen the face was pinched, expressive of great suffering, and the alæ nasi in constant action. It was rather pale than livid, and was not swollen. He was somewhat incoherent, though capable of answering questions at times quite rationally. The skin of the trunk was above, that of the extremities rather below, the natural heat. There was great dyspnœa, the respirations were 48 in the minute. The chest at each inspiration seemed to be fairly expanded; there was no dulness; air was found to enter every part of the lung. Sibilant and subcrepitant rhonci were more or less general over both sides of the chest. The pulse was 120, small and ill-developed. He had a troublesome short cough, with adhesive expectoration, which was at no time tinged. On the night of the 5th he became delirious, and continued so during the whole of the 6th and night of the 7th, the dyspnœa being at the same time very severe. On the morning of the 7th the pulse was 130 and feeble, and the skin cold; the breathing greatly oppressed. He died at 10 o'clock.

Section-Cadaveris, 6 hours after death.—On opening the chest the lungs did not collapse, they were crepitating throughout. On section

a large quantity of thin frothy sanious fluid oozed out ; the part was solidified. On opening the pericardium, the heart seemed large, its cavities were evidently distended ; they were found to contain coagula of two kinds, some loose, partially decolorized, others quite white and firmly adherent to the walls ; the latter were chiefly seen in the right side of the heart.

CASE 2.—Nundee, age 30, Hindoo servant, was under treatment by Dr. Ballingall for syphilis. He was doing well, the sore having almost healed. On the evening of the 31st December 1861 he complained of cough ; on the following morning the cough had increased, and the pulse became very small. During the day he was very restless, and had great dyspnœa ; the cough continued, and he expectorated a little rusty-looking fluid ; the pulse became imperceptible, and he died at half past one o'clock, having only been ill about twenty hours.

On examination after death a very small portion of one lung was solidified, either from pneumonia or pulmonary apoplexy. The heart contained decolorized coagula, firmly adherent to the walls of the ventricles.

CASE 3.—Durya Khan, age 20, Mussulman, just arrived from Sind ; admitted into the Clinical Ward on the 16th February 1862. He was unable to speak, so that no history could be obtained. There was great dyspnœa ; the pulse was 120 and very feeble ; the skin coldish ; the face was expressive of much distress. He had a slight short cough, with opaque adhesive expectoration. The chest was but cursorily examined owing to his weak state ; no dulness could be discovered. He died a few hours after admission.

Sectio-Cadaveris.—The body was not much emaciated. There were adhesions of the pleura on both sides ; those on the right were easily broken down. Upon the visceral layer on this side there were flakes of recently effused lymph, and in the sac there were 2 or 3 ounces of turbid serum. The lungs did not collapse : a good deal of frothy fluid escaped on section. No part was hepatized ; the whole of both lungs were freely crepitating. There were about 3 ounces of clear serum in the sac of the pericardium. In the right ventricle there was a coagulum decolorized, and firmly adherent to the wall, and also to the margin of

the auriculo-ventricular opening and tricuspid valve. It reached through this opening into the auricle, and was so firmly attached to the auricular wall that the heart could be lifted by it. That portion within the auricle was completely discoloured, and when divided presented an uniform appearance throughout. There was neither coloured fluid nor purulent matter in the centre. The left side of the heart contained loose coagula not discoloured, and not adherent.

REMARKS.—These are, I think, cases in which death was due to the formation of coagula in the heart. The symptoms, viz : the great dyspnœa, cold extremities and feeble pulse, were clearly referrible to an embarrassed state of the circulation. The lungs after death were found to be pervious to air in almost every part, from which it may be inferred that there was no obstacle to the due performance of the respiratory functions so far as they were concerned. The dyspnœa was probably due to the want of sufficient blood. That the coagula were formed before death seems certain from their firm adhesion to the walls, and the absence of coloured blood in the centre. In the first and last of the three cases described, the evidence is still stronger, as the left side of the heart contained ordinary loose coagula. If coagulation on the right side had occurred at the same time as that on the left, the coagula would doubtless have presented similar characters.

Two practical points in connection with Fibrinous Coagula in the heart may be briefly noticed—

1st.—Can their presence be detected during life?

2nd.—What is the cause of the coagulation?

1. The symptoms will vary according to the situation and amount of the coagula, but in a general way it may be said that intense dyspnœa, cold extremities, delirium, a feeble and intermitting pulse, and absence of the ordinary signs of apnœa, there being no impediment to the admission of air into the chest, denote the presence of coagula in the heart. It does not appear that they give rise to any murmur, but emphysema of the lungs is common, and of course the physical signs of its presence would be confirmatory.

2. As to the cause of the coagulation, there is much difference of opinion. Dr. Richardson states that it is due either to super-Fibrination

of the blood which is present in inflammatory diseases, or to languid motion of the blood current. More recent observations would seem to point to the presence of some foreign body in the blood, such as the products of inflammation, pus, &c. Emboli in the pulmonary and cerebral arteries have indeed been traced to vegetations from the valves of the heart.

No. 2.

Report of some experiments upon Dogs, made in connection with the subject of Dr. Haines' communication to the Society, printed at p. 224.

1.—To a stout dog, after previous fasting, three doses of pills and draught, of similar composition to those prescribed in the case referred to by Dr. Haines, were administered, at intervals also the same as in that case. No effects beyond what might be attributed to the local action of the ammonia were noticed, and next day the dog was killed.

Careful examination of the viscera disclosed a condition in all respects resembling that of health. The contents of the stomach were not submitted to analysis.

2.—A week after, to a small dog deprived of food for some hours and in a weakly state, a large dose (probably upwards of ten grains were swallowed) of calomel, washed down by repeated draughts containing much free carbonate of ammonia, was given about midday. Symptoms of abdominal uneasiness, occasional retching, but no purging, spasms and twitchings, appeared after a few hours, and in the course of the night the dog died.

On post-mortem examination no marks whatever of local irritation were discernible: the stomach contained a quantity of indigestible *débris*, portions of which were submitted to chemical analysis (with the kind assistance of Dr. Giraud), but no trace even of corrosive sublimate, or of a mercurial salt, was obtained.

The dog when experimented on was in an exhausted condition, and was not fed after the exhibition of the drugs.

3.—To a small dog, large doses of calomel and carbonate of ammonia in solution were administered, the latter being introduced with the stomach-pump; and most of the calomel must also have reached the stomach.

No effect having followed the first combined doses, they were repeated on the following day; temporary depression and abdominal uneasiness supervened, but soon after passed off, the animal regaining, to all appearance, its healthy state. As these experiments seemed conclusive, the dog was allowed to enjoy liberty again.

REMARKS — Perhaps the safest, if not the sole, conclusion that can be elicited from these few experiments, is that the circumstances under which the dangerous transformation of calomel occurs must be unusual, if not rare; and that generally, at least, the conditions under which the two remedies in question are administered are unfavourable to these chemical reactions which have been shown to take place, when no impediment to the play of chemical affinity is present. The drugs were given when it might be supposed that the stomach was empty, on account of the antagonizing influence the gastric juice might exert: but in the fatal case the stomach was found partly occupied; unfortunately the acid or alkaline condition of its contents was not ascertained, yet the presence of organic matters alone might be inimical to the operation of the poison, supposing it had been formed in the stomach.—H.V.C., *Secretary*.

No. 3.

Note on the peculiar Evacuations sometimes noticed in Epidemics of Cholera.—Extracted from the Annual Report of the Jamsetjee Jejeebhoy Hospital for the year 1862.

Paragraph 12. The cases of Cholera have been unusually severe; in 17 cases the stools were of a pink colour, and of these not one recovered. In 40 cases they were noticed as not being pink, in 43 the colour is not mentioned; probably some of these may have been pink.

16. The pink stools noticed in paragraph 12 are certainly not of common occurrence. Until within the last 3 years, I have seldom observed them. Dr. Morehead mentions having seen them occasionally, and only in the Jamsetjee Jejeebhoy Hospital: he gives 3 cases. So large a number as 16 cases in which the stools were of this character in a single epidemic, is I believe unprecedented. Dr. Morehead states that the pink colour is caused, no doubt, by partial transudation of the colouring matter of the blood. At my request Dr. Carter was good enough to examine the discharges, under the microscope, and has favoured me with the following report:

“ *Microscopic examination of the pink coloured stools of a Cholera patient, Jamsetjee Jejeebhoy Hospital, December 19th, 1861.*

“ The consistence was like that of pea-soup, reaction neutral to test paper; a portion of the brick-red opaque mucus was examined, and in it were found much granular matter; many forms of vegetable cells; epithelial cells, principally Columnar; oil globules; numerous quaternate clusters of *sarcina ventriculi*; and several red blood corpuscles, generally aggregated, occasionally separate.

“ To these last, as well probably to a more diffused stain from exuded hæmatine, was the red colour of the stools apparently owing.”

17. The mucous membrane of the small intestines was examined in several cases; where the stools had been pink, it was unusually red, and the solitary glands in a marked manner prominent.

18. There has not been any change in the treatment, which has been detailed on former occasions.—DR. PEET, Surgeon to the Hospital.

No. 4.

Report of a Case of Suicide by hanging, attended with rupture of the Superior longitudinal sinus.—By Assistant Surgeon S. W. LITHGOW.

Presented by the Principal Inspector General, Medical Department.

Thomas Stevenson, Gunner D Battery, 4th Brigade Royal Horse Artillery; Service in India 2 years; admitted 8th October 1862. Age about 24 years.

Admitted suffering from the effects of an attempt at suicide by hanging. He was confined at 5 P.M. to-day for being drunk, and in about 5 minutes afterwards was discovered in his cell hanging by a piece of jacket lace from a rafter. He was described as being “lifeless.” Immediately afterwards when seen by Mr. Apothecary Kinlock, he was breathing stertorously, pulse was small and weak, pupils dilated, face and lips livid. He had him removed to Hospital, where I saw him immediately afterwards; he was there lying on his back, and with the exception of the movements of respiration, quite motionless; breathing was stertorous, hurried, chiefly abdominal and accompanied by a peculiar

rattle in the throat ; eyes fixed, pupils widely dilated and insensible to the stimulus of light. Both sensation and voluntary motion in abeyance. Imperfect oxidation of the blood denoted by blueness and lividity of the skin and lips ; pulse small, fluttering and intermittent. Mark of cord above larynx narrow, raised and excoriated. The stomach pump had been introduced by Mr. Kinlock before my arrival, and a quantity of fluid smelling strongly of beer and arrack evacuated. Before its removal spirits ammonia aromatic ʒss., mixed with some water, was injected. He was then taken out into the verandah on the cot, and a stream of cold water made to fall from a height, on the vertex, the head and the shoulders at the same time kept well raised. An enema, containing ol. tigllii m. iv. was administered, and the feet and legs bathed with hot water, in which mustard had been thrown ; shortly afterwards vomiting took place, simultaneously with the evacuation of the bowels. This was followed by slight appearance of amendment ; great dyspnœa was present, and was characterised by alternate remissions and exacerbations. At times the respiration seemed to be suspended, but the application of the douche to the chest always called forth a deep inspiration ; this was repeated as often as the respiration appeared to flag. The enema having only produced two stools, it was repeated after a time, likewise two minims of croton oil administered by the mouth, the power of deglutition having returned temporarily ; by 7 P.M. he could move his arms up to his chest, pupils were observed to contract slightly on application of light, and his lips and face had a more natural colour. This was followed by drawing up the legs and attempts at groaning ; on the addition of more hot water being made to the foot-bath, pulse rose, increased in strength and kept intermitting every third beat. This was succeeded by a period of relapses and retrogressions of the favourable symptoms. The cold douche was again assiduously applied continuously to the head and occasionally to the chest, when the respiration appeared to fail ; gradual improvements were apparent, so that by 9 P.M. he had assumed a more natural position on his side ; pupils contracted distinctly on a lighted candle being put before them, and eyes rolled slightly, breathing continued hurried and labored ; body broke out in perspiration, bowels freely moved. At 10-30 P.M. a blister was applied over the scalp ; improvement continued, although he appeared to be very restless.

9th.—With the exception of occasional dozes passed a restless night ; when roused understands what is said to him ; breathing hurried, ster-

torous, and accompanied with the same peculiar noise in the throat. On percussion no distinct dulness is perceptible, large and small moist rales heard over the whole of the chest, but these are rendered obscure by the noise in the throat. Pulse rapid and small, and does not now intermit. Tongue moist and clean, on protrusion is drawn to left side; bowels moved several times during the night. Urine moderate in quantity and red from admixture of blood; he drank some coffee this morning. A sinapism to be applied to the chest; and to take an eighth of a grain of tartar emetic every two hours. *Vespere*.—Continued restless all day, but slept for about two hours during the forenoon. Is a little more intelligent, and on being asked whether he had any pain, points to his head; state of circulation and respiration unchanged, skin hot, and bowels freely moved. Twelve leeches were applied to the temples; five grains of James' powder given, and tartar emetic ordered to be continued.

10th.—Did not get any sleep last night, but kept tossing about from side to side; when questioned he answered in a husky voice, and with apparent difficulty; tongue is still protruded to left side, and is covered with a brown dry crust. Respiration continues quick, and is accompanied with the peculiar stertor before mentioned; there is neither cough nor expectoration, moist rales still heard over the chest. Hæmaturia still present, pulse quick and a little hard, the tartar emetic increased to $\frac{1}{6}$ of a grain every two hours, sinapism to chest repeated, as he complains of some pain there. *Vespere*.—Went on favourably until about 2:30 P.M., when he fell back in a convulsive fit, with clenched teeth and spasmodic contraction of the muscles; this was accompanied by increase of the dyspnoea, lividity, and blueness of face and lips, insensibility, dilatation of the pupils and failure of the pulse. An antispasmodic was given with but little benefit: at 3:30 P.M., pulse was scarcely perceptible at the wrist, and he could only be made to swallow some wine with extreme difficulty. He got rapidly worse, and sunk at 4:45 P.M.

Sectio Cadaveris post horas 12½.—Body muscular, on external surface posteriorly great ecchymosis present. Head,—about three drachms of effused blood, between calvarium and dura mater, evidently derived from a rupture of the superior longitudinal sinus, near its termination posteriorly. Two layers of arachnoid adherent to a small extent about posterior third of cerebrum at the margin of longitudinal fissure; vessels much congested with dark venous blood; about half an ounce of serum

in lateral ventricles. A section of brain shows an increased number of vascular points. Thorax,—right pleura slightly adherent, posteriorly strong adhesions present on left side, engorgement of the lungs generally with dark coloured blood, particularly in the lower and posterior portions. Near the base of right lung a spot about the size of a hen's egg, was softened and broken down by rupture of the pulmonary substance, and extravasation of blood. Heart,—some serous effusion in pericardium, left side of heart contracted and empty, walls of ventricle rather thicker than natural. Right side filled with dark venous blood, valves healthy, muscular substance congested. Abdomen,—liver rather above normal size, pale in colour, and vessels full of venous blood, spleen congested, kidneys also much congested, stomach empty, great congestion of its vessels, and in several places on the mucous membrane extravasation of blood had taken place; intestines appeared to partake of the general congested condition of the other internal organs, but were in other respects healthy.

No. 5.

On the composition of the liquid disengaged from mud volcanoes in Sind, &c.—Extracted from Dr. LALOR's paper read before the Medical and Physical Society in August 1862: the analyses by Dr. Haines.

Analysis of Bottle No. I. from a Khoop, 180 feet high, at Hooke.

Specific gravity at 60 ° F. 1,099.03; alkaline; 1,000 grain measures, evaporated to dryness, leave solids 140.96 grains.

Found in 1,000 grains.

Chloride of Sodium	118.686
Carbonate of Soda	20.236
Sulphate of Soda	.974
Chloride of Potassium	.100
Carbonate of Lime	.075
„ Magnesia	.055
Silica	.040

Total Solids . . . 140.166

Sulphuretted Hydrogen Gas053

Bottle No. II., was mud taken from a jet fifty feet above the surface of the ground in the side of a "Khoop" at Hoormara, nearly seventy

miles further westward; and about ten instead of two from the sea. The height of this, it will be recollected, was between four and five hundred feet, and the liquid in the crater all but quiescent.

Specific gravity of water in No. II. 1011·4; neutral. This was some water from the settling of the mud by the time it reached Bombay. The mud is chiefly finely-divided carbonate of lime, with a little dark coloured clay. Dr. Haines adds likewise, that the water is of a most interesting nature, and contains a very "decided impregnation of Iodine, a circumstance most unusual," but that a further quantity is required, which may be obtained during the next season of the Hindoo pilgrimage. For seldom, if ever, else, indeed, is a visitor seen on this dreary and truly "inauspicious coast."

The heaving up of the mud, he attributes to gaseous influence, and it would be highly interesting and satisfactory, as he says, if some of these gases could be collected at the "Khoops."

No. 6.

*Cases resembling the Typhoid Fever of Europe.** Recorded by Assistant Surgeon NIVEN, M.D., H.M. 103rd Regiment.

CASE 1.—Private J. S., H.M. 103rd Foot; age 27 years; three years' service; by occupation a labourer; a man of fair muscular development, with light coloured hair. Admitted into hospital on 30th August with symptoms of a common catarrh, cough troublesome, and expectoration considerable, but no constitutional disturbance. States that he has been ailing for the last three days.

On 3rd September he had a febrile paroxysm which returned on the afternoon of the 4th. Quinine was administered, and he experienced no febrile paroxysm on the 5th.

September 6th.—Complained of pain in epigastrium, was restless, and the pulse 90, tongue white.

September 7th.—Early this morning was suddenly seized with severe pain in the abdomen, which was relieved by fomentation and turpentine

* Dr. Niven remarks, "I am inclined to consider the disease of the same nature as typhoid fever, although at the commencement the symptoms assume an intermittent character."—*Note by Secretary.*

etupes, and he continued pretty well during the day, but the abdominal pain returned with greater severity about 10 o'clock, and he died before midnight.

Autopsy 8 hours after death.—External appearance,—body emaciated, rigor mortis present, muscular contractions in forearms and hands. Head,—adhesions around glandulæ pacchioni greater than usual; membranes and substance of brain healthy. Thorax,—adhesions at apex of right lung, which was much congested and contained, a hard tubercular deposit about the size of a filbert. Abdomen,—peritoneal cavity contained a large quantity of dirty-looking serum mixed with loose flocculent masses of fibrine; the membrane instead of being smooth and polished, was rough and opaque throughout, and over the ileum and ascending colon of a bright red colour. At the lower end of ileum was a black gangrenous patch with an ulcer in its centre, giving passage to the contents of the bowel. There were four small ulcers in the middle of the ileum, and two about the size of a rupee at its lower extremity; one of these latter had perforated all the intestinal coats, and corresponded with the gangrenous patch observed outside; the mucus membrane was of a darker colour than usual; there was much thickening of the membranes about the cœcum, and the glands of the colon were large and congested. No fœcal accumulations. The liver weighed 3 lbs. 10 oz., was congested and presented pale brown patches on its surface, but the discoloration did not extend above a few lines in depth.

CASE 2.—Private J. M., H.M. 103rd Foot; age 22 years; 3 years' service; a man of fair complexion, with light brown hair; formerly a gentleman's servant. Admitted 14th August, complaining of sickness at stomach and headache. Says he has been suffering from fever for some days.

Between the 15th and 19th he had some tendency to looseness of the bowels, but there was no purging and he complained of no pain.

August 20th.—There is some fever, looks pale and anemic.

August 22nd.—Complains of headache, but has no fever and no looseness of the bowels.

August 23rd.—Is reported to be feverish, but no headache; bowels regular.

August 27th.—Has had no fever for some days, bowels loose, pulse pretty good, tongue clean, skin moist and warm.

August 29th.—Expresses a wish to go to duty, says he feels quite well. He is discharged accordingly.

August 30th.—Re-admitted complaining of looseness of the bowels. States that he was quite well when he left the Hospital yesterday, and only got the bowel complaint this morning. The dejections are scanty, chiefly consisting of blood and slime. Abdomen tender on pressure, pulse 96 small and compressible, tongue coated with a white fur.

September 1st.—Purged five times during the night, stools light coloured; the abdominal tenderness not so great, pulse 80, tongue coated.

September 2nd.—Purged twice last night, dejections pale, no abdominal tenderness, pulse 90 and of moderate volume, tongue clean.

September 3rd.—Had an attack of fever at 10 o'clock last night. Pulse is now 90 small and wiry, tongue coated.

September 4th.—Had a return of the fever last night, pulse 90, tongue coated.

September 5th.—Had an accession of fever again last night, pulse 84 feeble, tongue coated and clammy, dark streak in centre. Bowels were moved thrice during the day and twice in the night, dejection liquid and of a dark brown colour. Towards evening he looked more feeble and exhausted.

September 6th.—Was delirious part of last night. The abdomen is puffy, and the pulse feeble and the tongue covered with sordes.

September 7th.—Raving occasionally, pulse 90 of better volume. He lies in a weak low state, but takes beef tea when roused up. Three liquid dejections in the night of a dark brown color.

September 8th.—Has been raving a good deal, passes his motions in bed, still takes beef tea.

September 9th.—Appears to be sinking fast. Died at 1 P.M. this day.

Autopsy 5 hours after death.—External appearance,—body emaciated, no rigor mortis. Head,—pia mater injected, ecchymose patch on left hemisphere which was softer than the right, weight of brain 47oz. Thorax,—pleural adhesions on right side, lungs collapsed, much congested and portions hepatized. Heart was small, left side hard and

contracted, right soft and flaccid, ventricles empty. Abdomen,—peritoneum discoloured, and over the ileum colon of a livid bluish tint, omentum puckered up. Mucous membrane of stomach and jejunum pale, that of duodenum red and injected. The ileum was studded with ulcers throughout its whole length, and those at its lower extremity were in a gangrenous state. The colon contained many small ulcers about the size of pin heads, with hard raised edges of a pale colour. These ulcers in the colon resembled small bone buttons with a black point in the centre. About six inches of the ascending colon was much contracted, and of a pale yellow colour. A living worm (*ascaris lumbricoides*) was found in the ileum. Other organs appeared healthy.

CASE 3.—Case of intermittent fever, result death, ulcers in ileum and cæcum. At Aden in autumn of 1855.

Private T. B., of 86th Foot, aged 24 years; 4 years in India; a young man of nervous temperament, with light hair, fine skin and delicate features. Was three weeks in Hospital in Camp suffering from intermittent fever, attended with unusual debility, and on account of which he was sent to the Sanitarium at Steamer Point on 4th October, where he died four days afterwards.

The following notes were taken from the Case Book of the Hospital at Steamer Point and given to me by Assistant Surgeon Stedman, at that time in medical charge.

October 5th, 1855.—Has been sent from Camp for change of air, and is suffering from debility after fever; complains of great prostration; is deaf, and appears hardly able to stand; seems agitated, and his voice is feeble and faltering; skin bedewed with perspiration, complexion sallow, and anemic looking; tongue loaded with a thick brown fur and almost black in centre; bowels regular.

October 6th.—Says he slept soundly last night. Continues in same feeble state, but complains of no pain; pulse very feeble and tremulous, tongue loaded with thick dark fur, bowels regular, urine natural.

October 7th.—Since midnight has been in a state of muttering delirium, and very restless. At the commencement of the night had slight epistaxis, and passed a copious watery stool involuntarily in bed. He is now constantly picking his nose, his features are sunken, and he answers questions only on being roused; pulse 115 feeble and

faltering, respirations 26, tongue loaded, lips dry, skin hot and dry. At midday he seemed somewhat revived, but in the evening the pupils were dilated, and he could not be roused to answer questions.

October 8th.—Patient gradually became comatose, and he died during the night.

Autopsy.—External appearance,—body emaciated, cadaverous rigidity well marked. Head,—some effusion of lymph on pia mater, and opaque spots on arachnoid, substance of brain congested and ventricles distended with serum. Thorax,—lungs healthy, slight effusion of serum into pericardium; heart, substance soft. Abdomen,—liver mottled and rather soft, stomach healthy, at the lower part of ileum were a few small ulcers with ragged edges, and an uneven surface covered with a greyish looking matter, in the cæcum were some larger sized ulcers of the same character as those in ileum, also considerable thickening of its coats.

CASE 4.—Notes of a case of Intermittent Fever terminating fatally from rupture of bowel. Ulcers in ileum and colon. Five weeks in Hospital.

Gunner W. S., of Bombay Artillery; age 28 years; 8 years in India; a man of rather weak constitution, with dark hair.

Admitted into Artillery Hospital at Aden on 16th September 1855. Complains of headache and weakness. He states that he has had daily attacks of fever for some time back, has no shivering, the fever comes on gradually, continues a few hours and terminates in perspiration. Bowels confined, and tongue foul.

September 17th.—Had a febrile paroxysm last night which terminated in profuse perspiration. Complains of a dull pain and weakness in lower extremities. No pyrexia at present. Between 18th September and 1st October, was taking quinine and continued free from febrile attacks, the appetite was pretty good, and the bowels regular, but he daily complained of feeling weak and exhausted.

October 3rd.—Was seized with rigors last night, which ended in heat of skin and perspiration. Has now pain and tenderness over whole of abdomen, pulse natural, tongue clean, bowels confined.

October 4th.—No return of rigors, no pyrexia, bowels well opened yesterday, pulse natural, tongue white.

October 5th.—No febrile paroxysm, abdominal pain and tenderness gone, bowels free, tongue clean.

October 8th.—No fever last three days. The debility continues, he is very thin and there is a tendency to œdema of the feet. Between the 9th and 21st he was taking quinine and iron, and seemed to improve a little; although he made daily complaints of weakness, especially about the knees, still he walked about the ward.

October 22nd.—Was suddenly seized this morning, while at stool, with a violent pain in right iliac region, extending upwards along the course of the colon. The pain was much increased on pressure and rapidly extended over the whole abdomen, which soon became hard and very tender.

October 23rd.—Passed a restless night, the pain was not relieved by the leeches and fomentations, but the bowels were moved several times by enema.

October 24th.—Passed several copious watery dejections during last 24 hours. Countenance cadaverous looking, breathing hurried and feeble with deep sighs, pulse rapid and feeble. Died at 11 A.M. this day.

Autopsy 5 hours after death.—External appearance,—body thin and emaciated. Thorax,—lungs and heart healthy. Abdomen,—liver soft, a livid coloured patch on convex surface penetrating a few lines in depth. Peritoneal cavity filled with muddy serum, mixed with sanous and puriform matter; omentum thickened and adhering to folds of intestines. Lower third of ileum, and ascending colon covered with black gangrenous patches, and small ulcerated openings were visible in these patches. Several ulcers existed in lower portion of ileum, in cæcum and colon; some of these ulcers were circular and about the size of a four anna piece (sixpence), others were oval, and of much larger size, deep and ragged in appearance; two in the colon and one in ileum had perforated all the coats, and given outlet to fœcal matter.

No. 7

Notes of three fatal cases—returned as Typhoid Fever—which occurred in H. M.'s 56th Regiment, at Deesa.—Presented to the Society by Assistant Surgeon LONGHEED.*

CASE 1.—Private Charles Goodwin, age 18; 3 years' service; service in India 9 months.

A delicate looking man, was admitted into Hospital on the 16th October 1862, with Febris Intermittens. Had a slight attack on that day, progressed favourably, only complaining of debility, until 20th, when he complained of griping pains over the abdomen (no pain on pressure), bowels loose, stools liquid, low fever continued until the 24th, when on attempting to get out of bed he fainted, the stools became more frequent, mixed with blood and slime, the abdomen swollen and tympanitic; on the morning of the 25th he was attacked with hæmorrhage from the bowels and died at 12 o'clock.

Post-mortem appearance 32 hours after death.—External appearances,—body emaciated. Head,—on removing the skull cap about 10 ounces of fluid escaped, there was a curdy deposit between the arachnoid membrane and the brain, the substance of the brain soft; congestion of the veins of the cerebellum. Thorax,—lungs healthy. Heart small, the wall of the left ventricle nearly 2 inches thick, right ventricle large, walls thin. Abdomen,—stomach healthy, distended with gas, the duodenum healthy, the lower portion of the jejunum slightly inflamed. Ileum of a bright scarlet colour, in it there were two small ulcers: the cæcum extensively ulcerated, and apparently gangrenous, a large clot of blood filled the cavity, the other intestines blanched. Liver large of a bright cinnamon colour, firm when cut into, containing scarcely any blood. Spleen congested; kidneys healthy, bladder healthy.

CASE 2.—Private Thomas Lee, age 21; service 3 years; service in India 6 months.

A healthy looking man, admitted into Hospital on the 11th September with Diarrhœa. On the 13th he became slightly delirious, skin hot

* These interesting notes reached the society through the obliging intervention of Mr. Hanbury, Surgeon to H. M.'s 33rd Regiment. In a further communication to that gentleman, Dr. Longheed adds the important fact that occasionally the "rash" was seen in the cases occurring at Deesa, and expresses his opinion that these cases were similar to those recorded in the last volume of the Transactions by Mr. Hanbury.—*Note by Secretary.*

and dry, pulse 86. In the evening the delirium was of a low character, and he became very restless; pupils dilated, stools scanty, and not so natural as on the previous day. 14th.—Very low, chest and arms covered with dark-coloured macula. Abdomen tympanitic, pulse occasionally not perceptible at the wrist, bowels not moved during the night; during the day passed fœces involuntary, extremities became cold, and the macula began to disappear. He gradually sank and died at 4½ o'clock P.M.

Post-mortem appearances 14 hours after death.—External appearance,—the body was that of a muscular man. Head,—on the removal of the skull cap about 4 ounces of dark-coloured fluid blood escaped, the veins were distended, the substance of the brain was firm and healthy. Thorax,—the heart large, both ventricles filled with fluid blood: the pericardium thick, adherent to the chest, requiring considerable force to break down the adhesions, lungs both very much congested, the left small and adherent. Abdomen,—liver very large and firm, extending into the left hypochondriac region, of a light nutmeg colour, gall bladder full of bile. Stomach healthy, distended with gas. Intestines, both large and small presented marks of inflammation, both Peyer's and Brunner's glands inflamed, there was extensive superficial ulceration of the cæcum. Kidneys small but healthy, spleen small, very dark coloured and congested; bladder empty and healthy.

CASE 3.—Private George Lodge; age 21; service 2 years; service in India, 9 months.

A delicate looking man, admitted into Hospital on the 30th September 1862, with Febris Continua. Had a slight attack of ague on the 2nd, and another on the 3rd of October; complained only of debility until the 7th, when he had a slight attack of diarrhœa, and the abdomen became slightly swollen and tympanitic. On the 10th he complained of violent headache, which was relieved by the application of a few leeches; on the 21st there was slight delirium; tongue brown and dry, stools dark-coloured and very offensive; pulse gradually becoming very feeble, extreme debility and emaciation. 24th.—Lies on his back muttering and picking the bed clothes, nearly unconscious, pulse occasionally imperceptible, pupils dilated. The above symptoms continued until the 26th October, when he died.

Post-mortem appearances 14 hours after death.—External appearances,—body greatly emaciated, marks of blistering and leeching over the

epigastrium, blistering to the nape of the neck, and leeching to the temples. Head,—not examined. Thorax,—lungs healthy, adherent to the walls of the chest, and the diaphragm, on the right side. Pericardium firmly adherent to the chest. Heart large, with a deposit of fibrine on the anterior portion of the left ventricle. Abdomen,—stomach distended with gas, the blood vessels congested. Liver very large, firmly adherent to the diaphragm, the substance soft and easily broken with the fingers. Gall bladder empty, spleen very large and congested. The whole of the intestines presented externally a greenish tint. On cutting them open the lower portion of the ileum (about 16 inches) was studded with ulcers, and gangrenous looking. The caput cæcum was one mass of ulcers. The colon and rectum were also studded with ulcers. Kidneys healthy ; bladder healthy.

No. 8.

An account of a case in which the Menses were apparently substituted by Hæmorrhage from the Skin.—Taken from a communication to the Grant College Medical Society, by Mr. A. P. d'ANDRADE, Graduate of the College.

The subject of this affection is a stout healthy Parsee lady, aged 18, and lives in Bombay. She applied for treatment on the 25th of July 1861, for amenorrhœa and hysteria.

She menstruated at thirteen, and continued regular until about two years and a half since, when the catamenia became irregular and scanty, and ultimately ceased, being replaced by bleeding at the gums and nose, and vomiting of blood. By an appropriate regimen and treatment, however, the menses returned although in a very scanty form, in which they continued up to May last. She has no children, and is not happy with her husband. Being of a somewhat irritable temper, she often gives way to fits of hysterical convulsions, preceded by a globus hystericus. The paroxysms are accompanied with a partial insensibility, closure of the eye-lids and a locked jaw. The convulsions are general, and though not always of a violent form, the fits at times last for several hours, and are so severe as to require a strong electric shock, or a pouring of a large quantity of cold water upon her face ; the latter, however, was sometimes difficult of being properly used on account of her great struggles. On using electricity

one of the poles was applied to the hand, and the other to the forehead with immediate success. Together with these symptoms she suffered also from headache, pain in the joints, and in the different regions of the abdomen and chest, particularly on the left side close to the mamma. There was no leucorrhœa, and nothing abnormal could be detected by an uterine examination. The treatment consisted in leeches to the vulva, hip bath, alætic purgatives, emenagogues, tonics and antispasmodics of all kinds, also sea bathing and exercise. The symptoms, although in a mitigated form, continued till October last, when all the medication was stopped, and she was advised for a change to Poona, but without any benefit.

In January last she informed me of the following peculiarity in her person, viz. that whilst in Poona, during the expected period of the menses, a general red appearance of the body was once or twice noticed, particularly of the face, chest, and arms; and in February, that bleeding had taken place from her leg without any visible ulcers, or breach of the skin.

On the 6th of March of the current year, about three or four days after the menses, I personally observed blood slowly exuding from the healthy skin of the left breast outside the areola, and of the right forearm immediately above the wrist; and on the 1st of April from the right knee and leg close to the ankle. The bleeding repeated from the breast on the 9th June, 13th July, and 7th August, and the subsequent day or two. She experiences first a sense of itching, smarting, and tenderness in a space about the size of a rupee, which in a short time becomes somewhat puffy and rose-coloured, like erythema. Within an hour or more a sort of dew of a serous fluid, and a number of fine points, like those that are seen during the act of perspiration, appear upon that portion of the skin, which quickly become pink-coloured, and then the little points of blood are seen oozing out slowly, which, being wiped away, reappear, and that again and again. They collect themselves in drops and trickle down her body, and thus an ounce or more of the sanguineous fluid may be obtained. The discharge continued for ten, fifteen, or twenty minutes, and stopped of itself. It was, however, accelerated and prolonged by pricking, or otherwise interfering with the part, but it could be arrested by the application of an astringent lotion. The medicine that I used for the sake of experiment was a strong solution of the biborate of soda. Cold water

apparently produced no effect. On ceasing, the discharge gradually diminished, becoming first pale-coloured, then serous and watery, and ultimately it disappeared, leaving only a slight discoloration of the skin, covered sometimes by a scab.

The hæmorrhage was generally repeated two or three days, and the quantity of the blood varied on different occasions from half an ounce to about ten drachms. The blood is thin, and of a dark red colour, neutral, or very slightly alkaline, and does not coagulate; apparently it contains little fibrine, and gives a faint smell. It becomes readily decomposed.

Under the microscope in the fluid there were innumerable red and white corpuscles. There was no tendency to their adherence to form rolls, most of them were perfectly round, but others presented a corrugated and starred appearance. Here and there also occasionally seen dark fatty looking specks, and scales of epithelium.

The hæmorrhage occurred periodically every month or two months, generally within a few days after the period of menstruation, or during the expected period. On several occasions I have seen the discharge proceeding from the rupture of a number of minute vesicles, or small fissures on the areola, close to the nipple; and then the bleeding was rather free.

The blood then also presented under the microscope the same appearances as above described. Once the palmar surface of the metacarpal space of the thumb was of a red colour, the redness remained for a whole day, but no discharge followed.

In the last month, during the expected period of the bleeding from the breast, a red and ecchymosed appearance of the calf of the left leg was noticed about the size of the palm of the hand. It was of a deep red colour at the centre, and bluish black at the margins. This appearance remained for several days without any discharge from it. Half a dozen leeches were applied to the affected part, when the redness gradually faded.

Ever since this case has been under observation the menses have been irregular, and now they are suppressed, yet pain about the pelvis, or rather a sense of weight in the uterine region, attacks the patient periodically. Sometimes there is a copious discharge of blood from the

mucous membrane of the nose and gums, and occasionally from the stomach. When vicarious hæmorrhage does not take place from the skin or the mucous membranes, the constitutional disturbance, viz : headache, giddiness, and convulsions, is most severe, being only relieved after the free discharge, either from the mucous membranes or the skin. From her history, it seems that the patient, for some years back, that is, since her marriage, had to contend with domestic troubles. She is not yet in harmony with her husband, and lives away from him.

The hysterical symptoms continue as severe as before. She has very little appetite, but continues as stout and in good condition as ever ; has occasional vomiting and hiccup. Bowels are free. Suffers frequently from retention of urine, and then diuretics, antispasmodics, and hip bath fail to bring on the flow of urine. No sponginess of the gums. The lungs and heart appear to be healthy.

Postscript.—Since the foregoing remarks were read before the Grant College Medical Society, the further progress of the case has been as follows :—

Blood was discharged from the forehead above the left eye-brow on the 11th of September 1862, and on the 15th idem from the same part and the left leg, also from the latter part on the 26th of October.

A similar discharge of blood took place for the first time from the right breast over the areola on the 18th, 23rd and 30th of January 1863 ; and from the right forearm close to the wrist joint on 6th of February, also from the right breast on the 20th idem ; and from the forehead (left side) on the 2nd, from both the mamma over the areola on the 7th, 8th and 11th, and from the left on the 14th, 15th, 16th and 17th of March 1863. On the 25th of September 1862, after a period of four months' suppression, the patient menstruated scantily, and on the 28th idem she passed a dark red coloured urine, having been previously suppressed for several hours, and it continued to be of a more or less red colour till the 4th of October. A distinct red colour of the urine was also noticed on the 3rd of February 1863.

The menstrual function, although very scantily performed indeed, continued with regularity from the 25th of September to the 15th of March 1863.

The hysterical fits are frequent, seem to be rather of a severe form, and not unfrequently are followed in a few hours by a discharge of blood from the skin, or the mucous membrane. Sometimes, when the fit is over, the headache and giddiness are apparently replaced by a temporary derangement of the mind. The patient is not yet in perfect harmony with her husband; and the cutaneous hæmorrhage occurs less periodically, or more frequently than during the last year.

Year.	Day.	Month.	Locality of Hæmorrhage.						
			Left Breast.	Left Forearm.	Left Knee.	Left Leg.	Forehead.	Right Breast.	Right Fore-arm.
1862	6	March	1	1	..	..	..	..	..
"	1	April	..	..	1	1	..	..	..
"	9	June	1	..	..	..	..	..	..
"	13	July	1	1	..	..	..	..	..
"	7	August	1	..	..	..	..	..	..
"	11	September	..	..	..	..	1	..	..
"	15	"	..	..	..	1	1	..	..
"	26	October	..	..	..	1	..	..	..
1863	18	January.	..	..	..	..	..	1	..
"	23	"	..	..	..	..	..	1	..
"	30	"	..	..	..	..	..	1	..
"	6	February	..	..	..	..	..	..	1
"	20	"	..	..	..	..	..	1	..
"	2	March	..	..	..	..	1	..	..
"	7	"	1	..	..	..	..	1	..
"	8	"	1	..	..	..	..	1	..
"	11	"	1	..	..	..	..	1	..
"	14	"	1	..	..	..	..	..	..
"	15	"	1	..	..	..	..	..	..
"	16	"	1	..	..	..	..	..	..
"	17	"	1	..	..	..	..	..	..

No. 9

Summary of a case of Abscess of the Liver opening into the Pericardium.—By H. V. CARTER, M.D., Assistant Surgeon Jamsetjee Jejeebhoy Hospital, Bombay.

An adult Mussulman, native of the Deccan, was admitted into the Jamsetjee Jejeebhoy Hospital, the subject for some months of fever, and more recently of looseness of the bowels; he was in a reduced condition, and complained of some pain in the epigastrium, but the diarrhœa was apparently not of a dysenteric character. There was some fulness in the hypochondria and the fever was mostly nocturnal: under the influence of ipecacuan and opium the stools, which were thin and sometimes streaked with blood, soon became less frequent; but the local pain continued, being strictly limited to a spot just beneath the ensiform cartilage; here two or three blisters were successively applied, with but little relief. A sense of throbbing at the point of the sternum was afterwards noticed. Physical examination of the lungs and abdominal viscera did not reveal clear evidence of disease, but the state of the heart was never ascertained during life, the symptoms not pointing to its derangement. Hydrocyanic acid and carbonate of soda were temporarily exhibited, and afterwards Grey powder and Dover's powder, with the object of affecting the system, but no permanent relief was obtained. The precordial uneasiness persisted, shifting however a little to the right; his strength began to fail; the pulse became feeble, and at times intermitting; puking of thin bile, and scanty action of the bowels followed, and twenty days after admission the patient died from sudden failure of the heart's action.

On *post-mortem* examination the lungs were found healthy, and the pleura free from adhesion or effusion; the sac of the pericardium contained about eight ounces of thin curdy pus, and its layers were covered with lymph. Exactly where the pain had been felt during life the left lobe of the liver was found attached by very vascular adhesions to the under surface of the diaphragm, it was the seat of a defined abscess, the size of an orange, which, pointing upwards, had communicated with the cavity of the pericardium; three small sloughy spots were here noticed, through one of which pus, resembling that contained in the serous sac, readily exuded on slight pres-

sure being made from below. The pericarditis should not probably be wholly referred to the presence of pus, the entrance of which it would seem to have preceded, having considerably advanced before death, although no marked general symptoms revealed its occurrence during life. The remainder of the liver substance was much congested: the spleen and kidneys were congested, the mucous membrane of the stomach and intestines was healthy.

Remarks.—This necessarily fatal result of hepatic abscess appears to be very unusual; Dr. Morehead had never seen an instance of it, and the case he refers to as recorded in these Transactions, is not very clear as to the connections of the abscess. The rarity of similar cases is the only excuse for printing the above scanty details.

No. 10.

Note on Mycetoma, the Fungus-disease of India.—By Assistant Surgeon H. V. CARTER.

Instances of this remarkable affection are sufficiently numerous in Bombay and elsewhere, to fully warrant its admission on the nosological list of Indian diseases as a specific malady.

At the close of May last year, Mr. Sudashew Hemraz, the medical attendant of the Rao of Kutch, forwarded to me three specimens, one of the foot, and two of the upper extremity and finger, accompanied with notes of the case; and shortly afterwards he communicated the details of a fourth case in which the foot was the part affected.

In the Jamsetjee Jejeebhoy Hospital two well-marked instances of Mycetoma have been seen during the past year, amputation of the foot being performed in one, August 9th, 1862; both these were of the commonest form of the second variety, while two of Mr. Hemraz's were of the first or black variety. No instances of the more unusual forms previously described by me have been lately seen; nor did any of the above present features of sufficient novelty to require lengthened notice. I may mention, however, that in the foot amputated at the Jamsetjee Jejeebhoy Hospital, a few of those peculiar brood-cells termed "myeloid," were found amongst the disintegrated tissues; the patient was a young man, and there is nothing in this circumstance to call for special remark.

The *treatment* of Mycetoma is a subject well worthy of attention; the progress of the disease is slow enough to allow of local applications being fairly tried, and diagnosis may sometimes be made at a very early stage. The object would be either to remove by caustic or knife the whole of the diseased mass, or else to attack the exciting cause, and by means of some vegetable-killing poison to kill the fungus-growth. Mr. Hemraz mentions his having used, as he thinks effectually, for the former purpose, strong nitric acid; a proceeding which would not have been applicable in one of the Jamsetjee Jejeebhoy Hospital cases, for here, though the disease was in a comparatively early stage, too large a portion of the foot was implicated. And as regards the injection of chemical solutions into the sinuses and canals of the growth so as to operate directly upon the parasite, I own myself sceptical as to its efficacy: the fecundity of the fungus, particularly of the black variety, is wonderful, and the length and tortuosity of the canals are very unfavourable to the passage of fluid along them. Fungi and cryptogams inhabiting the mucous cavities, or growing on the surface, are more readily attacked. In this poverty of means, the patient last referred to had to be left unrelieved, because the disease had not made sufficient progress to render amputation (the only resource) advisable, and yet there seemed no likelihood of local treatment being effectual in eradicating the disease.

The *real character of the parasitic fungus* appears to be now ascertained, and the red mould noticed in the Appendix to my Observations on this disease, published last year in these Transactions (Vol. VII. new series, p. 220), would seem to be the normal form of the fungus. The Rev. M. J. Berkeley, with whom I had already been in communication on the subject, having been provided with further information by Mr. H. J. Carter, now in England, furnished to a popular scientific Journal* a short account of the disease, and there he states that this red "mould is, it can scarcely be doubted, the perfect form of the species, though at present it has not been observed in any other situation; a circumstance, however," he adds, "which need excite no surprise, as so little attention has hitherto been paid to the minute fungi of India." The opinion of this eminent mycologist must, I presume, be considered, in view of all known facts, as conclusive; and since the date of my last remarks, I have obtained by experiment, besides witnessing a fourth instance of spontaneous growth, some confirmatory

* *The Intellectual Observer*, for November 1862, p. 248.

evidence of the accuracy of that opinion, having been able to watch the origin of the red mould from fungus particles not only of the black variety, but also of the second or more common form, and with the aid of the microscope, have seen its filaments springing from the interior of the latter. Such evidence is the only proof yet obtained of the nature of several forms of *Sclerotium*, few, if any, of which have ever been produced artificially from a given species, although their development into the normal or perfect form has, as in the present case, been effected by experiment. Mr. Berkeley is not inclined to agree with the views I formerly expressed as to the possible connection of the Fungus of Mycetoma with the rusts and mildews infesting many plants; and as just intimated, I now think it is rather amongst the moulds (*mucor*) we must look for the parent of the former. He considers the facts already made known warrant the specific distinction of the red mould, which although closely resembling *mucor*—identical I should myself say—is yet more like the genus *Chionyphe*, whence his proposed name and definition—“*Chionyphe Carteri* hyphasmate ex albo flavo-rubroque “*sporangii demum coccineis; sporis breviter fusiformibus.*”

It now remains for us in India to search for this mould on the surface of the soil, &c. as will perhaps be done with most success during the monsoon; and the fortunate discoverer will add the remaining link, should his observations be complete, in the history of a disease which is as yet unique in both character and locality: that the task is no easy one may well be judged, since in the instance of a parasitic affection far longer under our notice—I mean guinea-worm—this final step has not yet been made, indeed the natural history of *Dracunculus* is hardly so advanced as that of *Mycetoma*.

ABSTRACT PROCEEDINGS
OF THE
MEETINGS OF THE MEDICAL AND PHYSICAL SOCIETY,
FOR THE YEAR 1862.

COMMITTEE MEETING HELD 21st JANUARY 1862.

Present.

H. J. Carter, Esq., F.R.S. ; J. Peet, M.D. ; R. Haines, M.B. ; and
W. C. Coles, M.D.

1. The Committee having met proceeded to consider the finances of the Society, and after an examination of the balance in the Bombay Bank and of the outstanding bills, and after taking into consideration the probable annual expenditure, determined that Rs. 1,000 might be invested in the 5 per cent. Government Securities, in the name of the Secretary for the time being, which was directed to be carried out.

2. The Committee further considered that it would be advisable to submit for the votes of members a proposition to cancel so much of Rule VIII. as relates to the admission fee of Rupees 5 on election as a member of the Society, which in their opinion can be dispensed with.

3. Drs. Carter, Haines and Coles then formed themselves into a Sub-Committee on the Library, and the General Committee was dissolved.

No. 1.

MONTHLY MEETING HELD 1ST FEBRUARY 1862.*Present.*

H. J. Carter, Esq., F.R.S., *President*, in the Chair.

J. Peet, M.D., F.R.C.P., *Vice-President*.

Members.—T. Diver, M.D.; T. B. Johnstone, M.D.; F. Broughton, Esq.; J. Welsh, Esq.; W. G. Hunter, Esq.; G. R. Ballingall, M.D.; H. V. Carter, M.D.; and W. C. Coles, M.D., *Secretary*.

The proceedings of the last monthly meeting held on the 3rd December 1861, and of the Committee meeting held on the 21st January 1862, were read and confirmed.

It was announced that Dr. McDougall, who was proposed by Dr. Campbell, and seconded by the Secretary, as a member of the Society, under Rule VI., would be ballotted for at the next meeting.

The presents for the Library, consisting of the last published "volume of the Asiatic Society," "the Meteorological Observations for 1860" from Government, the 6th number of the "Madras Quarterly Journal," "the Chemist and Druggist for December," and four numbers of the "British Medical Journal" were laid upon the table.

The paper selected for the consideration of the meeting, entitled, Typhoid Fever in India, its clinical characters, morbid anatomy, and etiological relations, by Surgeon W. Hanbury, 33rd Foot, was then read. This is a highly important and interesting paper, and will be published in the Society's Transactions. The author, after referring to the little recorded evidence of the existence of typhoid fever in India, relates six fatal cases which fell under his observation in the 33rd Regiment of Foot at Deesa in the autumn of 1859, enumerates the leading symptoms which characterised the disease, and enters minutely into the appearances presented after death. Upon these data the writer proceeds to investigate the clinical characters, the morbid anatomy and the etiological relations of the disease, and leaves little room to doubt that the inferences drawn are strictly correct as to the existence of typhoid fever.

The paper characterised by the able manner in which the subject is treated, the careful mode of investigation pursued, and the satisfactory results which followed upon the disease being recognised, and upon essential sanitary measures being carried out.

Some discussion ensued on several points regarding the discrimination of typhoid fever from remittent and other fevers, and a wish was expressed that the author had added instances of recovery from the disease, as well as an outline of the treatment pursued both in fatal and recovered cases.

A few short notes on the use of dilute nitric acid in the treatment of intermittent fever by Sub-Assistant Surgeon Bazunjee Rustomjee were read, and after the meeting had voted the best thanks to Mr. Hanbury for his valuable contribution, the President announced its adjournment till Saturday, the 1st March next.

No. 2.

MONTHLY MEETING HELD 1ST MARCH 1862.

Present.

J. Peet, M.D., *Vice-President*, in the Chair.

R. Hainés, M.B., *Vice-President*.

Members.—W. Hanbury, Esq.; T.B. Johnstone, M.D.; F. Broughton, Esq.; J. M. Hyslop, M.D.; G. R. Ballingall, M.D.; J. Welsh, Esq.; G. C. M. Birdwood, M.D.; H. V. Carter, M.D.; and W. C. Coles, M.D., *Secretary*.

The proceedings of the meeting held on the 1st February were read and confirmed.

J. McDougall, M.D., was unanimously elected a member of the Society under Regulation VI.

The numbers of the "British Medical Journal" and the "Chemist," received since the last meeting, were laid upon the table.

The first paper read was entitled, Observations on Leprosy, part 1st, by Dr. H. V. Carter. The author stated that Leprosy had for some time engaged his attention and was still under investigation, but as important results had already been evolved, it was thought desirable to bring them before the notice of the Society. After a few comments on the only complete researches yet published, those of Messrs. Danielssen and Boeck, Physicians in Norway, where Leprosy still prevails, pointing out some differences in their conclusions and the present writer's, the description of a case of Leprosy in the Jamsetjee Jejeebhoy Hospital was given in detail, and from this instance, as well as others occurring subsequently, it was shown that the loss of feeling or Anæsthesia, so

characteristic of most forms of Leprosy, is solely owing to enlargement of the sensory nerves supplying the benumbed parts, accompanied with compression of the nerve-fibres, so that their function is greatly interfered with or even destroyed. The microscopic appearances of the affected parts were then described and illustrated by drawings; they are peculiar to this disease, and so far as the author was aware, are now first made known. It is no longer a matter of surprise that confirmed Leprosy is so little amenable to treatment. The connection of this disease with some others was then pointed out, reference being made to cases in the Jamsetjee Jejeebhoy Hospital.

Dr. Peet read notes of two fatal cases in which fibrinous concretions in the heart were found after death.

That portion of the annual report on the Jail Hospital, Ahmednuggur, by the Acting Civil Surgeon, Dr. Cook, was then read, which related to the measurement and registration of "Ozone," and upon which some discussion followed.

A communication was read from Dr. Lownds on the use of Liebeg's cold soup; and after the best thanks of the meeting had been awarded to contributors of papers, the Chairman adjourned the meeting for the recess of three months, the next meeting to take place on the first Saturday in July.

No. 3.

MONTHLY MEETING HELD 5TH JULY 1862.

Present.

J. Peet, M.D., F.R.C.P., *Vice-President*, in the Chair.

Members.—W. Hanbury, Esq.; A. Wright, Esq.; H. Giraud, M.D.; T. B. Johnstone, M.D.; F. Broughton, Esq., F.R.C.S.; T. Diver, Esq.; J. Welsh, Esq.; W. G. Hunter, Esq., F.R.C.S.; G. Birdwood, M.D., and H. V. Carter, M.D., *Secretary*.

The proceedings of the meeting held on the 1st March last were read and confirmed.

A letter from Dr. B. Niven, acknowledging the receipt of the Transactions was read, also one from M. D. Pereira (addressed from the Mission House, Ambrolie), regarding an indigenous remedy for Fever, &c. (named "Alph") employed in Persia, was read. The accompanying

specimen of the plant so used was, in the absence of the Professor of Materia Medica, entrusted to Dr. Birdwood, for identification.

The following letters, and resolutions of the Managing Committee thereon, were then read and agreed to :—

From the Secretary, W. C. COLES, M.D.

To the PRESIDENT, VICE-PRESIDENTS and COMMITTEE of the Medical and Physical Society.

GENTLEMEN,—Consequent upon being about to proceed to Europe for six months, it is necessary that I tender the resignation of Secretary to the Society.

I have ascertained that, if it is in accordance with the wishes of the Committee, Dr. H. V. Carter will be happy to become Secretary, and to him, under the directions of the Committee, I will make over charge.

I have the honour to be, &c.

(Signed) W. C. COLES, Secretary.

Bombay Medical and Physical Society's Rooms, 1st May 1862.

Memo. on receipt of the above letter.

If it be absolutely necessary that on account of his going to Europe Dr. Coles' valuable services as Secretary should be permanently lost to the Society, it is desirable that we should take this opportunity of acknowledging them, as well as, out of respect to Dr. Coles, accepting the nomination of the Gentleman whom he has proposed to be his successor.

I would therefore suggest that the following resolution should be passed by us, read at the next meeting of the Society, and thus having become part of the minutes of that meeting, should be subsequently printed in the Society's Transactions :—

RESOLUTION.—That the Members of the Committee feeling under deep obligation to Dr. Coles for his valuable services during the period of eight years that he has held the Secretaryship, do hereby record their conviction of the great advancement the Society has made in the fulfilment of its object under his care, their sense of his steady attachment to its interests, his great ability and unremitting zeal in the performance of his duties, and their regret that his departure for Europe should compel him to tender the resignation of the office which he has held for so long a time with such honour to himself and such profit to the Society.

In accordance with Dr. Coles' nomination, I would propose that Dr. H. V. Carter be appointed to succeed him as Secretary of the Medical and Physical Society.

(Signed) H. J. CARTER, *President*,

1st May 1862.

and Members.

To The SECRETARY of the Medical Society of Bombay.

DEAR SIR,—As the state of my health renders it desirable that I should go to England for change of air, it becomes necessary that I should request the favour of you to tender to the Society through the Committee of Management, my resignation of the Presidentship.

In doing which I would beg to record my conviction after many years' experience of the usefulness of the Society to the profession and the public generally, and locally, medically and socially, my sincere wishes therefore for its welfare, and lastly, the hope that although distantly separated from it, the Society will still continue to command my services in any way that they may be required for the advancement of its objects.

I remain, &c.

(Signed) H. J. CARTER, *President*.

Bombay, 13th May 1862.

Resolution of the Committee upon the receipt of Dr. Carter's letter.

We should, I think, in accepting Dr. Carter's resignation place on record our regret that the state of his health should have compelled him to relinquish an office in which, from the deep interest he has taken in the Society, and his scientific attainments, there was just reason to believe he would have done much to promote its prosperity. My colleagues will, I am sure, gladly avail themselves of this opportunity of expressing their cordial appreciation of Dr. Carter's valuable contributions to the Society's Transactions, and of the great services he has rendered it in the office of Vice-President and during a Membership of more than 20 years' duration.

(Signed) J. PEET, *Vice-President*,
and Members.

15th May 1862.

A ballot then took place for a President, when Dr. Peet was elected ; for a Secretary, when Dr. Carter was elected ; and for a Vice-President, in the place of Dr. Peet, in which Dr. Giraud was chosen.

Numbers of the "British Medical Journal" "Chemist and Druggist," "Indian Annals of Medicine," and the "Transactions of the Epidemico-logical Society" received since the last meeting were laid on the table, also the Catalogue of the Bombay Geographical Society, presented by the Secretary, and a copy of Dr. Moore's work on the Diseases of India, presented by the author.

The following communication was then read, entitled, "the Sanitary condition of Hill Stations with especial reference to Mount Aboo, by Dr. Moore, in medical charge of the Sanitarium, &c. The writer traces the history of sanitary establishments in India and continues—"I purpose in this paper making an attempt to prove that the advantages derivable from the climate of many Indian Hill Stations are negated by the neglect of sanitation in such localities, that preventible or mitigable diseases are much more prevalent on Mountain Ranges than they should be ; and that so long as this remains the case, the majority of our Indian Hill Stations can only be regarded as 'retreats from intense heat during the hot months.'"

Then follows a view of a few of the advantages the world has derived from the adoption of sanitary measures. The statement that "there are scarcely any localities where, both on account of the peculiarities of the climate, and the particular conformation of the surface of the ground, sanitary regulations are more demanded than in Indian Hill Stations ; neither are there any sites where such requirements may be effectually carried out with greater facility"—is next illustrated by the author in the course of his remarks on Malaria, and the decomposition of organic matters "*vis siccā, et vis humidā*" and the fact is mentioned of cholera having already in confirmation of Dr. Mackay's prophetic warning, made its appearance in the Neilgherries. Extracts follow from published reports, showing the present sanitary condition of some of the Hill Sanitaria, as Simla, Ootacamund, Nynsee Tal, Dugshai, Darjeeling, &c., and pointing out their defects, of which Mount Aboo equally partakes. Landour is lauded as a kind of model, and, in conclusion, suggestions are made as to the most efficient means of placing and maintaining the Hill Sanitaria in a

fit sanitary condition. The author expresses his intention to continue this subject.

Extract from the Annual Report of C Battery 4th Royal Horse Brigade for the year 1861, by Dr. Cruikshank. These had reference to the irregular manner in which an epidemic of cholera attacked several separate corps at Nusseerabad, and to the circumstances which might account for the comparative immunity of the Horse Artillery as to the number of cases, and severity of attack. The better working, the stone roofs and more complete isolation of the barracks, and the superior physical condition of the men were pointed out as in favour of the Artillery. Active precautionary and sanitary measures were also adopted.

Some points in the above communications having been discussed, the best thanks of the Society were awarded to the various contributors and donors, and the meeting separated.

MONTHLY MEETING, AUGUST 2ND, 1862.

Present.

Dr. Peet, *President*, in the Chair.

Members.—Drs. Broughton and Hyslop, and Dr. Carter, *Secretary*.

The minutes of the previous meeting having been read and confirmed, a letter from the Under-Secretary to Government, having reference to the formation of a Statistical Department and inviting the co-operation of the Society in collecting statistical information, was then read, and was referred to the Managing Committee for further consideration.

Dr. Thom, Garrison Surgeon, Bombay, had intimated his wish to rejoin the Society.

Numbers of the "Madras Quarterly Journal" and the "British Medical Journal" were laid on the table.

The following papers were then read :—

1. Rough Notes showing outline of the country between Kurrachee and Guadel, by Assistant Surgeon J. Lalor, B.A., 2nd Regiment Sind Horse. The country bordering immediately on the sea coast from Kurrachee to Guadel, and included between parallels 62° and 67° E. Longitude, might be aptly described as a bare and cheerless desert,

intersected occasionally by low hills, with a scanty and almost purely periodic supply of water. Its shore line is singularly straight and even, the difference in the Latitude of any of the places between the above named points, being never more than a few miles. On the road to Sonmiyanee the great Hala range of mountains was crossed, and the river Hubb: here some traces of vegetation were seen and a few wandering Noomreas people; the country is barren on account of the want of water, for onwards a short distance the road is along the sea-shore, afterwards over a long tract of salt land relieved by a solitary oasis, and halting place of pilgrims. The town and harbour of Sonmiyanee were next described: there is little local trade, and fresh water seems to be scarce. Beyond this place the road lies mainly over drifting sand-hills, or low lands on which the sea at times encroaches, forming large swamps in which the mangrove abounds. At Chur, the lesser Hala range of hills is reached; the latter have the appearance of disrupted conical masses, and are composed of clay and ochre beds, tipped with dark sandstone and conglomerate. Near here the Shor hills commence, the first of a series of remarkable white ridges that stud and disfigure the entire face of the country. About seven miles from Phor the mud volcanoes or springs of Hooke are met with: they are three in number, and situated close together, two indeed connected by a curtain of earth about twenty feet in extent and of similar composition and colour. They are distant from the sea about a couple of miles.

Of considerable height and conical shape, they can be seen from eight to ten miles off, and from their symmetry and apparent regularity of structure, resemble artificial mounds of white material, with a few feet of dark, discoloured top. On nearer survey, we find the sides not at all even or rounded, but deeply fissured, and presenting grotesque and fantastic shapes, most nearly resembling a large collection of alligators piled together. Access to the highest (about 350 feet) is easy, except near the crater, where the path becomes slippery. At the summit is a basin of circular form, about forty feet in diameter; within this the liquid mud is heaved up at irregular intervals, and in quantities varying during the time of our visit, from a mere bubble to jets of a foot high, and two or three in circumference.

Sometimes, the action is quite spasmodic, three or four jets following each other in quick succession, with a corresponding interval of

rest. The mud eventually runs over and down the sides, in a glistening stream. In a second, of lower elevation, probably about one hundred and eighty feet high, the mud is much more liquid, the action more regular and continued, and a good deal of water is formed on the settling of the irruption.

The temperature was the same as the earth and water in the locality, and the taste of the brine formed on the subsidence of the mud, salt and nauseous to immediate sickening.

In the action, as well as cause, of those springs, there is much ground for curious and puzzling study. Gypsum and sulphur are found abundantly, and may be met with in a free state here, and amongst the Shor hills before alluded to, there is also apparently a sulphurous taste in the water, but the absence of any rise in temperature, their course of action (to be afterwards mentioned) and the fact that no particular properties are attached to them which is invariably the case in the east, seem opposed to the idea of their being of a sulphurous nature.

Two interesting features deserve notice : 1st, It would appear that when the hills have attained a certain altitude, the action of the volcano ceases. Such might be readily inferred, from the sluggish motion now going on in the highest at Hooke, and from the fact that we found none in the line of Shor hills just mentioned, as varying between three and five hundred feet in height, and where at one time a great volcano is said have been. Again, on subsequently visiting another of greater elevation, and with a circumference at base of a quarter of a mile, situated about ten miles to the north of Hoormara, the mud in the crater was seen to be almost entirely quiescent, and had sunk fully eight feet below the crest ; while from the side, and at about fifty feet above the surface, there was oozing on to the plain, a good stream of liquid mud. The people of the country say that the full action is periodic, and reaches its greatest force at the time of spring tides ; in fact, that they are wholly connected with the ocean, and like it, influenced by the moon. Hence their Belooch name, Dherya chium (eye of the sea.)

The bay of Kutcherie and the Hingur river were next passed: the general characters of the latter are described, and mention is made of the famous temple of Hinglaj. The road onward to Hoormara passes over a district very scantily supplied with water, and difficult to traverse : crossing the Gorund river, Hoormara was then reached, a fishing village, the inhabitants of which are said to be civil and contented

under native rule. Hence the route is towards Kurmut, afterwards on the coast to Passenoe, and Guadel. The latter locality is described as flourishing, it belongs to the Imaum of Muscat and said to have once been in the possession of the Portuguese. Dr Lalor mentions the climate as good. The subsequent portion of his paper is occupied with critical remarks on the identity of the more prominent localities named in the ancient Greek histories of Alexander and Nearchus, with those now to be distinguished along this coast. Having revisited many of these localities from the sea, the author is able to offer some very interesting remarks on this subject. In the Appendix are two analyses of water and of liquid mud from the mud volcanoes of Hooke and Hoormara, by Dr. Haines: the specimen from the former locality contained a considerable quantity of salt, and was alkaline in reaction; of that from the latter, taken a distance of 10 miles from the sea, the solid part or mud consisted principally of carbonate of lime, the supernatant water remarkable for presenting decided traces of iodine, a very unusual occurrence.

2. The next communication was on the subject of the sanitary condition of Hill stations, especially Mount Aboo, being a continuation of Dr. Moore's former paper on this subject. It consisted of numerous tables, and accompanying remarks on the comparative prevalence and mortality of all the chief diseases, during various lengthened periods, at Mount Aboo, and can hardly be condensed so as to convey a correct impression of its contents; but these are of considerable interest. In conclusion the author reiterates his opinion that the sanitary condition of Indian Hill stations is not what it should, or might be, and that until this is improved "the most we can expect from Hill sanatoria is a refuge from intense heat during the hot months of the year."

Some conversation followed on the above and collateral topics, and the thanks of the Society were voted to the contributors, after which the meeting separated.

PROCEEDINGS OF A COMMITTEE HELD 6TH SEPTEMBER 1862, IN THE GRANT MEDICAL COLLEGE.

Present.—Drs. Peet, Haines, and Carter.

1. It being ascertained that the proposition agreed to at the last meeting of the Committee to abolish the entrance fee of Rs. 5 (in

supercession of the first part of Rule 8) had not been carried out, it was resolved that the subject be now referred to the members of the Society for decision.

2. The Committee deeming it desirable that Rule 7 should be applicable to officers of both services and that the period of non-paying membership should at the same time be reduced to one year, adopted the following modification of Rule 7—"Assistant Surgeons of either the British or Indian service on first arrival at the Bombay Presidency are considered ordinary members of the Society free of payment of annual subscription, and continue so for the period of one year, after which should they not intimate their wish to be considered ordinary members by payment of the regulated annual subscription, they are considered to have withdrawn from the Society."

3. It was proposed and agreed to, that in order to render the existence of the Society better known, and to extend thereby its usefulness, a copy of the last Number of the Transactions be forwarded to Surgeons of the British Army serving in the Presidency, with a copy of the Regulations.

4. The Committee next proceeded to consider the letter from Government referred to at the last meeting of the Society, and a resolution was passed, that the Society would be glad to assist in the collection of statistical information in any way Government might propose, and that the Transactions of the Society be considered at the disposal of Government for the publication of such information.

5. Two members of the Committee having recently left Bombay, the vacancies thus ensuing were directed to be filled up in accordance with Rule XV.

MONTHLY MEETING HELD 6TH SEPTEMBER 1862.

Present.

Dr. Peet, *President*, in the Chair.

Drs. Giraud and Haines, *Vice-Presidents*.

Members.—Dr. Stovell, Principal Inspector General; Drs. Johnstone, Broughton, Hyslop, Ballingall, Hunter, Beatty, Birdwood, Diver, and Dr. Carter, *Secretary*.

The Minutes of the last meeting were read and confirmed.

Dr. Birdwood then presented a brief report on the indigenous febrifuge (called "alpeh") sent to the Society by Mr. Pereira. It seems probable that the herb is nothing more than the common wormwood (*Artemisia Absinthum*) which has long had some reputation in the treatment of intermittents, but is not considered of much value that way at the present day.

Numbers of the "British Medical Journal," sent by the editor, and the "Report of the Medical College at Lahore," presented by Government, were laid on the table; and other communications read.

The first paper brought before the Society was by Dr. Beatty, it contained an interesting account of a case of *Placenta Prævia* attended by some unusual and unfavourable symptoms; the treatment adopted was explained and commented on by the author, who referred to the opinions of various eminent authorities on this subject, and afterwards exhibited to the Society a case of instruments lately introduced into Obstetric Surgery.

The next communication was on the prevalence of Typhoid Fever in the Bombay Presidency, by the President. Before narrating his own experience of this disease, the author glanced at the ground of distinction of this form of continued fever, regretting, like many others, that the term "Typhoid" should have been applied to it, and in order to render his subsequent remarks more clear, the characters of the disease, as laid down by a distinguished English physician, were read to the Society. The attention of Dr. Peet to the existence of typhoid fever in Bombay was first excited by the occurrence of a case in the beginning of 1859, which he had been requested by one of the College graduates to see; this young patient's case was marked by peculiar features, which precluded its being regarded as one of ordinary remittent fever, with abdominal symptoms, and which favoured the view of its being typhoid fever. Since then numerous similar instances had come before the notice of the author, most of which had not been watched sufficiently long to enable him to lay a full account of them before the Society (though not on that account less impressive to the observer himself); five or six cases however, more or less typical in their features, were related in detail, and in two of these the characteristic eruption of rose-coloured spots was detected; in all, the insidious commencement of the attack, its long duration, the absence of distinct remissions, the

state of the cerebral function, persistent diarrhœa, and tympanitic state of the abdomen, the tendency to relapse, and the prolonged convalescence, were together with the general youth of the patient, pointed out as the chief phenomena which seemed to indicate the real nature of the disease, and at the same time to distinguish it from the ordinary indigenous fever of the country. In one instance the *post-mortem* examination (the only one mode) revealed unequivocal evidence of the peculiar pathological changes of typhoid fever.

In passing on to the question of the existence of this disease in the tropical parts of India, the author stated that up to the year 1854, most writers on tropical diseases ignored or denied the existence of the common continued fevers of cold countries in warm climates, and he quoted to this effect, Annesley, Mackinnon, Martin, &c. ; even Dr. Morehead was not inclined to admit the occurrence of typhoid fever in India, at the time the first edition of his work was published ; since then however his opinion has been somewhat modified.

Having made a careful review of the writings of these and the older authors, Dr. Peet thought himself able to detect some instances of this form of continued fever, mentioning particularly one of Annesley's cases, and he pointed out how unfavourable the mode of treatment adopted in all fevers, at that time, was to the detection of typhoid fever, consisting as it did of large doses of calomel and frequent drastic purgatives, &c. Martin's statement of the frequent occurrence of intestinal ulceration in prolonged fevers amongst the labouring classes of natives in Calcutta was also referred to. The affection described by Twining in Bengal "as the insidious congestive fever of the cold season" appears to have presented, in some of its characters, a resemblance to typhoid fever, yet diarrhœa was rare and intestinal ulceration only occasionally found after death. Twining himself admits, on a review of the symptoms, "that they might establish a resemblance to some modification of the European typhus, although the resemblance be not strictly correct in all its details." Dr. Peet remarked on this passage : "these very sensible observations were written by Mr. Twining 27 years ago, and I am not aware of a single observation of any value having been since made to settle the very important question to which it relates." Recent writers differ in opinion as to the identities of the affection now referred to with typhoid fever ; the author inclines to the affirmative, and in concluding this part of the subject observed that

sufficient evidence had probably been adduced to render it at least probable that typhoid fever has at all times occasionally occurred within the tropics, and been confounded with remittent fever or other diseases.

The first recorded cases of typhoid fever, as such, are by Mr. Scriven (January 1854); they happened in Burmah, the diagnosis being chiefly based on *post-mortem* appearances. Dr. Ewart afterwards recorded four cases which occurred in the Ajmere Jail, and subsequently Dr. Goodeve has written on the subject, and satisfactorily proved the existence of the disease in Bengal. Articles by Drs. Ranking and Cornish were also referred by the author in proof of its existence in Madras, and also the valuable observations of Dr. Hanbury published in the last volume of the Transactions of the Society. Passing on to the question of diagnosis, the author discussed the semeiological value of the rose-coloured eruption, the state of the abdomen, mode of invasion, long duration, and prolonged convalescence, &c. of typhoid fever, and with reference to one of its characteristic symptoms, the intestinal lesions, remarked, "if it can be established (and I think it very probable it may be so) that Peyer's glands are not implicated in malarious fevers any more than in typhus or relapsing fever, a very important step in diagnosis will have been made."

On a future occasion Dr. Peet proposes to offer to the Society some additional remarks on the prevalence of this disease in the Bombay Presidency.

In the discussion which followed the reading of the above communication, the Principal Inspector General took a prominent part, and observed that the subject was one not only of professional interest, but of great importance in a sanitary point of view, supposing that typhoid fever be attributable, in its origin and propagation, to neglect of sanitation, as some maintain.

The best thanks of the Society having been voted to Drs. Peet and Beatty for their valuable contributions, the meeting separated.

MONTHLY MEETING HELD 4TH OCTOBER 1862.

Present :

Dr. Peet, *President*, in the Chair.

Members.—Dr. Stovell, Principal Inspector General Medical Department; Drs. Johnstone, Broughton, Hyslop, Haines, Ballingall, Welsh, Diver; and Dr. Carter, *Secretary*.

The proceedings of the last meetings of the Committee and of the Society were read and confirmed.

Numbers of the "British Medical Journal" and of a new Journal lately commenced at Goa (politely forwarded by Mr. Roberto, the Editor) were laid on the table.

The first paper read was on Delirium Tremens as observed at the European General Hospital, from 1857-1862, by Dr. Leith, Deputy Inspector General of Hospitals, Belgaum. The author commences his interesting and valuable communication by explaining the grounds upon which he has been led to distinguish "delirium tremens" from the milder affection which he terms "ebrietas," and which corresponds to the first stage of the disease as commonly accepted; but the statistics of both affections are contained in his elaborate table showing the admissions and deaths during five complete years in the European General Hospital. From this table it is calculated that the ratio of mortality on the admissions was from delirium tremens 5.24 per cent., from ebrietas 1.47 per cent. and from delirium tremens and ebrietas together 2.20 per cent.; the total number of admissions being 772 and of deaths 17. The majority of the deaths were of the first species or that which follows a debauch more or less prolonged, and is attended with vascular excitement. The influence of *seasons* and occupation, the age of the patients, are next treated of, the latter being somewhat over the age of patients in general: the liquors the patients had been drinking was most commonly brandy. Dr Leith considers that all kinds of drink have a similar effect; it is the alcohol that is the pernicious agent, and to the quantity of it taken is to be attributed the disease in all its phases, it is erroneous to imagine that only the bad or drugged liquor does harm. The accession of delirium often comes on while drinking, but sometimes after an interval of 40 or 50 hours: occasionally a relapse of delirium takes place, and the author has collected no fewer than 23 cases in which this "secondary" delirium occurred, and he gives a striking example; five such cases were amongst the fatal ones, and in these the secondary delirium was of a violent character and ended in convulsions. Irritability of *stomach* was not frequent. No particular state of the *tongue* exclusively pertains to either variety of the disease, nor were the bowels in any uniform state: the *skin* is generally natural, sometimes hot, especially in fatal cases: *heat of head* is by no means invariable: *head-*

ache was seldom complained of, but in two cases it was severe and followed convulsion. Redness of the eyes was occasionally present especially after long sleeplessness: *pulse*—Dr. Leith well remarks the influence of position on the pulse; his figures were obtained when the patients were either lying or sitting; they show an average of from 80 to 100 per minute as the most common, in the fatal cases the pulse was over 100 and once upwards of 130. *Tremor* was generally present and sometimes severe: *convulsions* occurred in all the fatal cases except one, being succeeded by coma, and they indicate very great danger: *sleeplessness* was a constant feature of the disease and usually preceded it. The *delirium* varied much in character and degree, Dr. Leith gives an elaborate summary of his observations of this point, quoting numerous illustrations: *Vertigo* was often observed, and in relation with these symptoms the author remarks that two confirmed drunkards at length became insane. The duration of delirium is next treated of; it mostly lasted upwards of three days. The condition of the *pupil* of the eye has for many years been most carefully investigated by the author, who states, that in delirium tremens the pupil is abnormally large; it would be impossible to suggest precautions to avoid error not already adopted by the author; he observes that the pupil is double in size during the delirium, and to this last the increase is owing; when convulsions come on, the pupil widely dilates. Some most interesting cases illustrating his remarks are then given by Dr. Leith, but can only be referred to here. The subject of *treatment* next follows and the elaborate care exhibited in carrying this out so as to avoid injurious influences and assist the natural process of recovery, is most apparent in this part of Dr. Leith's paper; he states that he considers alimentation along with quiet to be the most important part of the treatment of delirium tremens. It is surprising, too, to find from Dr. Leith's observations, how well nourishing broths and other liquid food is retained by the patient when alcohol is withheld, and it may be at once stopped with safety: of this fact an example is given. Seldom was medicine required, and then only on account of complications or symptoms more urgent than usual: depletion Dr. Leith thinks seldom necessary, even in robust men suffering from the effects of a single debauch; in one case chloroform failed to procure sleep, once it succeeded; opiates were never given with this intention.

All the eleven patients who died were habitual drunkards: three had

fever, probably the result of exposure to the sun, violent delirium, convulsions, and coma quickly followed, three had convulsions on their admission, in four they subsequently came on, one patient sank exhausted from a complication of chronic dysentery; Dr. Leith furnishes a table of the post-mortem appearances. The congested condition of the stomach and lungs is mentioned as perhaps due to the state of the pneumogastric nerve, in this particular mode of death; only once were the renal organs found diseased. The mean time patients were kept in hospital was nine days,—more than the treatment required, but prolonged from humane motives.

2. The other communication read to the Society was by Dr. Ballingall on the subject of Elephantiasis of the Scrotum. It contained the result of the author's recent experience, being an addition to his previous paper on the same subject; since then (1858) Dr. Ballingall has operated successfully on ten cases; in two the tumours being of large size, one of these cases was then described more fully and the method adopted for removing a mass weighing upwards of 100 pounds (106½ lbs.) the patient completely recovered. In a second instance described by the author some difficulties arose from the presence of hernia. Amongst other remarks the beneficial effects of change of air to the Deccan was pointed out, also the fallacy of the popular notion that Elephantiasis is due to a fish diet.

A discussion followed the reading of these two papers and the best thanks of the meeting were unanimously voted to Drs. Leith and Ballingall. It is intended that both communications be printed in the next volume of the Transactions of the Society.

MONTHLY MEETING HELD 1st NOVEMBER 1862.

Present.

Dr. Peet, *President*, in the Chair.

Drs. Giraud and Haines, *Vice-Presidents*.

Members.—Dr. Stovell, Principal Inspector General Medical Department; Drs. Thom, Hanbury, Broughton, Hyslop, Welsh; and Dr. Carter, *Secretary*.

The minutes of the last meeting were read and confirmed.

Letters from Dr. Seward intimating his request to become a member of the Society ; from Dr. Mee, Surgeon of H. M. 44th Regiment, expressing the same wish ; from Dr. Skues, of H. M. Depôt, Kurra-
chee, and from the Secretary of the Geographical Society of Bombay, were then read.

The donations presented were the last "Mortuary Returns" by the Principal Inspector General ; numbers of the "Chemist and Druggist" and "British Medical Journal," by the Editors, &c.

The first communication on the list was "On the conversion of calomel into corrosive sublimate, by ammoniacal salts," by Dr. Haines. The author introduced his subject with some remarks on the ready decomposition of the sub-compounds of mercury into protosalt and metal ; even light alone thus acts upon the suboxide and subiodide, but not, as it fortunately happens, upon the sub-chloride or calomel, otherwise the exhibition of this remedy might be attended with most serious results. This influence of light is really one of reduction, or deoxidation, such as is witnessed in its effects upon the oxides of silver and gold, &c., only in the case of the mercurial salts mentioned the nascent halogen or oxygen reunites with part of the unchanged compound, converting it into a protosalt : it may be supposed that the evolution of oxygen by the leaves of plants on exposure to light is owing to a similar process of deoxidation, and not dependant upon vital action. The power of ammoniacal salts, and especially of the carbonate, to convert calomel into corrosive sublimate has been already recognized, and from a recorded fatal case it would seem that the neutral hydrochlorate has a similar effect, the patient (a child) having died from the effects of some powders containing calomel and sal-ammoniac. Dr. Haines gave some account of a late instance he had become acquainted with, in which an adult European soldier, suffering from remittent fever, but progressing favorably, had been submitted by a second Medical officer to treatment by calomel pills, and carbonate of ammonia in solution with the acetate ; four doses of the pills and draughts, taken simultaneously, were administered, but after the second, symptoms of gastric irritation came on, and in two or three days the man died ; after death inflammation and sloughing of the mucous membrane of the stomach and fauces were found to have taken place. It was then shown that it was highly probable that the draughts administered contained a large excess of the alkaline carbonate of ammonia, notwithstanding that the solution

of the acetate had been ascertained to be acid in reaction, and the author proceeded to describe some interesting and conclusive experiments he had himself made for the purpose of inquiring into the action upon calomel of the acetate and carbonate of ammonia, and he showed that the sub-chloride (calomel) is to a slight extent changed into the chloride (corrosive sublimate) even by the neutral acetate aided by a temperature of 98° to 102° F.; but the conversion is much more marked when carbonate of ammonia was in excess; while if the solution were acid, hardly any change occurred, and none at all in calomel placed in distilled water under the same circumstances: from quantitative analysis it was estimated then in the case in question from 6 to 8 grains of the poisonous sublimate may thus have been formed in the stomach, and in conclusion the author pointed out the inadvisability of prescribing simultaneously calomel and acetate of ammonia, especially when the latter is alkaline in reaction.

Much interest was expressed by the members of the Society on this subject, different opinions being advanced as to the cause of death in the case referred to; it is not an uncommon practice to order the two substances mentioned, at the same time, and no injurious effects follow; still the actual occurrence of an instance like the above was considered to demand the earnest attention of the Society, and at the suggestion of Dr. Stovell, a Sub-Committee consisting of Drs. Peet, Giraud, and Haines, with Dr. Carter as Secretary, was formed, for the purpose of ascertaining, by direct experiment upon the lower animals, the circumstances under which calomel may thus be changed by the salts of ammonia into the far more irritant salt, the possibility of such a conversion outside the body having been satisfactorily demonstrated by Dr. Haines.

The next communication, presented by the Principal Inspector General of the Medical Department, was entitled "Remarks on Sanitary subjects with special reference to Mahableshwur," by Deputy Inspector General Grierson. The author prefaced his remarks by some general considerations on the proper method of studying subjects belonging to man in his individual and social relations: human nature is to be studied in its totality. As regards the relation in which man stands to the material world around him, the primitive commandment to dress and keep the earth, the latter embracing, as the Hebrew word "Shamr," implies, the preservation of the soil, was insisted on by

No. 8.

PROCEEDINGS OF A MEETING OF THE MEDICAL AND PHYSICAL SOCIETY HELD IN THE LIBRARY OF THE GRANT MEDICAL COLLEGE ON THE 5TH DAY OF NOVEMBER 1870.

Present :

Dr. Martin, *Vice-President*, in the Chair.

Members.—Drs. Partridge, Lalor, Peters, Waters, and Sylvester, *Secretary*.

The first paper read was contributed by Mr. Gerson DaCunha, M.R.C.S., on the subject of Vicarious Menstruation. Mr. DaCunha illustrated his paper by two cases, one of which was perhaps unique, inasmuch as he had consulted the various writers from which he quoted, but in no instance had the menstrual discharge been described as issuing from a *nævus*; the discharge obeyed the character of periodicity, and was accompanied by the menstrual *molimen*.

In the second case—that of an anæmic woman, aged twenty, suffering from suppressed menstruation—the secretion seemed to have been periodically replaced by patches of subcutaneous congestion of the skin on the right fore-arm; the patches sometimes disappeared spontaneously, sometimes necessitated leeches: under appropriate treatment the discharge was brought back to the natural channel in both instances.

A case of Hydrophobia by Assistant Surgeon Haliday was next read. The patient had received the disease by inoculation through the bite of a dog; it ran the usual course—spasm, “hydrophobic slaver,” restlessness, delirium, exhaustion, and death. The period of incubation was six weeks. Subcutaneous injection of atropine, and the administration of sulphite or hyposulphite of soda *per anum*, so highly recommended, does not appear to have been resorted to in the treatment of the case.

A table showing six cases of Scarlet Fever treated by Dr. Bell, Staff Surgeon, Poona, was laid before the Meeting. No details of the cases

were given. Provided that these were genuine scarlet fever, we must include the affection amongst Indian maladies. Dr. Holmsted's case read at last meeting was unquestionably quite the European type of the disease.

A fatal case of Gunshot Wound of the Thorax, by Sub-Assistant Surgeon Pereira, was next read; it exhibited no unusual feature, but was well detailed, and very judiciously treated.

Dr. Roche, Acting Civil Surgeon, Hydrabad, contributed notes of two cases of Tumour of the Antrum, for which he had removed the upper maxilla successfully. Pen and ink sketches accompanied the notes.

The thanks of the Meeting were voted to the contributors, and it adjourned.

**ANNUAL STATEMENT of RECEIPTS AND DISBURSEMENTS of the MEDICAL AND PHYSICAL SOCIETY from 1st
January to 31st December 1870 inclusive.**

PROCEEDINGS.

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RECEIPTS.		DISBURSEMENTS.	
	Rs. a. p.		Rs. a. p.
To Balance of last Account, closed on 31st December 1869	1,237 0 0	To the amount paid for Printing charges of Volume IX., Circulars, &c., and Office Establishment	2,145 7 8
To Subscriptions received from 1st January to 31st December 1870	624 4 0	* To Balance in the Bank of Bombay	238 0 4
To amount received by Sale of Books	22 4 0		
Government donation for Volume IX.	500 0 0		
Total Rupees.....	2,383 8 0	Total Rupees.....	2,383 8 0

* This does not include a Government note for Rs. 1,000 in the 5 per cent. Loan.

REGULATIONS

OF THE

MEDICAL AND PHYSICAL SOCIETY OF BOMBAY.

ESTABLISHED 1835.

Objects.

I. The encouragement of the cultivation of Medical Science and its collateral branches, by discussion at periodical meetings, and by the publication of original communications.

Constitution.

II. The Society is composed of Ordinary, Corresponding, and Honorary Members.

Ordinary Members.

III. Under the head of Ordinary Members are to be classed all who contribute to the funds of the Society, and all who are admitted in accordance with Regulation VII.

IV. All Medical men residing in India, who can produce certificates of a regular medical education, are eligible as Ordinary Members.

V. Medical Officers of Her Majesty's Indian or British Services are elected Ordinary Members of the Society, on application by letter addressed to the Secretary.

VI. Qualified Medical Practitioners, not belonging to Her Majesty's Indian or British Services, are elected by ballot at the ordinary meetings of the Society, and a majority of three-fourths of the Members present is necessary to secure the election.

VII. Medical Officers of either the British or Indian Service, on first arrival at the Bombay Presidency, are considered Ordinary Members of the Society, free of payment of annual subscription, and continue so for a period of one year, after which, should they not intimate their wish to be considered Ordinary Members by payment of the regulated annual subscription, they are considered to have withdrawn from the Society.

Payments.

VIII. Ordinary Members pay an annual subscription of Rupees 12, payable in advance, in the month of January of each year.

IX. Ordinary Members absent from India are not chargeable with subscriptions for the period of their absence.

X. Ordinary Members neglecting to pay their annual subscription for two successive years are considered to have withdrawn from the Society, and are liable to have their names erased from the list of Members, under a resolution passed to that effect at an ordinary meeting of the Society.

Corresponding Members.

XI. Ordinary Members on retiring from service in India, on being proposed and seconded at an ordinary meeting of the Society, are eligible, by ballot, as Corresponding Members. A majority of four-fifths of the Members present is necessary to secure their election.

Honorary Members.

XII. Medical men of celebrity, not residing in India, are eligible as Honorary Members. On being proposed and seconded at an ordinary meeting of the Society, they may be elected at the next meeting by the unanimous consent of the Members present.

Election of Office-bearers.

XIII. The Committee of Management of the Society consists of eight Members, elected annually from among the Ordinary Members resident in Bombay, by the general vote of the Ordinary Members residing under the Government of Bombay.

XIV. The Voting Lists are circulated in the first week of November of each year, and the result of the election is declared at the annual meeting of the Society.

XV. In the event of vacancies occurring in the Committee between the periods of election, such vacancies to be filled up in rotation by the gentlemen who commanded the number of votes next to those of the Members returned at the last election.

XVI. A President and two Vice-Presidents of the Society are elected annually from among the Members of the Committee of Management by the Members of the Society present at the meeting at which the annual election of the Committee is declared.

XVII. The Secretary of the Society is elected biennially, from among the Ordinary Members resident in Bombay, at the annual meeting held in the month

of January of alternate years, or, on the occurrence of a vacancy, at any other ordinary meeting of the Society.

Committee of Management.

XVIII. The Committee of Management have the general direction of the affairs of the Society, and decide on what communications are to be published in the Transactions of the Society. They keep minutes of all their proceedings, which are entered into the Minute-book of the Society, and read at the following ordinary meeting.

XIX. When questions of importance to the stability and interests of the Society arise, they shall be submitted by the Committee for decision to the Ordinary Members residing *under the Government of Bombay*, the majority of votes necessary to decide any question to be determined according to its importance, and fixed at the time by the Committee.

XX. It shall form part of the duty of the Committee to give due consideration to all suggestions offered by Members of the Society. Should it be represented to the Committee that the conduct of a Member of the Society is disgraceful in a professional or social capacity, the Committee may, if they deem it necessary, bring the question of his expulsion before a Special Meeting of the Society, at which the votes of three-fourths of the Members present are necessary to decide it affirmatively.

President and Vice-Presidents.

XXI. The President shall take the Chair and conduct the business at all meetings of the Society.

XXII. In the absence of the President, one of the Vice-Presidents shall take the Chair and conduct the business of the Meeting; and in case neither be present, the Senior Member at the meeting shall preside.

Secretary.

XXIII. The Secretary is a Member of the Committee of Management *ex officio*.

XXIV. It shall be his duty to enter into the Minute-book of the Society minutes of the proceedings of all meetings and transactions of the Society, and, in communication with the Committee of Management, to conduct the details of business, and carry on the correspondence, of the Society.

XXV. The Secretary shall prepare an annual statement of the receipts and disbursements of the Society, to be laid before the annual meeting in the month of January of each year.

XXVI. To enable the Secretary to perform these duties, a suitable establishment is entertained, under the sanction of the Committee of Management confirmed at an ordinary meeting of the Society.

Meetings.

XXVII. Ordinary meetings of the Society are held in Bombay on the first Saturday of every month except April, May, and June.

XXVIII. The Chair being taken, the order of business shall be as follows:—

1. The minutes of the last meeting, and those of subsequent Committee meetings, to be read and confirmed.
2. The announcement and election of new Members, in accordance with Regulations V., VI., and VII.
3. The election of Corresponding and Honorary Members.
4. The reading of letters, and the discussion of any ordinary business of the Society which may be before the meeting.
5. The announcement of presents and donations,
6. That of papers and dissertations,

received since the last meeting.

XXIX. After the announcement of the papers and dissertations, the President shall call upon the Secretary to read one or more of them, and shall subsequently invite the Members to discuss any particular part of them which they may consider deserving of remark.

XXX. No new business shall be introduced until that which is before the meeting has been concluded.

Papers and Dissertations.

XXXI. All papers and dissertations presented to the Society to be considered the property of the Society.

XXXII. The Transactions of the Society are published by the Secretary, in communication with the Committee, as often as circumstances will admit.

XXXIII. A copy of each publication is presented to the Honorary and Corresponding Members of the Society, and to every Ordinary Member who at the time of publication is a contributor to the funds of the Society.

Guests.

XXXIV. Any Member may introduce a guest at the Meetings of the Society.

N.B.—All communications addressed to the Secretary or Treasurers must be prepaid.

Members are requested to pay the amount of their subscriptions to the New Bank of Bombay, Treasurers to the Society.

3 The Publications of the Society are for sale by Mr. Hormusjee Sorabjee, 26, Meadow Street, Fort, Bombay, the Society's Agent.

The first Series of the Transactions of the Society consists of—

No. *1, 1838.....	Pp. 370.....	Rs. 5
„ 2, 1839.....	„ 269.....	„ 5
„ 3, 1840.....	„ 225.....	„ 3
„ 4, 1841.....	„ 156.....	„ 3
„ 5, 1842.....	„ 196.....	„ 3
„ 6, 1843.....	„ 250.....	„ 3
„ 7, 1844.....	„ 206.....	„ 3
„ 8, 1845-46.....	„ 122.....	„ 3
„ 9, 1847-48.....	„ 264.....	„ 5
„ 10, 1849-50.....	„ 338.....	„ 5

The Index to the above „ 1

The Second Series of the Transactions consists of—

No. 1, 1851-52.....	Pp. 356.....	Rs. 5
„ 2, 1853-54.....	„ 362.....	„ 5
„ 3, 1855-56.....	„ 389.....	„ 5
„ 4, 1857-58.....	„ 389.....	„ 5
„ 5, 1859.....	„ 349.....	„ 5
„ 6, 1860.....	„ 484.....	„ 5
„ 7, 1861.....	„ 349.....	„ 5
„ 8, 1862.....	„ 350.....	„ 5
„ 9, 1869.....	„ 378.....	„ 5
„ 10, 1870.....	„ 424.....	„ 5

The Index to the above is in preparation.....

* Out of print.

MEDICAL AND PHYSICAL SOCIETY OF BOMBAY

FOR THE YEAR 1871.

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