

Remarks on hill diarrhoea and dysentery : with brief notices of some of the Himalayan sanatoria / by Alexander Grant.

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REMARKS
ON
HILL DIARRHŒA AND DYSENTERY,
WITH
BRIEF NOTICES OF SOME OF THE HIMALAYAN SANATARIA.

BY
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ALEXANDER GRANT, ESQ.,
BENGAL MEDICAL SERVICE.

IN these remarks I propose submitting to the profession the results of my personal experience, and also such particulars of interest as I have been able to glean concerning that peculiar and often inveterate form of bowel complaint which is well known to be endemic in the important and near-lying group of Hill Sanataria, that includes Kus-sowlie, Subathoo, Simla, and the new station of Dugshai.

There are few topics of greater importance than the sanatory advantages of these localities, and the study of their essential and accidental atmospheric agencies, especially with reference to the prevalence of this particular class of diseases which occasions nearly all the mortality, and has been in some instances, a serious source of inefficiency and loss to regiments for years after they have returned to the plains.

I am the more desirous to draw attention to the subject because I have been unable to find any notice of it, either in the works which treat of the prevailing diseases of the North-Western Provinces, or in the periodical literature of Bengal, yet it is one of very general interest, and has been carefully investigated by many medical officers who have served at these Hill stations, and it must have attracted the

attention of others who have visited them in search of health, or recreation.

I shall first notice briefly the localities, and after stating some facts regarding the extent to which these bowel complaints have prevailed, I shall proceed to consider their causes, symptoms, pathology, and treatment, which will include also the means by which they may be best prevented and mitigated.

It is not intended, and indeed there is not space within the compass of this paper, to enter into topographical details, but a few general remarks under that head are requisite, and will be useful for the purposes of illustration and reference.

1. *Topography*.—Kussowlie, the station nearest to the plains, is situated in Lat. 30.56 North, Long. 77 East, 45 miles distant from Umballah, and 32 from Simla; its height is about 6,400 feet, there is no table land, and the peaks are rather steep, and pretty densely clothed with fir trees: there is a plentiful supply of excellent spring water 700 feet below the barracks; the meat supplied to the troops is good, and latterly vegetables have been plentiful. The climate may be pronounced to be temperate and agreeable, unless during the rainy season, when dense fogs make it gloomy and depressing.

The barracks during the early years of occupation were very inferior, having flat mud roofs, and rooms only 10 feet high, with clay flooring; lately, however, the rooms have been raised to $15\frac{1}{2}$ feet, the floors have been boarded, and the roofs made to slope so that they do not leak.

Subathoo lies 9 miles from Kussowlie on the road to Simla, at an elevation of only 4,000 feet; the hills are bare of wood; the climate differs from that of Kussowlie in being hotter in summer, and warmer in winter; it is altogether more dry and sheltered, and has an advantage in being seldom visited by fogs. The Barracks were at first unsuitable temporary buildings, but latterly they have been greatly improved and added to, and each man, both here and at Kussowlie, is allowed space equal to 1,000 cubic feet of air; the water is good and abundant, and the supplies excellent.—the beef being varied occasionally by mutton.

Dugshai is distant 18 miles from Kalka, and is 8 miles East of Kussowlie, and 10 miles South of Subathoo; its height ranges from 5,600 to 6,000 feet; the hills have a bleak and barren look, being completely bare of trees, and covered only by a long coarse grass. The situation, however, has the advantage of free exposure to the prevailing winds; water

is abundant and good at the distance of a mile from the barracks, which are new, substantial, and excellent, both in point of accommodation and ventilation. The rations are good and occasionally varied, and six acres of ground are laid out as a soldiers' garden. The climate is said to be unexceptionable, although the heat of the summer is sometimes oppressive, and the cold of winter rather piercing. In 1851, August was the most rainy month, and in January there were two feet of snow on the ground.

Simla, the most in-lying station, is 77 miles from Umballah, in Lat. 30.6 North, Long. 77.11 East, the houses are scattered over an extent of about 7 miles, on a series of heights varying from 6,500 to 8,000 feet, which is the highest elevation; it is in most places densely wooded with fir and *Rhododendron*, and there is much rank jungle which keeps the surface soil constantly damp; both here and at Kussowlie the heat of summer is somewhat tempered by the exhalations from, and the shelter of so much rich foliage. The climate of the two stations is also very similar, and it has been compared with that of the Cape of Good Hope. The rains commence early in July, heavy dense clouds and fogs then load the air, and with this increase of humidity, disease becomes very prevalent. Water is scarce during the hot months, but I am not aware that it is bad, although many persons take the precaution to boil and filter it; supplies are abundant enough, but in general high priced. Nothing can be worse than the state of conservancy, at least it was so up to the end of 1851. The smells along all the bye-paths were 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 12,000 persons was almost unrestrained by any police rules, and hence an amount of nuisance that is scarcely credible: the introduction of a municipal act has, I hope, quite changed this state of matters.

I can find no accurate data of the fall of rain at the several stations: it has been variously estimated at 60, 80, and 100 inches: at Kussowlie and *Simla* 70 inches may be estimated as a fair annual average.

The deep ravines and water-courses which intersect all the hills are dry during the greater part of the year; the heated air ascends from these confined gorges, bringing in the rainy season dense clouds of mist, which are doubtless excellent media for the transmission of the miasmal exhalations that are generated in such places by moist warmth acting upon an abundant vegetation.

The following table exhibits, as correctly as I have been able to ascertain, the mean temperature of each month :—

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September	October.	November.	December.	Height.	Fall of rain.
Kussowlie, ...	42.	47.4	58.5	64.4	77.2	73.9	70.5	70.6	72.1	66.2	6400	About 70 inches.
Subathoo, ...	...	...	...	77.	81.5	84.5	79.3	77.	...	...	...	...	4000
Dugshai, ...	42.	47.	57.	64.	69.	71.	72.	68.	66.	62.	54.	53	6000	
Simla, ...	40.	44.1	53.4	61.3	66.3	80.9	75.5	78.1	70.	67.9	52.3	46.1	8000	

Comparing the above with the mean temperature of the day at the following Hill stations, we find that the range of the Thermometer is almost invariably higher in the Simla group, and the fall of rain considerably lower.

Nainee Tal,	42.1	46.5	56.	61.2	69.5	69.6	67.8	69.2	65.1	61.5	50.1	47.9	6200	82.31
Landour, ...	35.9	40.7	51.3	...	...	...	...	...	68.0	64.1	49.6	46.3	7300	...
Murree, ...	...	...	...	...	...	69.5	68.4	66.7	62.1	62.8	...	...	6786	...
* Darjeeling.	40.9	41.7	51.8	55.3	61.9	62.5	63.7	64.3	63.2	55.8	50.4	44.8	8008	125.20
Mahables-war	63.11	64.59	71.82	74.14	71.79	66.89	63.36	63.71	64.34	65.68	64	63.04	4700	239.80

2. *Prevalence.*—There are abundant statistical data of the prevalence of diarrhœa and dysentery at these stations, and the loss sustained has been so considerable as to lead to a very general belief that as sanatoria they have proved failures.

In 1843-44, H. M.'s 9th Foot had 350 admissions from bowel complaint, and 57 deaths; while in 1844-45 its second year of residence, there were only 231 admissions, and 17 deaths.

The 1st Bengal Fusiliers stationed at Subathoo in 1845, also suffered much, but both regiments came to the Hills in a very sickly state, the one having been decimated by fever and dysentery in Affghanistan, the other by a similar epidemic at Kurnaul during two years.

The same may be said of H. M.'s 29th Foot, and the 2nd Bengal Fusiliers, the former having been in a sickly condition with a taint of scurvy for years before, and the latter

* Some of these figures are extracted from a communication by Colonel Sykes, read before the British Association for the Advancement of Science, and published in pamphlet form—others are from private and official records.

having been very sickly in Scinde. In 1847-48, the 29th had 33 deaths out of 382 cases of diseases of the stomach and bowels, and out of 25 deaths in the 2d Fusiliers, 13 were from this class of diseases.

Of late years, regiments in a less unhealthy state have been sent to the hills, and there has been very great improvement in the Barrack accommodation as well as in the conservancy department.

In 1850-51, H. M.'s 60th Rifles were stationed, the right wing at Kussowlie, the left at Subathoo: the average strength of the regiment was 1,002, and the deaths within the year only 14, of which however 13 were from bowel affections. At Kussowlie there were 220 cases, or 33.4 per cent. of average strength, with 9 deaths, and at Subathoo 74 admissions, or only 21.4 per cent., with 4 deaths, showing what has hitherto been rare in the history of these two stations, that the balance of salubrity was in favour of Subathoo. The admissions from diarrhœa were 221 with 2 deaths, but many more men were attacked, although not admitted into hospital. There were 22 admissions from chronic dysentery, of which 16 with 2 deaths occurred in the last quarter of the year, and chiefly in men who had suffered from repeated attacks of diarrhœa.

In 1851-52, the same regiment, with an average strength of 910 $\frac{3}{4}$ had of total admissions 892, deaths 36, of which 27 were from bowel complaints out of 252 admissions divided as follows; dysentery 35 cases and 9 deaths, diarrhœa 215 cases and 17 deaths against 221 cases with only 2 deaths in the previous year. On arrival at Jullunder there were in hospital 57 cases of bowel complaint, and out of the 36 deaths, 9 occurred there, but all from disease contracted in the hills. It will be observed that the actual admissions were less, but the mortality which in the first year had been only 1.39 per cent., to strength rose to 3.95 per cent., the disease from repeated relapses or from concealment of it, becoming much more intractable.

In 1850-51, H. M.'s 22nd Regt. occupied Dugshai: average strength 1,049, deaths 27, of which 7 were from dysentery, and 1 from diarrhœa: the total admissions from this class of diseases were under 200, and the diarrhœa was peculiarly mild.

In 1851-52, the second year of residence, the average strength is stated to be 1045, and the deaths at head-quarters 20, of which 3 were from dysentery out of 47 admissions, nearly all preceded by frequent attacks of diarrhœa,

and 3 from diarrhœa out of 199 admissions. During this year the regiment had fewer casualties, and fewer admissions into Hospital than in any year since its arrival in India. In 1851, during the cold season, it marched to Rawul Pindee, and for months after it had been there, it continued in a high state of health and efficiency, and without any excess of bowel complaints among the admissions into Hospital.

Of the prevalence of diarrhœa at Simla there are no statistical data, but it has long been matter of notoriety. In slang phrase, the disease is called "Simla trots," and few persons escape one or more attacks in the course of the season; of late years, however, it appears to have become much more general, and to have attracted more attention, in consequence of many visitors having neglected, or concealed the disease, and thereby experienced years of ill health.

The attacks are not confined to persons in broken down health, who have suffered from periodic fever, or other tropical diseases; on the contrary, residents in the prime of life and of sound constitution, have been very generally affected, and among these, examples of its proving fatal are not rare; so late as last year two melancholy cases came under my notice: in one the diarrhœa was aggravated by the fatigue of a dawk journey, and proved fatal in Calcutta by terminating in malignant scorbutic dysentery; in the other, there was only the wasting painless form of disease, and death took place on the passage to England.

3. *Causes.*—Of the various causes assigned, the first and most popular was the bad quality of the water: this however, has been disproved. The water from the springs on the north side of Kussowlie is very pure, while that on the south side is only impregnated with a trace of lime, but to a less degree than is found at many healthy stations in the plains. At Simla, in the hot season, the supply of water is scanty, and not of the best quality, but that is the time when diarrhœa is least common. During the rains the running streams are as pure as could be desired after the first few showers have washed out the water courses; besides, persons who were careful to use only boiled and filtered water did not escape the diarrhœa.

Both at Simla and Kussowlie, the trees have gained the repute of producing the disease, by reason of their promoting damp exhalations, and preventing the free circulation of air. But Subathoo and Dugshai are bare of trees, and yet experience no immunity from the prevailing endemic: I admit that in places the trees require thinning, in order

to admit light and air, and to keep down the thick jungle which at Simla especially, is, I believe, a source of noxious influence: it may be added that the results of experience are in favor of selecting sites, like that of Dugshai, clear of trees and jungle which promote humidity and afford materials for decomposition.

The best founded and most influential exciting causes are the cold moist atmosphere, and the great and sudden vicissitudes of temperature by which perspiration is checked, leading to internal congestion, languid, and impeded circulation in the liver and functional derangement of that organ. But these ungenial influences of temperature and moisture must have something superadded to them, to account satisfactorily for the inherent and peculiar liability of these localities to produce diarrhœa: the climate of Mussoorie is equally humid, but without the same tendency to diarrhœa, and this may be said also of Nainee Tal, Murree, and Darjeeling, the last being remarkably cold and cloudy, and the air long supersaturated with moisture. Other mountain ranges also possess a similar immunity, such as the Neilgherries and Mahableshwar.

There must, therefore, to account for its prevalence from year to year, be some cause other than the ordinary or essential climatic agencies, some limited morbid influence of a specific nature, and this appears to me to be partly malarious, partly scorbutic. We know that primary cases of intermittent fever are by no means uncommon at Simla and the neighbouring stations, and we meet with occasional cases of the worst form of typhoid remittent;* but notwithstanding these proofs of malaria, experience teaches us that in general it is not here powerful enough to excite periodic fever: it seems to ascend from the numerous deep ravines and water-courses which intersect these stations, but to be so diluted, or changed by the effect of elevation, cold, and moisture, as to cause bowel complaints instead, and this is exactly what occurs in some mountain ranges in other parts of the world, where we observe bad remittent fevers at the level of the sea, Intermittents at a higher level,

* In the season 1850, at Simla, I witnessed two cases of malignant typhoid remittent fever; in one of these, an officer on the general staff of the army, the disease proved fatal; in the other, an A. D. C. on the staff of the commander-in-chief, recovery took place after a protracted and dangerous illness: both these officers must have contracted the fever at Simla, or in its immediate neighbourhood, probably in crossing some low foul ravine.

bowel complaints higher still, and at the highest ulcers which appear as the feeblest result of malarious poisoning in depressing the vital powers.*

Of the essential nature of land scurvy, we are as yet ignorant, and like malaria it is known only by its effects; it is by no means always dependent upon the want of vegetables, and it may pervade the system without any manifest affection of the gums. In the Hills I suspect it is much more common than is generally supposed; many of the cases I have noticed were marked only by a cachectic state of body, by soreness of the tongue and œsophagus, or by pains in the thighs and long bones. When, however, we reflect on the debilitating influences of the scorbutic taint, and its tendency to complicate and aggravate all diseases in this climate, we may see sufficient reason for the peculiarly intractable and adynamic form of the bowel complaint with which it is associated, and how futile will be our efforts to cure in the midst of the local circumstances which are deteriorating the constitution, and the cold and damp which tend to induce internal congestions and relapse.

But the activity of these local contaminations has been greatly increased by the neglect of sanitary municipal measures, and I must here record my belief that at Simla the adventitious sources of disease in its neglected conservancy, are more powerful than the innate insalubrity of the site: particular parts of it, and even individual houses are noted for the unhealthiness of their situation; this sometimes depends on their vicinity to a bazaar, or to a deep and foul ravine, and to currents of air blowing over these. The same was observed in reference to some of the barracks at Subathoo and Kussowlie, when badly situated, crowded and exposed to the effluvia from lines of privies, the inmates were more generally attacked, relapses were more frequent, and the disease was of a more intractable form than among those less unfavourably situated, who, as it were, breathed an air malarious indeed, but not rendered highly so by exhalations of an extraneous and removable nature.

* The cognate character of these diseases was also remarked in China, and is noticed by Mr. Wilson in his "Medical Notes." In ships which lay at anchor at some distance from the shore, the miasma was received in a diluted form, and the seamen suffered from an inveterate species of ulcer obviously dependent on malarious taint in the blood.

I may notice also that an opinion has been gaining ground among medical officers in this Presidency, that the epidemic ophthalmia, which has of late years been the source of so much inefficiency and loss in European regiments, has its origin in the presence of a scorbutic diathesis among the men.

It is to be hoped that the municipal committee of Simla will do something for that overgrown, and hitherto ill regulated station, but I confess not to place much confidence in local irresponsible supervision: the coercive functions of Government are required to procure a strict observance of conservancy regulations, and without this power, the labours of the Committee will I fear be of small avail.

The conservancy of the military stations in the Hills is now excellently administered, and this no doubt has tended to the improvement of their character for salubrity. The night soil is daily removed and buried in pits: the supply of water by means of mules is abundant, and houses for ablution are among the other improvements to the barracks; there are also soldiers' gardens; and games, such as quoits and foot-ball, are encouraged.

I have dwelt on this head more fully in the hope of removing some erroneous impressions that are current, and to give expression to my own view, namely that there is, in this group of hills, a malarious atmospheric taint,* but so little powerful as scarcely to affect healthy persons, who are well housed, and well fed, and who avoid

* I may strengthen this line of argument by another proof drawn from the prevalence of a severe colic which attacks natives, chiefly the Dhobees of Simla, whose occupations lead them to visit the water-courses of the deep ravines in this group of hills. The disease is well described by Dr. Webb in his *Pathologica Indica*, and he ascribes it, correctly I believe, to intense miasmatic poisoning of the blood: we witness in some of these cases the most intense forms of abdominal congestion, a cold tongue, and clammy perspirations, as in the collapse of cholera.

The diarrhœa which attacked the army of Lord Keane on its advance to Candahar and Ghuznee, and the army of General Pollock in the Khyber Pass, was no doubt of malarious origin; there were there ravines, and the dry beds of mountain torrents in abundance, and the experience of the British army in Spain has proved how deadly are such localities to bivouac in.

Dr. R. H. Hunter, of the 2nd (Queen's Royals) remarks in his description of the disease (*vide* the Transactions of the Medical and Physical Society of Bombay) that it was worst on the march from Dadur to Kandahar, and that in the Bolan and Kojeh passes, it was complicated with low remittent fever: besides the obvious sources of malaria in both localities there were in addition at that time, exhalations from putrifying animal matter from which the stench was often quite sickening. He adds, "speaking generally, the disease was ushered in by a feeling of fulness or distension with griping, followed in most instances by sudden uncontrollable calls to stool; in some however preceded for a day or two by unusually light-colored motions, tending to laxness. During the next stage, as consistence became restored, the motions were again light colored, or as they expressed it, loose, and like those of a child, then dark-colored, and bilious, but convalescence often took place without this appearance. The gripings and purgings were always greatly aggravated in the cold of the morning. Indeed in addition to the numerous admissions in this disease during the month, it was no unusual thing between Kwettah and Khandar to see a fourth or even a third fall out to the rear during the first

undue exposure to the heat by day, or the cold by night; moreover, when such persons are attacked the disease is generally mild, and when early treated it is absolutely and easily curable. But, on the contrary, when the disease is neglected, or concealed, when men are sent in a broken down state of health, and are crowded, or ill-fed and reckless in their personal habits, we see a form of disease very different in the conditions of its development and fatality, and even when, on early application it is relieved, there is no perfect cure, the men long remaining feeble, and in a state of imperfect efficiency. This last description will apply to the regiments first sent to Kussowlie and Subathoo, and hence the discouraging results of these first experiments; the other may be taken as a picture of the experience and condition of those that have been lately stationed at Dugshai, with a result that as yet has been perfectly satisfactory.

4. *Symptoms*.—The Hill endemic may be well designated as a *Diarrhœa alba*,* passing into a *Diarrhœa cum cachexia*, or *cum anæmia* or into *Diarrhœa Hectica*, similar to that which prevails in jails in the plains, and is associated, or complicated with a taint of land scurvy.

It is always difficult to draw the line of demarcation between diarrhœa and dysentery, where the one terminates and the other commences, but I must observe that I have known the hill diarrhœa to persist for years, without a trace of dysentery, and with no organic disease of the liver, proving fatal by long continuance and emaciation alone. We may therefore, consider separately the symptoms of the diarrhœa, and those of the chronic and fatal form of flux which often supervenes upon it.

It has been already stated that the commencement of the rainy season is the period of greatest prevalence of this disease. At that time the air, from being dry and warm, becomes moist and cool, and from the hot steaming ravines and valleys heavy vapours ascend and envelope the stations. The nights are cold as well as damp, and exposure to the night air causes hepatic congestion, and functional derangement.

The attack is not generally preceded by nausea or griping, but there are dyspeptic symptoms, loss of relish for food,

halt. Many suffered very much who did not come to hospital, or if they did, not for many days after. The fever was *often preceded by the diarrhœa* for some days, and indeed I think in all the bad cases."

Dr. Hunter remarks that the water in these passes was pure and good.

* I prefer this term to *chylous*, or *milky*, or that used by Dr. Good, *gypseous*, or *chalky*. All depend upon deficiency and vitiation of the secretions from the liver.

much flatulence, and distension of stomach. The calls to stool are urgent and frequent, but there is no forcing; the stools are very fluid, and contain air bubbles, neither faintness or even a sense of weakness follows the discharges, however copious; on the contrary, ease and a feeling of comfort and satisfaction, are experienced from the expulsion of flatus, and the consequent relief to the distressing distension. The number of motions varies from 4 or 5 to a dozen in the course of the 24 hours. The patient views the disease as trivial; he continues at his ordinary occupations, and if an idle man, he makes no change in his round of gaieties. If going to a dinner party, or a ball, he fortifies himself by an astringent dose, but eats and drinks as may be his wont, and in this way he may go on for months, until he begins to droop, to look ill, and to lose flesh to a degree that generally attracts the notice of his friends, before it is remarked by himself; in fact, he can scarcely be convinced of the dangers of an ailment which causes him so little suffering, and interferes so little with his business pursuits or pleasures.

Such are the usual phenomena of the disease, but the varieties and modifications are numerous, as they may depend on season, locality, age, constitution, and previous disease.

In some seasons the disease is more prevalent, and more fatal than in others, these stations being liable to the same epidemic alternations as those in the plains, depending apparently on the fall of rain and general meteoric changes.

The most severe forms are to be met with at Kussowlie, the differences and peculiarities tending more to scorbutic complication.

Among children it is of mild character, and may continue long without apparently injuring their constitutions.

There is great natural susceptibility to attacks among persons of strumous habit, in whom the disease shows itself in an intractable form, even resisting early and prompt treatment, and our most powerful alterative remedy, change of climate: as to acquired susceptibility, we may mention all those circumstances which tend to impair the general health such as previous disease, especially of malarious origin, where the vital powers are depressed, and there is a taint of marsh poison in the blood, crowding in barracks, innutritious food, insufficient clothing, great exposure by day or by night, and the imprudent personal habits of soldiers: the temperate, however, suffer equally with the intemperate, but the mortality among these last is much higher.

In all cases there is arrest of the biliary secretion, and it may be pronounced that the disordered function of the liver is an essential characteristic of the disease: there is also simultaneous derangement of the functions of the skin, which is harsh and dry, and generally constricted from rapidity of evaporation in a rarefied atmosphere; and it would appear as if the inordinate action of the exhalent vessels of the bowels was partly vicarious with the cutaneous secretion: it is difficult to excite perspiration, the face is pale, and in the advanced stages wan and sallow, or of a pomegranate colour.

The depraved and diminished secretion of bile is indicated by the peculiar and almost constant character of the stools which are of a pale drab, or muddy grey colour, frothy and feculent: in the early stage often white, and very loose, afterwards becoming pultaceous and yeasty, of the character termed LIENTERIC. I have never noticed them dark-colored, and they rarely contain mucus, or serum, the products of inflammatory action: they are passed between daylight and breakfast time, and again as evening approaches; their odour is peculiar, and unnatural, but not offensive.

By far the most distressing symptom is the tumefaction and flatulent distension of the abdomen; this is always worst towards evening, and is only relieved by copious evacuations. The abnormal secretion of flatus seems dependent on the absence of the stimulus of healthy bile, and the uneasiness experienced arises from the extreme distension of the bowels, exciting the irritability of their muscular coat; it is necessary therefore to guard against mistaking this for the tenderness of subacute inflammation. When pain is established, we must view it as a symptom of threatened, or established organic lesion, the supervention of chronic dysentery being first indicated by sense of fulness and soreness over the Iliac-regions, a change in the character of the discharges, and some excitement in the circulation. This leads us to the character of the pulse, which in the stage of diarrhœa is weak and in general remarkably slow and indicative of the want of organic power: in the advanced stages this slowness increases as vital power diminishes, until 40 beats become a not unusual standard.

The state of the tongue and mouth is remarkable and characteristic. There is in a vast majority of cases an aphthous and congested condition of the lining membrane, and the irritation often extends to the œsophagus;* there

* In some cases this *erethism*, or *local hyperemic condition*, extends throughout the mucous membrane of the digestive canal.

are also superficial ulcerations, and deep indentations around the margin of the tongue, and the gums are congested, retracted, and bleed freely. Or the tongue may present a white appearance with streaks or chaps, and mere redness about the edges: in the latter stages it becomes shining, raw, and fissured, or dry and rough, especially in the centre; there is at length difficulty in swallowing, and as death approaches the power of utterance fails, the voice becoming feeble and thick.

We meet, however, with cases of many months standing, where the irritation of the bowels is not indicated by soreness and redness of the tongue; on the contrary, this organ is pale and whitish, not furred, but merely streaked, and the papillæ slightly erected about the edges, while the gums and the lining membrane of the mouth are perfectly anæmic. Such cases I have viewed as purely cachectic, while the others are generally indicative of the scorbutic taint: in both, however, the functions of assimilation and nutrition are seriously impaired, and in the countenance and gait of the patient there are indications of the serious constitutional disease within.

Progressive emaciation is another pervading characteristic of the disease, and is often our first warning of danger. It makes us justly suspicious of enlargement of the mesenteric glands, or of organic lesion of the mucous membrane and some of its follicles, and wherever it advances, we may confidently recommend a thorough change of climate as absolutely demanded. As the disease progresses, we notice that assimilation and nutrition, which in the early stage seemed only perverted, become at length nearly destroyed. The mind becomes weak, and the temper fretful, the emaciation is extreme, and organic and vital exhaustion is marked by œdema of the legs, and dropsy of the abdomen. But even these last symptoms of constitutional decay do not indicate a state altogether hopeless; a few of such cases rally, and ultimately recover by means of great care and total change of climate, although the subjects of them will suffer through life, from an enfeebled condition of the alimentary canal.

The last of the symptoms to be noticed is that of the appetite, which is often not much impaired; on the contrary, it may be keen with great craving for animal food and for many things which are most injurious: this capriciousness often continues to the last, and is a source of much vexation and anxiety to the physician.

Relapse is common, and easily induced; an error of diet, a change in the weather, as from dry to wet, will bring back and aggravate all the symptoms: it is almost needless to add that ardent spirits act as a poison, and often prove poisonous to soldiers who can procure them. But the tendency to relapse will continue in some regiments long after their return to the plains: the men have perhaps concealed the disease, and continue in the ranks until they are too weak to perform their duties. They have a sallow, earthy, and sunken complexion, pale lips, a dull, lack lustre eye, a tongue, morbidly red about the edges, feeble digestion, imperfect nutrition, and a feeble or slouching gait. They are in fact below the standard of health: the stools are not perhaps numerous, but pultaceous and feculent, yet wanting the natural bilious colour, and too bulky in proportion to the food. With increasing bodily weakness, we observe great irritability of temper, and mental despondency, languid circulation, listlessness, cold feet, and such like indications of the great reduction of organic and vital power.

In the diarrhœa which proved so fatal in China, there was noticed a similar pervading cachectic condition, with increasing attenuation and debility; and, when recovery did take place, such inroads were made upon the constitution, that the officer remained a valetudinarian for life, while the poor soldier soon perished from some other disease, to which his broken health made him doubly liable.*

5. *Pathology*.—In the post-mortem appearances there has not been found much that is pathologically instructive, but the following may be accepted as a faithful summary of the various structural changes that have been observed.

* The fatal consequences of exposure, privation, and fatigue were exemplified in a lamentable manner during the first occupation of Chusan, which subsequently, by ordinary precautionary measures, became the most healthy station in China. During nearly three years that I was stationed there with one of H. M.'s Regiments, the sickness and mortality averaged less than at most cantonments in the plains of India; the intermittent fevers were by no means obstinate, and the endemic diarrhœa was like that in the hills, almost always amenable to treatment, unless when the men neglected or concealed the disease.

Although the diarrhœa often followed as a sequela of the fever, that is, as a result of the congestions in the cold stage, yet it was very generally observed as a primary disease, and obviously of malarious origin. I experienced repeated attacks at Chusan, but had no ague till years afterwards; it left however a distressingly debilitated state of the digestive organs.

Mere diurnal changes of temperature could not be assigned as a cause of this *diarrhœa alba*, for, during its prevalence, the temperature was high and remarkably equable.

In some cases of the wasting painless diarrhœa there are no organic lesions to account for death; the bowels, like the body, are pale, blanched, and anæmic, or the coats of the intestines are strikingly atrophied, and in places diaphanous. This applies peculiarly to the small intestines, while there are leaden spots in the colon which is easily lacerated.

In other cases, the mesenteric glands, and the mucous follicles of the intestines are enlarged, and the calibre of the gut is narrowed in places, and its mucous membrane softened, pulpy, and hypertrophied, with serous exudation under it, or simply thickened, and in a red granular state,*

Whenever there have been dysenteric symptoms we generally find more extensive lesions in the colon. The ulcers are of every variety, superficial, and irregular, penetrating, sloughing, or in masses of a small miliary kind. The lower portion of the ileum is sometimes affected, and the rectum almost always deeply involved, thickened, softened, and at times in a state of sphacelus, breaking down in handling it.

When the patient has suffered much previously from periodic fever, then the disorganization of the colon especially at its commencement and termination, is very great, both mucous and muscular coats being destroyed, and the peritoneal covering presenting in these places inflamed patches.

In the diarrhœa cases, abscess of the liver is rare: in general this organ is small, pale and friable, especially in the anæmic cases, but where dysentery has been established, it is more generally congested, and the gall bladder filled with a green viscid bile. The spleen is generally small, and not diseased: the lungs pale and half collapsed: the heart small and flabby, and its walls attenuated.

In further illustration of the post-mortem appearances, I am able to add a few cases from the records of two of H. M.'s Regiments, which have recently completed their tour of residence in the hills.†

6. *Treatment.*—I will commence my remarks on treatment with one warning as a correct guide, and its importance should be impressed upon every one who visits these Hills. It is that the early and prompt application of remedies rarely fails to effect a cure in all recent cases—there being in connexion with this obscure disease no fact better ascer-

* Dr. R. H. Hunter, already quoted, remarks "Towards the end of the campaign, when these Khandar bowel complaints terminated fatally by chronic dysentery, there was *often little ulceration, but only a granular state of the lining membrane, like what occurs in chronic ophthalmia.*"

† We are obliged from want of space to omit these cases.

tained than its absolute curability when coming early under treatment; this is to be effected by speedy restoration of the biliary and cuticular secretions, with which object we commence by giving a dose of blue pill and Dover's powder at bed-time, to be followed in the morning by an ounce of castor-oil, with a few drops of laudanum. These simple measures, with a farinaceous diet, and confinement within doors for a few days, will in the generality of cases, be all that is necessary. If a relapse occurs, we must repeat the remedies, enjoining care in diet and habits, and keeping up an astringent action on the bowels, by occasional doses of Dover's powder and the Hydrargyrum cum creta, or what I prefer, the compound chalk powder, with a fourth or half a grain of morphia: opium, unless in combination with ipecacuanha, is objectionable, as it checks the secretion from the liver.

In obstinate cases, after unsuccessfully making trial of a great variety of drugs, I was led to trust almost solely to a combination of aromatics and astringents, concurrent with a strict attention to diet and clothing. The beneficial agency of this treatment I have tested in many severe cases, and with a result always mitigatory, and very often remedial. I do not wish to ascribe to the combination any exaggerated virtues, but I can affirm that it has often proved curative, after all other means had failed—that it is grateful to, and agrees with the stomach, and that the patient soon comes to like it, and to put faith in it.*

* It will suffice if I add here two or three examples of the forms in which I generally prescribed the aromatics and astringents.

R. Pulv : Rhei	..	..	..	5i.		
—— Cretæ p. p.						
—— Cinnam : Comp : a a.	..	..	..	5i.		
Spt. ammon : aromat.	..	..	..	5iss.		
Sol : Mur : Morphiæ.	..	..	..	5i.		
Mucilaginis,	..	..	..	5ss.		
Aquæ Cinnamon.	..	..	..	5v.	M.	Dosis 5i.
R. Pulv : Rhei.	..	..	..	grs. xxv.		
Pulv. cinnam : Comp.	..	..	..	5i.		
Confect : Aromat.	..	..	..	5ii.		
Tinct. opii.	..	..	..	5i.		
Extr : Taraxaci.	..	..	..	5ii.		
Spt. Ammon : Arom.	..	..	..	5iij		
Tincturæ kino.	..	..	..	5i.		
Syrupi Zingiberis.	..	..	..	5ss.		
Misturæ Cretæ.	..	..	..	5vi.	M.	Dosis 5i.

The doses and the proportions of the several ingredients are regulated according to the age and symptoms.

I have not used it where there was evidence of sub-acute inflammatory action, or morbid sensibility, but chiefly in cases where there appeared to be only relaxation, thinning, or softening of the mucous membrane without destructive organic lesion. The rhubarb is corrective, the chalk absorbing, the aromatics carminative and stimulating, the laudanum or morphia so small in quantity as not to check secretions, and the whole soothes and binds the bowels, bringing the stools to a consistent form, and thus materially aiding the nutritive function. But with this result it generally happens that there is still absence of bile, a sure sign that the disease however mitigated has not been eradicated. To give mercury would be most injurious, for in protracted cases the system is intolerant of its action, cachexia, scorbutic or malarious, is established, and to affect the gums will aggravate all the symptoms.

To promote and rectify the secretions of the liver in the advanced stage, we must therefore trust to taraxacum, nitro-muriatic acid, or minute doses of grey powder, aided by change of climate, and improvement in the general health. As an alterative I have used with much apparent good effect the Bromide of Potassium in solution, with some aromatic

R. Pulv : Rhei.	..	..	..	3ss.
Tinct. Opii.	..	..	..	3ii.
Pulv. Cretæ comp.	..	..	..	3iiiiss.
— Cinnam : Comp.	..	..	..	3ii.
Liquor Taraxaci.	..	..	..	3i.
Spt. ammon : aromat.	..	..	..	3ss.
Ol. carui.	..	..	..	3vi.
Infusi Calumbæ.	..	..	..	3xiii. M. Dosis 3i.

The two following formulæ I have often found useful—the one as an astringent and alterative tonic; the other as an alterative tonic.

R. Opii.	..	..	..	gr. ix.
Pulv. Ipecacuan.	..	..	..	gr. vi.
Hydrarg : c. creta.	..	..	..	gr. xii.
Quinæ Disulph.	..	..	..	gr. iv.
Ol. Anisi.	..	..	..	gr. iv. M. et div. in pill : No. vi. Sumat. i. omni. nocte.

R. Tincturæ humuli.				
— Zingiberis a a.	..	..	..	3ii.
Liquor. Taraxaci.	..	..	..	3ss.
Sodæ Bicarbon.	..	..	..	3ii.
Infus. Calumbæ.	..	..	..	3v. M.
Dosis—3ss ter quotidie.				

tincture, as that of cardamoms, or ginger; it seemed to be best suited for anæmic cases, where the mesenteric glands were enlarged, and it was exhibited simultaneously with the aromatic astringent mixture.

Cod-liver oil has failed in the trials I have made with it.

Where the scorbutic diathesis is marked, the nitric, or nitro-muriatic acid, with laudanum, in small doses, may be given at the same time with the aromatic mixture.

The Bael fruit is often efficacious, but as often again it will fail entirely.

Tannic, or gallic acid may also be tried, but I have no experience of their value.

The principal adjuvant remedies are the tepid bath, and friction with a rough towel or flesh brush over the whole body, morning and evening; these measures tend to excite the action of the skin, and to relieve the languid and impeded circulation in the liver.

Occasional cold water enemata may be used; flannel is to be worn, and a silk "patee" gives comfortable support to the bowels, and is an excellent protective agent: the temperature of the house, or Hospital should be moderately warm, and the comforts of the patient are to be studied as far as circumstances will permit.

Attention to diet is most important; the food should be light and unirritating, as sago, arrowroot, tapioca with or without milk, soft-boiled eggs, and light puddings, and the quantity is to be carefully regulated and restricted. When there is yielding of the disease, we may allow pish-pash, roast chicken, or even a mutton-chop once a day. Guard against morbid cravings, repletion acts as a poison, and occasions the most dangerous forms of relapse; the patient therefore is to be made fully aware of the advantages, as well as the absolute necessity of a strict attention to the dietetic rules which are laid down for his guidance. Port wine may be given, but it often disagrees, especially where the mucous membrane of the mouth, and œsophagus is in an irritable state.

There is after each relapse, such a diminished chance of successful treatment, that if a fair trial of the aromatic astringent mixture fails to produce a gradual and unequivocal yielding of the symptoms, we must then recommend the patient's removal to a less humid climate. This leads me to the consideration of the value and importance of change of air as a remedy in obstinate cases. It is sufficiently obvious how favourably removal from the malarious sphere

or adverse climatic agency will act on the disease, for as cold and moisture are conditions of its development, so a dry and equable temperature is necessary for its cure, by restoring the mutual balance of the cuticular, hepatic and alimentary secretions,—hence it happens that, at Simla and the adjacent stations, the difficulties in the way of successful treatment are almost insuperable, while merely sending the patient to the plains for a short time will alone in many cases suffice to effect a cure.

When, however, the disease has been neglected, or long concealed, the proneness to relapse will only be obviated by prolonged and thorough change of air. If the patient's strength is not much reduced, he may be recommended to visit Kunawur; after renovating there, if he gains in weight, and feels equal to the fatigue of the journey, he should proceed on to Cashmere, and a sojourn there of a few months will in all likelihood restore him to health.* But in many cases this change would be unsuitable and impracticable, and wherever the strength is much reduced, and there is *progressive loss of weight*, notwithstanding that the diarrhœa is kept in check by astringents, then the result is to be anxiously apprehended. Such persons are apt to get a chill followed by fever, with aggravation of the looseness; or dysentery may supervene, or the debility may proceed to such an extent, as to cause dropsy: the sole hope now rests in a return to Europe, and a prolonged

* During the rainy season of 1851, I was consulted in the case of an officer, who, from being a stout and unusually powerful man, was reduced to a state of great emaciation from obstinate chronic diarrhœa: he had been under the care of several medical officers, but not deriving the full benefit that he anticipated, he had given up all medicine, and was attempting to cure himself by strict dietetic regimen alone—when a mutual friend brought him to me. I examined him, and could detect no organic disease: the stools were of the characteristic white color, and there was great derangement of the assimilative and nutritive functions, with, I thought, incipient enlargement of the mesenteric glands: he told me that the mercurials which had been given to him aggravated all the symptoms, in fact, that they acted as poison. He was placed under the treatment with aromatic astringents, occasional minute doses of grey powder, and subsequently the bromide of potassium, with an aromatic tincture: the improvement was immediate and manifest, and continued satisfactory, being marked first by more perfect digestion, and greater consistency of the evacuations, and then by progressive increase of weight, he passed safely through the rainy season, marched during the cold weather, and returned to Simla in the following spring. On the approach of the rains, however, he was again attacked, when he at once and most wisely, proceeded to Chenée in Kunawur: a short residence there restored him so much, that he was able to prosecute his journey through the mountain tracks to Cashmere, and after a sojourn there, he rejoined his appointment in comparatively robust health, having, as he wrote to me, enjoyed every foot of the way.

residence there—change of scene, the prospect of home, the salubrity, equability and softness of the ocean atmosphere, all aid the medicinal and dietetic measures, and although the constitution may never entirely recover the shock, still a moderate measure of health may be the reward of a strict adherence to this advice.

The change to the Cape or to Australia is not always sufficient for protracted cases, the constitution does not rally sufficiently, and many on their return to India have again broken down in health, and been obliged ultimately to proceed to Europe.* It may be added also that during the cold and humid winter of the Cape, the invalid is constrained to remain much within doors, or if he ventures out it is at the risk of relapse; he can rarely take the moderate exercise that his strength will bear, and he is denied that free access to the open air which is always so conducive to health, and is the best tonic in anæmic cases.

The climate of Van Dieman's Land is, I believe, the most suitable of any within the charter limits.

For soldiers the only change at present practicable—is to the plains, and if those who suffer frequent relapses were invariably sent there, the saving of life would doubtless be considerable.

* The following brief summary of a very interesting case will serve to illustrate this point:— came under my care with chronic Hill diarrhœa in November, 1851; he had been 5 months ill at Simla, having entirely neglected the disease—he said it was only "Trots," and that it kept his head clear, that he had often had the same ailment before, and that it always became cured spontaneously on his returning to the plains: on the present occasion, however, the change seemed to aggravate the symptoms, the heat of the day and the cold during night being so great in tents.

He had lost much flesh, and was quite anæmic: the stools were loose, clay-coloured and feculent, but there was no evidence of organic disease. I put him under the usual treatment, which had an immediate effect in restraining the looseness, but there was no healthy action of the liver. A slight imprudence in diet brought on dysenteric symptoms, which were chiefly subdued by ipecacuanha, with small doses of opium and blue pill and occasional aperient draughts consisting of a few grains of Rhubarb and magnesia: During the dysenteric excitement *the liver acted freely*, but as soon as the dysentery was cured, the characteristic white stools again appeared. The diarrhœa was for months kept completely in check—the stools were well formed, and occasionally showed traces of bile, but the constitution had received too severe a shock—there was no satisfactory improvement—on the contrary there was gradual and progressive loss of flesh, notwithstanding the use of cod-liver oil, and other means to strengthen the system: I consequently urged an immediate return to Europe; circumstances obliged the patient to select a change within the Charter limits, and the result has been so disappointing that in all probability he will yet be compelled to proceed home. I might add that this officer was in the prime of life, and had enjoyed almost uninterrupted good health until he was attacked with this diarrhœa: he had never suffered from periodic fever.

HILL DYSENTERY.

My remarks under this head must necessarily be brief. Considering the almost European character of the Hill climate, one is surprised at the adynamic features of the prevailing dysentery, and its proneness even in healthy subjects, to degenerate into ulceration and the complicated sufferings of chronic flux.

The system seems from the first intolerant of active measures, and the symptoms in general do not indicate their necessity.

The dysentery is not, like the diarrhœa, always to be checked, and in most cases cured by the prompt application of judicious means, even in primary and uncomplicated cases when the constitution is sound; how much less then when the general health is impaired, and there is either a scorbutic, or malarious taint in the blood.

Regarding the treatment, I wish to notice prominently that the system is intolerant of mercury, and the measure and manner of its employment must be carefully regulated: as a general rule, it should not be given but in small alterative doses in the earliest stage, as in the form of Twining's pills: when there is ulceration, or other organic disease it only irritates and exhausts the patient; and when there is a scorbutic taint it is as dangerous as in spleen disease.

When diarrhœa has long preceded the attack, there is so great reduction of constitutional vigour that depletory measures must be very cautiously used, otherwise they may only hasten on the ulcerative stage.

The application of a few leeches is often of advantage, but we must guard against mistaking for inflammation that which is far more common, namely irritation or morbid sensibility.

No one remedy has been found much superior to another: experience is in favour of sugar of lead and opium, and in the very chronic cases, with frothy feculent stools, sulphate of copper has been found of most advantage. Large enemata, medicated and simple, often do good, and the best palliative is the small opiate enema at bed-time.

Sometimes even after ulceration of the bowels is established, we may, by a well-judged selection and use of tonics with alteratives and astringents, strict regulation of the diet, and attention to the comforts of the patient, effect a cure; but the results in most chronic cases are grievously dis-

appointing, and the fatigue of moving a dysenteric patient for change of air (unless when he can travel by water,) will in most cases only increase the suffering and hasten on the fatal termination.

In review of the opinions just expressed, I will conclude by observing that in chronic Hill diarrhœa the pathological process seems to be, first internal abdominal congestion,* suspended function of, and vitiated secretion from the liver, leading to irritation of the bowels, and disordered assimilation and nutrition. This may advance steadily till nutrition is destroyed, the blood becomes watery, but not broken down, and the patient dies of inanition, of mesenteric phthisis in fact, organic and vital power being exhausted rather than destroyed; the post-mortem examinations disclosing no notable organic injury, or little else than general emaciation of the tissues, or enlargement of the mesenteric glands, and intestinal follicles.

Or this slow wasting process may be interrupted, and the rapidity as well as the gravity of the disease increased by excitation of dysenteric symptoms, either from some sudden and adverse atmospheric change, or some gross error in diet: when there is simply the cachectic or anæmic condition with the diarrhœa, then the superinduced dysentery is marked by discharges of mucus and blood, there is pain on pressure over the Iliac fossæ, difficult micturition from affection of the rectum, more or less tenesmus, and the post-mortem examinations disclose all the ordinary lesions of subacute dysentery.

When however, there is the scorbutic diathesis as a complication, then the dysenteric symptoms are still more asthenic; there is no straining, or pain, but from flatulent distension; the motions are almost invariably clayey, pul-taceous and yeasty, and in the last stage a dirty water, with shreds floating in it; the blood is not only poor as in anæmia, but it seems to be disintegrated, the countenance is muddy and tinged yellow, as if from broken down blood; there are perhaps petechiæ, and affection of the gums and mouth, an intensely foul breath, great thirst and dryness

* I view this congestion as caused rather by local aerial contamination than as an effect of a cold and rarefied atmosphere, for the "white diarrhœa" is almost entirely confined to the Simla group of Hills—neither Darjeeling, Landour, Murree, Mabhleshwur, nor the Neilgherries, all equally elevated and cold, have—as has been already observed, any such bad reputation, and they are also free from the other forms of malarious disease, which are found in Simla—namely Hill colic, and periodic fevers.

of throat, while in addition to the variety of lesions already noted, we find after death, petechial spots in the large and small intestines.

The above successions and combinations are often well marked, and sometimes they alternate with paroxysms of intermittent fever, a complication less serious indeed, but often presenting like the others, a field of practice equally hopeless.

I may here incidentally notice a chronic form of diarrhœa which occurs in the plains, resisting every remedy but change of air; and singularly enough, this disease is often in its earlier stages entirely cured by a few months' residence in the Hills. I have noted such cases, and the improvement was very marked when the weather became cool after the rains set in.

There is a distinction that is practically important between this tedious affection and that prevalent in the Hills, for the former seems to arise from long-continued excited action of the liver, with irritation and relaxation of the exhalent vessels of the bowels, being the joint action of high temperature and a too stimulating diet, and hence the salutary effects of removal to a mountain residence. The physiological effects of the change appear to be that the diminution of temperature relieves the liver, aids digestion, and gives tone to a frame enervated by long residence in the plains; for all such cases, the climate of Kunawar is admirably suited. But I must add that it is by no means uncommon to meet with cases of protracted diarrhœa in the plains of malarious origin, associated with a scorbutic taint:* The symptoms are similar to those described as characteristic of the scorbutic diarrhœa and dysentery in the Hills: the same languor of body and mind, the peculiar clay-coloured, frothy and pul-taceous motions, and *progressive emaciation*. The Hill climate proves hurtful to such cases; the cold and humid air aggravating the internal congestions in which they originate, whether as the sequelæ of intermittent fever, or other diseases.

Of the wide diffusion of land scurvy in this group of hills there is abundant evidence: it is not however always

* The anæmic condition often passes into the scorbutic. I first observed this in China among patients with chronic diarrhœa, who had been long under treatment and subject to the confinement and uniform diet of an Hospital. As scorbutic rheumatism is cured by lime-juice, so do we find its salutary effects in other diseases associated with scurvy, hence, I believe, the numerous cures we hear of from what is called a *Course of Grapes* at the Cape, or in Egypt, among officers from India who have proceeded there labouring under chronic diarrhœa.

associated with diarrhœa; on the contrary, we often find that the aphthous ulceration of the mouth is greatest when the bowels are most confined: cases are not rare where, in addition to the wasting and marked lassitude of body and mind, there is frequent bleeding from the spongy gums, the teeth loosen and drop out, and there are gangrenous ulcers about the mouth and fauces, and petechial spots on the legs.

I witnessed no evidence of this scorbutic affection among the Hill people.

Whatever may be its nature, it is greatly aggravated by crowding, want of exercise, humidity in excess, and habitual uniformity in diet,—depressing influences, which will of course aid the operation of a local miasm. Something similar is observed in our Jails in the plains, where there are, in addition, the depressing effects of confinement, often hopelessly protracted, and we have a wasting diarrhœa “the diarrhœa hectica,” or white flux,”—very similar to the scorbutic diarrhœa of the Hills, and even more fatal.

7. *Conclusion.*—To obviate any tendency the preceding remarks may have to depreciate in the mind of the reader the sanatory advantages of a mountain residence, I add the following returns, to show that the results, in so far as regards the saving of life, are not problematical, but have been real and important.

No. 1.
Return of the Sickness and Mortality in Her Majesty's 29th Regiment for Six Years.

Years.	1842-43. 18 Months only.	1843-44.	1844-45.	1845-46.	1846-47.	1847-48.
Stations.	Chinsurah. The March to Ghazepore.	Ghazepore.	Ghazepore. The March to Meerut.	Meerut. Army of the Sutledg.	Kussowlee.	Kussowlee.
Mean daily strength,	1019	921	930	886.2	782	928.7
Total admissions,	1637	1657	2475	1792	807	910
Total deaths,	101	83	144	124	44	41
Mean daily sick,	72.5	70.3	137	97.9	59.5	59.7
„ per cent admitted,	160.6	180	266	202.2	103.7	97.9
„ died,	9.9	9.	15.48	13.992	5.62	4.4
„ constantly sick,	7.1	7.6	14.7	11.	7.6	6.42
Mean duration of each attack,	10.7	15.5	20.2	19.94	27.	24.
Average sick time each soldier,	17.3	28.	53.8	40.33	27.8	23.59

Continued in next page.

Years,	1842-43.		1843-44.		1844-45.		1845-46.		1846-47.		1847-48.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
By Fever,	369	9	302	16	1337	85	506	16	81	5	154	2
" Eruptive Fever, ..	0	0	0	0	0	0	1	0	2	2	2	0
" Diseases of the Lungs, ..	99	2	68	5	87	7	38	5	41	1	43	0
" " Liver, ..	9	1	52	3	47	3	28	1	39	5	31	0
" Stomach and Bowels, ..	490	24	381	11	343	13	240	6	293	20	365	33
" Cholera Asiatica, ..	112	63	40	26	76	32	69	41	0	0	2	1
" Diseases of the Brain, ..	13	1	40	22	18	2	11	2	24	5	9	3
Dropsies,	0	0	1	0	1	1	1	0	3	2	2	1
Rheumatic Affections, ..	45	0	72	0	22	0	29	0	12	0	23	0
Venereal,	215	0	347	0	218	1	242	0	79	0	43	0
Abscesses and Ulcers, ..	115	1	88	0	86	0	61	0	52	0	63	0
Wounds and Injuries, ..	33	0	34	0	59	0	372	53	72	2	51	1
Punished,	5	0	8	0	6	0	5	0	11	0	4	0
Diseases of the Eye, ..	32	0	58	0	109	0	129	0	48	0	81	0
" " Skin, ..	12	0	12	0	4	0	6	0	6	0	2	0
All other diseases, ..	88	0	54	0	62	0	54	0	53	1	35	0
Total,	1637	101	1657	83	2475	144	1792	124	807	44	910	41

No. 2.

Return of Admissions and Deaths in Her Majesty's 60th Regiment for Six Years.

Station.	Year.	Admissions.	Deaths.	REMARKS.
Kurrachee,	1846-47	1300	121	The Cholera Epidemic.
Ditto,	1847-48	1136	23	Ditto, ditto.
Ditto and Punjaub,	1848-49	1388	32	Ditto, ditto.
Peshawur,	1849-50	2935	55	Ditto, ditto.
Hills,	1850-51	1776	14	13 of which from bowel complaint.
Ditto,	1851-52	892	36	27 from ditto.

No. 3.

Return of Casualties for Five Years in Her Majesty's 22nd Regiment from Fevers, Bowel Complaints, Hepatic and Pulmonic Affections.

Years.	Names of Station.	Causes Malarious or not.	Fevers.	Dysentery.	Diarrhœa.	Hepatic. Affections.	Pulmonic Affections.	Total.
1847-48	Poona,		5	10	1	1	1	18
1848-49	{ From Bombay to Kur- rachee,	In Bombay strongly malarious, in the other stations probably tropical heat as much as malaria,	7	27	0	5	0	39
1849-50	{ Bombay, Kurrachee & March to Dugshai, ..		7	35	2	15	1	60
1850-51	Dugshai,		1	7	1	4	2	15
1851-52	Dugshai,		2	3	3	4	3	15

No. 4.

*Monthly Abstract of Admissions and Deaths in Her Majesty's 22nd Regiment for the year ending 31st March, 1848.**
Station Poona.

Months.	Total Admitted.	Total Died.	Total Proportion.	Thermo- meter.		Winds.	REMARKS.
April, ..	204	4	1 in 51	101	86	N. E. and W.	Temperature very high during the day; on the 19th, 20th and 21st, heavy rain.
May, ..	205	4	1 in 51½	96	86	Westerly, ..	Temperature at mid-day very high, with hot Winds from West, on the evening of the 21st, 22nd and 23rd, severe thunder storms with lightning, followed by hail and rain.
June, ..	185	1	1 in 185	89	79	S. W. ..	Climate exceedingly pleasant. The winds from the South-West blowing steadily during the day.
July, ..	225	2	1 in 112½	90	81	S. W. ..	Climate pleasant from continued S. W. monsoon breezes.
August, ..	180	0	0 0 0	86	79	S. W. ..	Cool and pleasant, occasionally light rain latter part of the month, days hotter; the monsoon breeze occasionally felt.
September, ..	138	2	1 in 65	89	78	Westerly, ..	Hot and sultry during the day, thunder and lightning but little rain, heavy dews and fogs.
October, ..	83	2	1 in 41½	94	78	Easterly, ..	Rain on the 1st and 2nd of the month, after which cold weather, heavy dews and fogs.
November, ..	113	3	1 in 37½	91	72	E. and N. E.	Nights and mornings cold, sun rays powerful; heavy rain on the 23d.
December, ..	91	0	0 0 0	82	66	N. E. ..	Air dry, mornings and evenings cold, sky clear and cloudless.
January, ..	180	1	1 in 180	89	71	E. N. E. W.	Sky clear during the 1st half of this month; mid-day sun's rays powerful.
February, ..	174	1	1 in 174	95	74	W. and N. W.	Morning during the 1st quarter of the month clear and cool, latterly cloudy; oppressive on the evening of the 26th instant.
March, ..	165	3	1 in 55	99	78	Westerly, ..	Thunder and lightning to Southward.
Total, ..	1935	+ 23	Average,	91.75	77.16	62.66	Annual average strength 958½, average daily sick, 78½.

* The quantity of rain was not registered in the above year; in 1842, it amounted to 19 inches, which as I have already alleged, I consider somewhat below the average of the year.

† 4 Men died out of Hospital this year.

No. 4.—(Continued.)
Monthly Abstract of Adms. & Deaths in H. M.'s 22nd Regt. for the year ending 21st March, 1851. Station Dugshai.

Months.	Total Admitted.	Total Died.	Total Proportion.	Thermometer			Rain Inches.	Winds.	Annual average strength 1049. Average daily sick, 69.095.
April, ..	170	2	1 in 85	Max.	Med	Min.	..	Westerly,	Mornings and evenings cool; hot during the day.
May, ..	171	0	0 0 0	75	70	65	..	N. W. ..	2 Showers in early part of month, latter part hot and sultry.
June, ..	176	4	1 in 44	76 $\frac{22}{30}$	70 $\frac{7}{30}$	63 $\frac{16}{30}$	..	Ditto, ..	Hot and sultry with frequent thunderstorms, hail showers, &c.
July, ..	155	0	0 0 0	73 $\frac{4}{31}$	69 $\frac{9}{31}$	64 $\frac{19}{31}$	9 $\frac{1}{2}$	S. Easterly,	Violent thunder-storms in beginning; heavy rain in end of month.
August, ..	135	4	1 in 33 $\frac{3}{4}$	68	66 $\frac{5}{31}$	65	24 $\frac{1}{2}$	N. W. ..	Heavy rains; weather cool and pleasant.
September,	118	3	1 in 39 $\frac{1}{3}$	68 $\frac{25}{30}$	68 $\frac{6}{30}$	66 $\frac{6}{30}$	2 $\frac{3}{12}$	W. N. W.	Heavy showers with thunder; morning and evening cool.
October, ..	122	3	1 in 40 $\frac{2}{3}$	65	62	59	0 $\frac{1}{12}$	Easterly & Westerly,	Dense foggy weather, passing showers; morning cool.
November,	113	2	1 in 56 $\frac{1}{2}$	59 $\frac{24}{30}$	57 $\frac{24}{30}$	55	1 $\frac{1}{4}$	Easterly, ..	Clear dry weather.
December,	121	1	1 in 21	54 $\frac{29}{31}$	52 $\frac{28}{31}$	51 $\frac{14}{31}$	1 $\frac{1}{4}$	E. & S. E.	Cold and frosty in morning; heavy rain in end of month.
January, ..	84	1	1 in 84	44 $\frac{22}{31}$	43 $\frac{12}{31}$	41 $\frac{5}{31}$	0 $\frac{3}{12}$	Easterly, ..	Heavy fall of snow on 10th, snow on ground till end of month.
February,	93	1	1 in 93	46 $\frac{22}{28}$	45 $\frac{17}{28}$	43 $\frac{8}{28}$	2 $\frac{1}{4}$	Ditto, ..	Weather unsettled and variable.
March, ..	0	0	0	0	0	0	0	.. ..	Fine clear cold weather; rain on 3 days.
Total, ..	1564	* 21	1 in 74	476.63	60.72	56.99	43 $\frac{7}{12}$		

* Six men died out of Hospital this year.

The return No. 1. shows that adverse as were the circumstances of H. M.'s 29th Regiment, as regarded its state of health on arriving in the Hills, and its accommodation there, still the mortality was reduced in the first year to nearly one-third of what it had been during the two previous years in the plains, and in the 2d year it became still further reduced, amounting to scarcely more than one half of what it had been during the most favorable year, from the time of the arrival of the regiment in India.

By the return No 2. of Her Majesty's 60th, the comparison of results is not so decidedly favorable, yet the improvement in the first year of residence in the hills is remarkable and gratifying, so is the diminution of the admissions, especially as regards periodic fever, in the second year, but with a singular and lamentable increase of mortality arising probably from concealed relapses of diarrhœa passing into hopeless chronic flux.

The return No. 3 shows results that are remarkably favourable to the climate of Dugshai, even as regards the mortality from bowel complaints; and I have added the return No. 4, to prove that this new station will bear comparison with Poona, reputed to be one of the healthiest, if not the most healthy cantonment in India.

It has been already remarked that children, although they suffer from Hill Diarrhœa, experience a singular immunity from its dangers—it may go on for a long time apparently not injuring their constitutions, and rarely running into Dysentery; they look rosy, and are stout and lively, although their stools are of a chalky whiteness.

So far as my own observations extend, the Hill climate is very conducive to the health of children, and I believe that this fully accords with the experience of others.

I may here notice the success of that noble institution, the Lawrence Asylum, and I can offer no better proofs of the healthiness of the site at Sunawur, and of the admirable internal economy of the institution, than are afforded by the following extract and returns from the last published report of its able and humane Principal and Secretary.

Health of Children.

“The health of the children during the past year has been unprecedented in any former period. It is of course impossible to account for the great difference which sometimes is found to exist in the health of the same community at different periods, but it is not unreasonable to believe, that in

the case of the Asylum, the cautionary means employed may have tended to this desirable result. Boarded floors, warm covering for the feet, the seclusion of the children in inclement weather, attention to ventilation and diet, improved intellectual status and physical constitution, and prompt medical care, all may have, more or less, had their share. But to the thoroughly English climate of Sunawur must be accorded a chief place among the causes contributing to health. Sheltered on all sides by higher ranges, yet open to the breeze from various gorges in the surrounding hills; its climate is a happy medium between the winter cold of Simla and Kusowlee, and the summer heat of Subathoo, whilst in a most important point, it has the advantage of most Hill stations, that of an abundant supply of the finest water. On the whole, it would perhaps have been impossible to have selected a locality better adapted to the purpose in view, the raising a population, thoroughly English, in habits, in physical constitution, and mental vigour.

“Since the first commencement of the Institution, in April 1847, a period of 5 years and 9 months, in which the annual average number of children maintained has been 106; 4 deaths only have occurred. Of these, one child, a girl, died of consumption after one month’s residence; she having arrived in a dying state. The second, a boy, died of quinsey, caught on his way up, on the third day after arrival. The third, a girl, died in a fit of epilepsy, in the first month of residence; her mother having died of the same disease, and the fourth, a boy, died of hooping cough, acting upon a mal-formed chest. This last is, in truth, the *only* case, in which death can be said to have ensued from disease contracted in the Asylum; giving an annual average of deaths to strength of .0015. The general appearance of the children is fully equal to that of well-reared children in our healthiest rural districts in England.

“It was at one time supposed, that children of mixed parentage would not be likely to derive the same benefit from a cold and bracing climate, which might be expected in the case of pure Europeans. But this opinion has proved to be erroneous. This class is found to improve in muscular strength and bodily and mental activity equally with their European compeers, and it is confidently hoped that from their amalgamation with these last in the Institution, they will, in process of time lose all traces of native habits and feeling, and, that at no distant date, a race of Anglo-Indians will issue from the Himalayan Hills who shall prefer claims

to the confidence and respect of the Indian public, before which existing prejudices against this numerous and important class will gradually disappear.

“ The Medical returns for the years 1850, 1851, and 1852, are given below ; a comparison will shew the improvement which has taken place.

*Annual Medical Reports of the Lawrence Asylum,
for the year 1850.*

SEX.	Fevers.		Eruptive Fevers.		Bowel Complaint.		Colds.		Epilepsy.		Chronic Scrofula.		Ophthalmia.		Ringworm.		Chilblain & Whitlow.		Fracture.	
	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.
Boys,	56	4	3	1	36	6	25	0	0	1	0	1	44	0	20	7	9	1	0	0
Girls,	49	6	4	0	16	0	30	0	0	0	0	0	68	3	19	10	13	0	0	1
Total,	105	10	7	1	52	6	55	0	0	1	0	1	112	3	39	17	22	1	0	1

Shewing ratio of sick to strength of 4. 11.

For the year 1851.

SEX.	Fevers.		Eruptive Fevers.		Hooping Cough.		Colds.		Bowel Complaint.		Ophthalmia.		Chronic Scrofula.		Epilepsy.		Scorbutus.		Chilblains.	
	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.	Mild.	Severe.
Boys,	23	1	3	0	38	7	6	0	13	1	87	3	0	2	3	0	2	0	6	1
Girls,	16	2	2	0	21	5	8	0	12	1	27	1	0	0	0	0	3	0	4	1
Total,	39	3	5	0	59	12	14	0	25	2	114	4	0	2	3	0	5	0	10	2

Shewing a ratio of sick to strength of 5. 95.

For the year 1852.

Months.		SPECIFIC DISEASES.											Remaining on 1st Janry. 1852.	Admitted since.	Total.	Discharged.	Died.	Remaining 31st Decr., 1852.	Daily average No. of sick.	Ratio of Sick to strength.	Ratio of Deaths to strength.	Ratio of Deaths to treated.
		Accidents (Slight.)	Chilblains.	Debility.	Diarrhoea.	Dysentery.	Epilepsia.	Fever (Tertian Intermitt.)	Influenza and Colds.	Ophthalmia.	Scrofula.	Scurvy.										
Janry.	B.	1	1	"	1	"	"	"	1	1	1	"	1	6	6	"	"	1.03	1.27	"	"	
	G.	"	1	"	"	"	"	"	"	"	"	"	"	1	1	"	"	0.48	0.80	"	"	
Febry.	B.	"	"	"	"	"	"	"	"	2	"	"	"	2	3	"	"	0.85	0.96	"	"	
	G.	"	"	"	"	"	"	"	"	2	"	"	"	2	"	"	"	0.53	0.82	"	"	
March.	B.	"	"	2	1	"	1	"	"	"	"	"	4	3	3	"	"	7.25	1.5	"	"	
	G.	"	"	"	"	1	"	1	"	"	"	1	3	3	"	"	"	0.80	1.25	"	"	
April.	B.	"	"	"	2	"	"	3	1	"	1	"	7	6	"	"	"	1.63	1.85	"	"	
	G.	"	"	2	1	"	1	"	1	"	1	"	7	8	"	"	"	0.96	1.50	"	"	
May.	B.	"	"	"	3	1	1	"	1	"	"	"	6	7	"	"	"	1.97	2.23	"	"	
	G.	"	"	"	1	"	2	"	"	"	"	"	3	3	"	"	"	0.61	0.95	"	"	
June.	B.	1	"	2	1	1	"	1	4	"	"	"	10	7	"	"	"	2.23	2.84	"	"	
	G.	"	"	2	1	"	1	"	2	"	"	1	7	8	"	"	"	0.80	8.25	"	"	
July.	B.	"	"	1	5	"	"	3	1	"	"	"	10	9	"	"	"	4.68	3.17	"	"	
	G.	"	"	2	1	"	"	2	"	1	"	"	6	2	1	"	"	1.90	0.37	0.13	0.16	
Aug.	B.	"	"	1	3	3	"	1	"	"	"	"	8	11	"	"	"	4.35	3.9	"	"	
	G.	"	"	"	"	"	"	1	"	"	"	"	1	3	"	"	"	1.0	0.17	"	"	
Sept.	B.	"	"	"	3	"	"	1	1	"	"	"	5	5	"	"	"	2.76	1.63	"	"	
	G.	"	"	"	"	"	"	1	"	"	"	1	2	2	"	"	"	1.17	0.16	"	"	
Octbr.	B.	"	"	1	2	"	"	2	5	"	"	1	11	10	"	"	"	4.0	2.40	"	"	
	G.	1	"	"	2	"	"	1	2	"	"	"	6	5	"	"	"	1.35	1.87	"	"	
Novr.	B.	1	"	"	2	1	"	2	"	"	"	"	6	5	"	"	"	2.56	2.48	"	"	
	G.	"	"	1	3	"	"	1	"	"	"	1	6	6	"	"	"	2.27	3.06	"	"	
Decr.	B.	1	"	"	1	"	1	"	"	"	"	"	3	4	"	3	"	2.74	1.27	"	"	
	G.	"	"	"	1	"	"	1	1	"	"	"	3	1	1	3	"	0.31	0.55	"	"	
Total	..	4	1	7	24	6	2	11	10	4	1	2	1	78	79	76	3	2.50	2.12	"	"	
		1	1	7	10	1	2	10	0	4	"	5	"	17	47	43	1	1.3	0.90	0.13	0.16	

Shewing an average of sick to strength of 3. 02.

It ought further to be more particularly noticed that no healthy corps has yet been sent to any of the Hill stations; on the contrary almost all the regiments were in an inefficient condition,—the constitutions of the men being more or less broken down, or tainted with malaria, and numbers of them suffering from intermittent fever, and its sequelæ, enlarged spleen, and liver. And we know with what unequal force a morbid atmosphere will affect a body of men so predisposed and one comparatively healthy, located there rather to maintain health than to renovate it; doubtless, therefore, with regiments in an efficient condition, the saving of life and constitution will show a proportional increase, as in H. M.'s 22d Regiment, which was comparatively healthy when it arrived at Dugshai.

The real auxiliary agency of the Hill climate in states of disease has yet to be determined: the best established facts are the diminution in the admissions from fever, the general mildness of type, and the diminished mortality compared with what occurs in the plains.

It is well known that the results of the various convalescent depôts have been very disappointing: my own impression is that, to render the sanatory experiment completely successful, we must advance further into the interior of the Himalayas; and instead of confining the stations to the mountain ranges that border on the plains, where the climate and vegetation have much of a tropical character, we must advance beyond the influence of the periodic rains to the vicinity of the snowy ranges, where we possess a climate as bracing and as healthy as that of Switzerland, with a soil equally productive, and scenery equally grand. At a distance from Simla of less than 100 miles in a direct line, and only 140 miles by the old route, we find in the interior of Kunawar, elevated and temperate slopes on some of the vast mountain ranges which skirt the right bank of the Sutledge, and these sheltered and comparatively fertile spots are now being made easily accessible by means of the new Hindoostan and Thibet road: instead of an atmosphere supersaturated with moisture, and gloomy and depressing, we have here throughout the whole hot and rainy season of the plains, a climate dry, elastic, and invigorating; the sky is generally of a clear azure colour, and when mists arise they are attracted by the lofty snow-clad peaks and rarely descend into the valleys: the showers of rain are few and gentle, and besides this almost complete absence of humidity there is no evi-

dence of miasmal contamination.* The climate is powerfully tonic, appetite and digestion are improved, the languid pulse increases in force, the tone of the mind is restored, and there is a buoyancy and elevation of spirits, and a lightness and freedom about the chest, which we rarely feel in the plains: instead of the slow and uncertain convalescence at Simla, where we experience all the disadvantages of humidity in excess, there is immediate and manifest relief from the change; we are stimulated to bodily exercise, and so dry is the climate, and so modified is the temperature by the proximity of the snowy ranges, that we may expose ourselves both by day or by night with impunity; even the shade of a tree forms a cool retreat, and most travellers have no other protection than a small flimsy tent which when rolled up does not form a cooly's load.

In fact it were difficult to find a climate more congenial to the feelings, or more calculated to restore the invalid, and as yet the results of experience fully warrant the warmest eulogy of it; for cases of chronic bowel complaint, and that large class of rheumatic and syphilitic affections, which is rarely benefited, and often aggravated by residence at our present Hill sanatoria, it is admirably suited,† so also with cachectic subjects, and those suffering from periodic fever and its sequelæ: the only exceptional cases would be diseases of the Heart, and a few affections of the Lungs where the stimulus of a rarified atmosphere is injurious; but all such cases are unfit for a mountain climate, and they ought never to be sent to the Hills.

I must add however, that Kunawar is not adapted for winter residence, the cold is far too severe and penetrating, and the country is then unapproachable from the roads being blocked up with snow.

* In 1849 I suffered at Simla from repeated attacks of intermittent fever, and also from the endemic of the place; next year at Chenée in Kunawur I had, although thus predisposed to both diseases, no attack of either: I found that the fresh grapes had a decidedly astringent and alterative effect on the system: I may add that on the summit of the same mountain, on which these grapes are grown, there is a perpetual supply of snow in places easily accessible; a cooly will bring the day's supply every morning.

† At Chenée in Kunawur in July, August and September, 1850, the mean daily temperature in an unsheltered hill tent was 64. 32—69. 34—69. 35.

In a house the thermometer had a far more limited range, namely, from 54° to 58°, and 66°, the mean being about 55°.

During the same period the fall of rain could not have exceeded, indeed I am sure it was under 2 inches, while in the Simla group of Hills it was computed to be about 45 inches in the above 3 months.

When this magnificent region, as yet little frequented, has been made easily accessible, it is much to be desired that a convalescent depot should be established in it. There are few obstacles in the way of such an experiment : the additional expence to be incurred by its remote position would be fully counter-balanced by the favourable results that might be confidently anticipated ; supplies that are now dear will be cheapened, by the opening of the new road, wood is plentiful on the spot, water is good and abundant, the rivulets being numerous, and never drying up as at Simla ; the soil is rich, and produces as fine vegetables as I have ever tasted. Some of the mountains have a moderate slope towards the Sutledge, and are laid out in terrace cultivation :—here every variety of temperature is within easy access, for in the lower lines of terraces near the banks of the river, the climate is as warm as in the plains, and thus in the ascent of one mountain side, there may be observed the vegetation of the two Zones :—the Plantain at the lowest level, about the centre the Vine, higher still the Apricot and Peach, and highest of all the Bramble berry, the Strawberry, and the rough Whin bush, which last spreads its prickly arms on the verge of the snow line.

The Vine grows luxuriantly in the open fields, and considering how little care is bestowed on its cultivation, it is surprising that the grapes should be so large and luscious as we find them ; there are about ten varieties, and they are so plentiful, that a basketful may be purchased for a few annas. For the invalid they would be a valuable article of food, and it would not be difficult to prepare from them a very tolerable wine for ordinary use.

I will here conclude with the expression of my opinion that it would be scarcely possible to overrate the boon—both to officers and to men, of the establishment of a Sanatarium in Kunawar, as an auxiliary agent in the cure of many cases of functional disorder and chronic disease, for which the humid climate of our present Hill stations has been found, after many years' experience, to be wholly and decidedly unsuited.
