

hollow as well as the canula, and both are perforated with holes near their points like a catheter: these holes correspond when the trocar is withdrawn just within the canula. When this aspirator is required for use the *modus operandi* is as follows:—Carbolic acid lotion, 1 in 40, is sucked through the needle and allowed to fill the syringe; the plate is then rotated and the lotion discharged; the needle is then dipped into carbolic oil, 1 in 10, and the skin over the part having been pulled a little to one side so as to make the puncture valvular, the needle is introduced in the proper direction into the sac of the abscess. In the case of an iliac abscess the needle should be passed downwards, backwards and slightly inwards, across and internal to the track of the iliac vessels, the puncture being made about $1\frac{1}{2}$ inches above Poupart's ligament, and 3 inches or so from the crest of the ileum. When the needle is withdrawn, the puncture should be closed with sticking plaster.

The nine cases recorded here show the value of both aspiration and the antiseptic method; but very good results can also be secured by those who have not got the necessary instruments and appliances, by simply opening the abscess and washing out the cavity daily with a syringe and drainage tube and carbolic lotion 1 in 40. The India rubber drainage tube is necessary because the carbolic lotion cannot be made to penetrate the deeper portion of the cavity of the abscess by merely placing the nozzle of the syringe into the wound. It should be introduced into the free end of the drainage tube which should have no holes in the sides for the first two inches, and should reach the bottom of the abscess; the antiseptic lotion will then be forced into the bottom of the cavity.

Professor Lister has published a method of antiseptic treatment which is meant to be used when the regular appliances are not available. The following are his directions: "Wash the parts thoroughly with carbolic solution, one part of the crystallised acid to 20 of water. Then place upon the wound 2 or 3 layers of oiled-silk smeared on both sides with a solution of carbolic acid in 5 parts of any of the fixed oils—olive, almond, linseed &c, the oiled-silk being made large enough to cover the raw surface completely and slightly overlap the surrounding skin; next apply, without loss of time, lint, charpie, or cloth (linen or cotton), well steeped in the oily solution of the acid, the cloth or lint being folded sufficiently to produce a layer, at least a quarter of an inch in thickness, and extending a considerable distance, say 3 inches, beyond the oiled-silk in all directions, the outer layer being somewhat larger than the rest, so that the margin of the mass of cloth may be thin. Cover the oily cloth with a piece of thin gutta-percha tissue sufficiently large to overlap it on all sides by an inch or more, and retain it securely in position by a roller steeped in the antiseptic oil. Round this again wrap a still larger piece of folded cloth also steeped in the oily solution of carbolic acid and cover it with a piece of oiled-silk or gutta-percha tissue." The above would answer as a method of dressing an iliac abscess when the more complicated system could not be carried out; and if the sac of the abscess were carefully washed out daily as above directed, it would answer well.

(To be continued.)

MEDICO-TOPOGRAPHICAL NOTES ON SUBATHOO.

By F. R. Hogg, Surgeon-Major, A. M. D.

OCCUPIED by Goorkhas in 1815, by the English in 1828, and irregularly settled on a ridge two miles long and half a mile broad, the sub-tropical Himalayan station of Subathoo appears at first gradually, then abruptly, sloped down from the Dugshai range which runs north and south with deep valleys on each side. Spreading out east and west, this ridge is intersected by water-courses draining down the ravines. Bounded on the west by the hill state of Kothar, on the east by the bold lofty

Crole, in fact surrounded and shut in by mountains, the station is only elevated 4,300 feet as compared with Kussowlee 10 miles south, and Simla 24 miles north, each sanitarium towering 3,000 feet higher. Mountain wave after wave recede in the Simla direction, and when the azure blue sky clears after rain, the distant silver pinnacles of perpetual snow sparkle and dazzle especially at golden sunrise. At Kussowlee, Sanawar, Dugshai, Simla, Jutogh, and even at Solon there is free perflation of air; but the enclosed depressed position of Subathoo will account for stifling evenings with a mess room temperature of 90°, necessitating white clothing and punkahs, if not iced drinks, and may help also to explain why typho-malarial fever recurs at certain periods. The hospital on a level with Solon is exposed to refreshing breezes. There are no marshes near the station. The river Ghumbur, separating Kussowlee and Kothar from Subathoo, although for many months an insignificant stream, swells into a dangerous torrent during the rains. At Kukkurhuttee there is a suspension bridge. To reach Kothar elephants, it is said, were required for crossing the river when cholera necessitated flight. Also on the Solon road the stream at Dhobie's ghat has caused inconvenience. Camps have been formed on the height above Subathoo, but the water-supply there is not so abundant as in the Solon direction, where a regular spot is reserved, the only objections being a bad road only fit for mules, and that the fir trees are said to afflict the drinking water. There is a grand ridge at Banaloghee on the Kothar territory, but the road is merely a steep descent to the river, and on the other side a terrible scramble over stones and boulders requiring specially good mules. The distance appears about five miles, the ground very hard, and the delicious water spring near a magnificent bamboo by all accounts never fails. Towards Dharampore there is a splendid level road adapted for carts and camels, and in this direction sanitary camps might be pitched, of course at a distance from the Simla track.

Geology.—The formation mostly consists of lime stone in crumbling strata and rugged rocks; the subsoil of clay slate, disintegrated by heat, rain or frost, washed by torrents, disturbed by tempests tossing the few trees, and displaced by earthquakes, when the hospital elevated 300 feet above the station may be shaken. In one direction red rocks are stained with iron, possibly malarious; in another, glistening scales of mica, elsewhere traces of copper can be noticed. In two places there are lead mines, formerly so promising that speculators were tempted to sink shafts 225 feet deep, likewise to start tall chimneys, expensive machinery, and smelting furnaces now remaining as silent memorials awaiting decay. Rocks are constantly blasted, and these mines are still believed in.

Roads.—Marching up and down the ravines tries the hearts of old soldiers, especially those enfeebled by fever, syphilis, rum or tobacco. The circular road on the northern hill affords a promenade of two miles. Towards Solon the narrow path is very rough, until the pine plantations are reached. Towards Kussowlee, after crossing the river, the ascent is tedious, whilst the five hours' ride to Simla will be found extremely wearisome from Syrie upwards under Jutogh. Doolies, dandies and jumpans are procurable in the bazar, but, whether up to Simla or 21 miles down to Kalka, the best plan is to convey invalids leisurely on the gradually inclined Tongha road *via* Dharampore.

Trees and vegetation.—Evolving at night the heat absorbed by day, the bare rocks peep out in so many places that beyond scanty herbage, melancholy cactus, and the marvel of Peru (the crerices occasionally relieved by a few ferns and stone crop) the hill sides are drearily barren. On the hard parade ground, 500 yards square, slowly grow the lilac, hibiscus, the ruddy lagerstromia, a few toon and poplar, whilst scattered about the station are sweet-scented babul trees evolving oppres-

sive perfume at night, and occasional specimens of chir pine, peepul, cypress, sissoo, sal, bakain and willow. Neither nim, bael, deodar, rhododendra, holly or mistletoe were noticed. Starting at 4,000 feet the deodar requires shade, shelter, moisture, ample soil, and freedom from herbs, brambles, or brushwood, on slopes with a northerly aspect. The toon loves moisture on a rich soil. The chir pine abounding with resin and turpentine, and a prey to insects and damp until matured, besides requiring light instead of shade, must have space to make a long tap root, and almost shuns Subathoo, as do walnut trees, which growing slowly prefer the rich and deeper soil near Solon. On various roads the red pomegranate, white rose, wild fig and olive alternate with golden honey suckle, purple convolvulus, and fragrant jasmin. In a few gardens were noticed damask and yellow roses, oleanders, dahlias, tiger and crocus lilies, different varieties of portulaca, verbenas, pansies, petunias and passion flowers. It was proposed to cover the hospital hill with chir pine, kark-cettes, bael, deodar or else with walnut trees, and Dr. Brandis kindly gave some hints; but taking into consideration the scanty crumbling soil with insecure foundation, the non-circulation of air, the dangers of damp, likewise the want of care, protection and judicious watering which these fickle capricious young trees would long require, perhaps it would be better to leave the hill alone to the dandelion, scarlet geranium, tomato, also the sumal-hemp and datura so useful as anodyne remedies.

Near the mess a tank, 176 feet long, 111 wide, 5 deep, and intended for watering mules and shrubs might be improved by the cultivation of singhara, which, growing under the water, displays white flowers with green leaves, until the rains, when decay takes place as the chestnuts ripen. Mud is said to increase rapidly, and decay of this, under a September sun, may do more harm than good to the water, and also perhaps encourage the production of a fever atmosphere.

Fruits.—A few trees were laden with small plums and tasteless apricots, quinces, pomegranates, figs, limes, and hard pears. The foliage of the apricot trees turning yellow in August become red before falling. In the bazar were indifferent crab apples, mulberries, guavas, plantains, loquats, also miserable strawberries raspberries, grapes, fair melons, and small mangoes from neighbouring valleys; the want of rain is ever to be remembered.

Vegetables.—Capable of great improvement, the pumpkins, onions, carrots, parsnips, cabbages and turnips are poor; the cauliflowers, cucumbers and tomatoes fair. Excellent potatoes, an anna the seer in the bazar, were, however, not procurable when most required. The drought told on the soldiers' garden about 600 feet below the barracks, and which ought to be maintained regularly by the commissariat instead of by intermittent cultivation by soldiers who are discouraged by the precipitous distance of the hot ravine. With care nearly everything will grow there in spite of birds, insects, poor soil and irregular supply of water. It is a moot question about utilizing the adjacent conservancy trenches, taking into consideration the position of the barracks overhead, the slow decomposition, the tendency of pestilential vapours to be wafted up above, especially at night. Sewage farming produces rapidly large tasteless vegetables, and, whilst the grandiose conceptions of chemists as to fertility have not been confirmed, the dangers have not diminished; indeed filth fevers appear on the increase everywhere.

Crops.—Wheat, barley, maize, several varieties of millet, red pepper, a small amount of cotton, opium, tobacco and rice. Chupatties, sold during the famine panic, were almost black, and it is alleged that kessaree dall credited with causing paralysis is added occasionally to other grains. The chief adulterations of wheat flour appear to consist of beans, peas,

maize, millet and rice, but very probably numerous twigs or leaves only known to natives are utilized.

Animal life.—Very little sport beyond quail and partridge in the direction of that beautiful and grand mountain the Crole. Two leopards were shot near Subathoo and hyenas robbed larders occasionally; very few foxes, still fewer snakes, scorpions or monkeys. The cuckoo was very jubilant in Mays and at other times the chattering of mynas, the cry of the magnificent eagle, soaring over the ravines, and the wail of the jackal at night, were heard. Very fine hawks, vultures, jackdaws and green pigeons, most beautiful golden orioles and a species of humming bird were noticed. Very few glow worms and it was a bad year for butterflies or moths here so celebrated. Neither sparrows nor mosquitoes troubled much as compared with bugs in certain houses. Cattle and sheep imported for slaughter purposes, feeling the want of rain and pasture, sickened, so did poultry, but goats and mules continued well. Much of the barrack milk the goats supply, and as cows run dry when suffering from enteritis the secret of enteric fever is not discovered. It was suspected that mule tank water was added to cows milk supplied to the mess, but this could not be proved. No pigs were kept in the bazar where the slaughter house is; the beef and mutton shops, likewise the meat exposed for sale in gauze safes, came under supervision. Meat putrefied very rapidly when fever was prevalent.

Water supply.—The population consisted of the 73rd Regiment including officers, three of whom were married, 845 men, 48 women, 81 children and 4 families attached; also a clergyman, priest, two missionaries, an engineer officer, a stray quartermaster, a commissariat conductor and the European landlord of bungalows: nearly all with wives and children requiring a number of native servants. The bazar community mustered 3,000, but on this as on other points, from lack of information of any kind it is impossible to place before the reader the experiences of the past or many facts of the present. There is no dak bungalow, but the Executive Engineer retains a house suitable to rest sick travellers. The water supply in 1877 was severely strained to provide enough for drinking, cooking, lavatory or general purposes; and, when wells are low in seasons of drought, it becomes almost impossible to prevent bheestees from bringing water from certain tanks, puddles or shallow surface pools for drinking requirements. Subathoo is said to be specially fortunate in amount of supply as compared with Simla, unable to afford two gallons a head instead of four: even this according to Parkes would not allow daily washing of the body or sufficient change of under-clothing. Dr. Munro, in 1859, recommended tapping a mountain stream four miles from Subathoo, and by a seven miles channel cut in the hill sides leading the water towards the barracks. He also established a bathing place about two miles from the station and certain men take advantage of every puddle down the khud, although the toil up the hill afterwards under a fierce sun will neutralize any benefit. Young officers new to the country are often reckless about frequent tubbing; some men are great bathers, and others, when down the green valleys after butterflies, relieve thirst anywhere, no matter how suspicious the stream. Goitre amongst natives probably depends on hard limestone water associated with poverty, dirt, intermarriages or polyandry, not forgetting syphilis related to leprosy and paralysis. Persons sceptical about certain points should see the patients at Mooltan to-day treated (with arsenic and locally iodine) for oriental sores contracted at Dera Ismail Khan where men, women and children who drink or wash in well water invariably suffer, whilst others who depend on the river Indus for all purposes, entirely escape. Including those in officer's compounds, about 30 wells were counted at Subathoo, some shallow, narrow, unprotected, and containing surface water enclosed in

lime and iron stone. In July, the raised covered pump spring well near the canteen, 20 feet deep, contained 5 of water: the wide bakery well 22 with 9, and another in a private compound called sleepy hollow with 16 of water of excellent quality, and from time immemorial, extremely popular. Sleepy hollow near the canteen has a garden much cultivated and manured, yet prior to, or during, the sickly season no rain fell to moisten manure on which the sun could play, and there were no proofs of sewage contamination of this well water which was subjected to independent analysis. It would be better, however, to get rid of this house and garden, the sole income of a poor old lady who allows people to draw water from this favorite source. In this direction there are other springs or else water receptacles. The raised open well used for making effervescent drinks had three feet of excellent water bubbling up from a little spring greatly appreciated by the natives. With few exceptions the wells gradually failed. It is necessary to explain that the scattered barracks, with the hospital on a hill, Dugshai direction, occupy the southern extremity of the station: in the centre of latter is the parade, at one end of which the bazar commencing on a hill 40 feet below, the commissariat buildings and likewise the canteen are placed. At the other end of the parade ground is the officer's mess near the mule tank: on the Kussowlee or barrack side are a few houses and the temporary Church, whilst on the other or Simla side there are seven bungalows, besides an old native fort on an eminence rising 1,100 feet from the right bank of the river Ghumbur. Dotted on the hill above and beyond, are about eight houses built on steppes, and at the extreme end of this northern hill the circular road approaches a leper hospital. People in this direction mostly depend on private wells, else send to the canteen or the cultivated garden adjoining. The mule tank abounding with organic impurities is conveniently tempting to bheesties as they pass it on the road. Men and families in barracks at the other end of the station are supplied mostly with good though hard water pumped from two covered tanks of stone and cement, on the Kussowlee road, 170 feet below the nearest barrack, 518 below the hospital. About 100 feet apart each tank carefully locked and periodically cleaned is connected by a stone tunnel with under ground springs, one 20 feet, other 40 feet distant. Occasionally these channels leak when the tanks become empty and the water is either lost down the khud or else nourishes adjacent trees and crops. Mules unavoidably create slight nuisances and several native houses below and beyond cantonments are in somewhat close proximity, but repeated careful observations failed in detecting sewage contamination in any direction. According to tradition these favorite springs never fail, and in seasons of drought it is only a money question to send mules down to the river, at such times a shallow little stream. For bathing purposes some married people supplement their allowance by purchasing water at a pice per bag, and others unless watched will depend on the filters for all purposes. The total yield of the two covered tanks has been calculated to exceed 8,000 gallons daily, leaving a storage of 3,000 gallons on demand according to a certain scale of supply. Major Holmes, R.E., is the authority for this statement. Eighty mules, each laden with 16 gallons, should make four daily trips to carry water to the barracks, the greatest distance about a mile: also up the zig-zag road a mile to the hospital where, but for hydropathic treatment, the mortality of enteric fever cases would have been at least double. Mussucks, however old, being constantly emptied, could scarcely be contaminated in transit, and as regards sand, charcoal, mechanical arrangements and constant supervision, the 17 Macnamara filters were in good working order. Surgeon-Major O'Brien, who shared all the heavy anxious professional work, coincided in the opinion that no blame could be attached to the tanks on the Kussowlee road. Lavatory arrangements

in dry seasons must be limited, however hot the sun may be.

Annals.—Before alluding to the present system of conservancy or other topics, it may not be out of place to enquire into the medical history of the past. About 1843-44 certain regiments enfeebled by fever, dysentery or scurvy in Affghanistan and Kurnal suffered much at Subathoo from bowel complaints in barracks said to be badly situated, crowded, and exposed to offensive effluvia. In 1843, from May to October, 8 cases of cholera, none fatal, the strength being 816. In 1844, strength 870 men, 5 non-fatal cases from April to August. In 1845, strength 817, in April 2, in June 2, in August 108, and September 21 cases of cholera, 42 of which died. In 1846, strength 1418, in July 2 non-fatal cases. In 1847, strength 1,226 from April to October, 6 non-fatal cases. In 1849 the strength fell to 46 and yet in August a non-fatal case occurred. Sir Charles Napier, at his inspection October 23rd, finding 14 men in badly ventilated barracks 12 feet high, so remedied matters afterwards that the sick list sank to 19 out of 1,050 in the fever season. In 1857 and 1859, about 3 cases of cholera were noted. Altogether from 1843 to 1877 this disease has been noticed 13 times, only epidemic in 1845, 1867, 1869 and non-fatal on 7 occasions; the cases as a rule were isolated. In 1867, imported by pilgrims returning from Hurdwar (where about 4 millions of persons bathed in the Ganges,) the cholera starting in April fastened on the 90th—an anæmic regiment enfeebled by Peshawur climate, by remittent and intermittent fevers, likewise by typhoid pneumonia contracted on the march in the spring from Nowshera. Between July 28th and August 7th, there were 9 cases, the climax reached on the 14th, and the end on the 29th—altogether 39 instances of cholera and choleraic diarrhoea, 30 occurring in quarters to 9 in camp; and amongst the women and children 16, all developed before removal from old to better barracks. Some men were taken ill either on guard at the old fort or just when relieved. The year was singularly cool and the rains, commencing early, continued unusually long. Dr. Munro (now Inspector-General) reporting the old barracks to be overcrowded, badly situated, dark, badly ventilated, inconveniently constructed and extremely damp, recommended sending two companies to Solon in separate camps, and a third company to be located on a height above Subathoo. About August 14th (except by the married families transferred to other barracks) the station was evacuated, and the troops distributed thus:—48 on height above Subathoo, 227 Banaloghie, 183 at Solon, 206, including head-quarters, at Dhobies Ghat: including married families and sick about 62 remained in Subathoo. The transfer from hospital to the chapel or school-room succeeding admirably. Out in camp the men had their cots and only eight occupants were allotted to each tent. The party at Dhobies Ghat did not get on so well as those at Solon. Dr. Munro most conclusively proved that moving out of barracks into camp, there changing ground frequently and marching short distances away succeeded in arresting the spread and continuance of disease. In 1869, the first case noted, August 5th, was doubtless imported by the native servant of an officer dying on his journey to Simla, but about 19 children out of 130 died with suspicious symptoms, such as coldness and collapse, in May and June, and Dr. Bryden believes that the cholera was localized somewhere on the hills. Very remarkably no other hill station was attacked but Subathoo, which out of a strength of 1,010 had 28 cases, 19 fatal, and of these 6 started in hospital. After 17 cases had occurred, the 41st Regiment was moved, September 1st, into Camp at Banaloghie and Solon; the latter place the most fortunate. Variola, fevers, heat apoplexy, dysentery, diarrhoea, delirium tremens, hepatitis, in 1869, in various stations, no doubt were influenced by the extreme heat in the early months, and the rainfall particularly

in the Punjab approximated that of 1867, the prevailing winds from July to September being easterly. In 1872, the rains were heavy, and out of a strength of 1,134 at Subathoo 6 cases of cholera with 3 deaths occurred in July, the wind veering from south-east to south-west, then changing to north-west. No natives suffered, no particular barrack was attacked, as the cases occurred in six different buildings widely separate; no evidence of importation or contagion. Dr. Leask reported the drainage as unsatisfactory and the water springs as insufficiently protected. In some barracks he considered there was slight overcrowding, but the old, leaky, ill-ventilated buildings did not specially suffer. As soon as a case of cholera occurred the affected room was evacuated with good results; a kind of quarantine was maintained from July 24th to September 18th, and the 2-12th regiment did not go out to camp. Dugshai, Kussowlie, Sanawar (with a rainfall of 32 inches in August) and Simla all were attacked, so was Cherat about the same elevation as Subathoo. In 1874, when cholera prevailed chiefly in the hills, for instance, Kussowlie and Simla, where natives principally suffered, no instances recorded at Subathoo, where as a rule natives seldom are attacked severely although the bazar attracts persons from all directions. According to Bryden from 1860-69 there appears to be little or no variola and the deaths figure as heat apoplexy 2, dysentery 22, diarrhoea 10, hepatitis 12, respiratory diseases 5, heart diseases 4, phthisis 5, amongst the European soldiers, who appear to suffer lightly from rheumatism or ophthalmia. From 1863-72 the women's deaths were accounted as cholera 3, fevers 3, hepatitis 2, and single instances of child birth, diarrhoea, hepatitis, atrophy, and respiratory diseases. For the same period infantile mortality ran thus—dysentery 13, diarrhoea 11, convulsions 8, croup or diphtheria 8, measles 7, cholera 3, tabes 3, meningitis 2, bronchitis or pneumonia 2, hooping cough and phthisis of each a fatal case: the total death-rate per 1,000 of strength from all causes including cholera 134, as compared with Darjeeling 18, Jutogh 25, Nynital 46, Raneehet, Chuekrata, Dugshai 55, Landour 62, Kussowlie 92, Murree 124, Dhurmsalla and Kangra 125. These figures only embrace a short period and a small population, besides the previous stations of regiments have such ranges of health or sickness. Now as regards fevers at Subathoo affecting the troops, reverting to the tables from 1860-69, it appears that 4 men died of intermittent fever in 1863, and the cholera year 1867: also 22 deaths are attributed to remittent or continued fevers, namely, 5 in 1863, none in 1867, but 7 in 1869—another cholera year. The admissions under the heading of fevers per thousand of average strength amounted in round numbers to 228 during the 10 years, as compared with 201 at Dugshai 179 at Kussowlee, 581 at Umballa, 952 Mooltan, 1,577 at Peshawur. Subathoo has always been blamed as a home of a typhoid form of malarious fever ever ready to recur in certain seasons when a light is applied to the inflammable material. Troops also carry the disease with them and in some stations the poison finding no welcome remains dormant only to wreak its fury afterwards on the young unseasoned new comers who laugh at the sun and the warnings of experience. If there are no suitable victims the fever contrives to catch older persons enfeebled by malaria. In 1856 remittent fever in June and July frequently ran into a low typhoid form, the severe and intractable cases soon became delirious, and after death in two instances the characteristic lesions of enteric were demonstrated. In June 1871, a lad aged 21, admitted with ague, died of enteric fever after 24 days' sickness. Doubtless Dr. Cunningham's invaluable reports contain many such records only accessible at certain stations. Dr. Alexander Smith believes that when malarious fevers end fatally at an early stage, cerebral lesions will be noticed, whilst at a later period the characteristic proofs of enteric will be found in the ilium. In 1872, only 2 cases of enteric were recorded at Subathoo. In 1873, from April

to July, on the fourth week of which latter month the rains began, there were 8 admissions, 2 deaths, the cause attributed to the use of impure water coming from the slopes and hollows of a neighbouring hill, collected and stored in tanks, and there becoming polluted. Dr. Murray Thomson at one time, followed by Dr. DeRenzy at another, reported the water supply as obtained from an uncovered reservoir below the station, and polluted by natives. As already stated, these two tanks near the Kussowlie road, are now most carefully protected. Both these gentlemen blame the other tank on the Simla road below the fort, and near the mess. However useful this pond, (containing a combination of rain water, drainage, dead plants or grasses, miscellaneous contributions, including decaying animal products) may be especially on dry weather for watering mules, and the arid parade ground, the risk will ever continue of such water being introduced to houses for drinking purposes. Better therefore to cover over the pond, which is partially supplied by springs, also let one man have the key and be held responsible that only for irrigation purposes the water be used. Another proposition is to fill up the pond, and lead the stream down the old gully below the fort, either to waste or to be utilized for cultivation. Neither in 1874 or 1875, does enteric fever appear to have attracted notice at Subathoo, where the annually occurring remittent fevers so much resemble typhoid. In 1876, the 73rd Regiment, which had suffered from enteric in Cawnpore, Ceylon, if not in China, brought the disease with them to Subathoo, and out of 8 undoubted cases 2 died: the fever very high, the eruption clear in 4 cases, and, whilst delirium was common, none escaped engorgement of lung or liver. In Dr. Hinde's opinion, hill temperature may account for absence of eruption, most of his cases had diarrhoea and danger decreased when the eruption appeared. This smart regiment, which attracted so much admiration at Delhi, had previously appeared so sickly at Cawnpore, that Lord Napier of Magdala removed them to Subathoo. In April 1877, Surgeon-Major Hinde proceeding on 6 months' leave to Cashmere, his duties were temporarily performed by myself, transferred from Mean Meer. Surgeon-Major H. J. O'Brien, who shared the work, belonged to the regiment. As anticipated and foretold by Dr. Hinde, enteric fever, which appeared at Kussowlie, Dugshai, Solon and Simla, severely scourged Subathoo; for out of 32 undoubted cases 7 proved fatal. Very likely the numbers were much greater, but only after death are the secrets of diagnosis really revealed; it was a famine year when the scanty and irregular rain failed to wash the hill sides and to grow vegetables for men, or pasture for beasts. Lavatory arrangements were conducted with difficulty, and, as drinking water failed in various wells, the *bhistees* were tempted to fill their *mussucks* at the most convenient opportunity. Several of the sick, though not water-drinkers, were partial to milk, and it is feared the oft-abused tank water was fraudulently added. The heat at one time proved very trying, and at night foul breezes were wafted up the ravines. Having left Subathoo in November for Allahabad, Jullundur, and eventually Mooltan, where this paper is written, it is impossible even to venture on a summary of the epidemic without regular notes for reference, as all the documents are with the regiment at Lucknow. Besides 3 cases occurred after my departure—altogether 6 unseasoned young officers, one if not two officers' wives, 23 men, 1 woman and her child were attacked. One lady lived exactly over the objectionable tank, the other near the Simla road. The two officers, who died occupied a small house on the northern hill occasionally exposed to unpleasant breezes from the bazar, ravines, and the servants' quarters were on a higher elevation. Other officers were scattered about in different bungalows. The soldier's wife lived in the writers' quarters on another hill, 300 feet above the station, just below the hospital, Dugshai

direction, and it is believed she inhaled the poison, as until prevented certain receptacle carriers choose a short cut past her door. Most of the cases, strangely enough, would appear to have originated in double-storeyed barracks, until it is explained that, in the endeavour to make the most of space, the men were shifted according to circumstances. Some cases came from the double-storeyed building nearest to the parade ground, others from the extreme end of the station, for instance, from the band block occupied by bachelors below, with married families over head; none of the latter were attacked, and during my time no case was noted in the last double-storeyed married block occupied by 32 families, who drank the same water as the male sufferers in the band block. The magnificent barrack, formerly the hospital, contributed one or two cases. In the old single-storeyed barracks, to the best of my recollection, the fever did not specially prevail, although the occupants, as a rule, looking sickly, were more prone to prolonged diarrhoea, dysentery and hepatitis. Several men drank khud water, some pleaded guilty to reckless bathing, one officer eternally in his tub took no heed of the sun, another for a freak swam through the tank one night, and a third was drenched with rain when the excitement of leopard shooting had cooled down. One man took no trouble about damp bedding, another slept in wet clothes, and a few fancied they caught cold chills when lying in verandahs or out in the open on sultry nights. The sick officers were mostly lads and there being no young unseasoned soldiers in the ranks, the fever selected others up to thirty-five,—the average age of sufferers being about twenty-three. These officers were comparatively new to the country, and of three who arrived in the same ship together a few months before, only one survived. About fifteen men had been in Ceylon and one in China, having left England with the regiment in 1866. A bandsman blamed the sun, another alluded to a bad smell in the practice room, whilst a third wore a cap instead of a helmet in the afternoon. About twelve had histories of ague, several of chronic gleet and the previous general health in every instance appeared indifferent. The alleged proofs of contagion or infection include the two officers living together, the hospital sergeant's wife inhaling effluvium, a brother nursing a brother, a soldier tending a comrade, and two cases appeared in the same ward, across the room at some distance from a suspicious admission. The woman and child were treated in quarters, two officers in the house occupied by Dr. H. J. O'Brien and myself, four officers in separate rooms, and the men in a special ward of the excellent double-storeyed hospital, where, but for the exertions of Dr. O'Brien, first class Apothecary Fitzpatrick and apprentices Yates and Foster, backed up by the splendid nursing of Private Rose and other soldiers, the mortality would have been double in all human probability. For, in my opinion, based on twenty years' service, which has included ample experience, very malignant was the type of disease, indeed desperately ill were the majority of cases, and as the daily total sick list gradually increased to seventy, many requiring constant attention, the distance of the hospital over a mile from the scattered station below, up a winding mountain path, proved extremely inconvenient. Progressing rapidly towards death or recovery, cholera is a simpler disease without many of the prolonged perils, the perpetual anxieties, the day and night watching, the countless complications or the heart-breaking relapses of enteric. A simple chill, a shower of rain, a sudden movement, some slight change or indiscretion in diet, nursing or abdominal bandaging, any mental excitement, in short, a thousand comparatively trivial things thwart the physician, and either at the onset or after a drawn battle, death unexpectedly may claim the victory. Starting about May, enteric (in some respects resembling relapsing fever), severe in August, clung to the 73rd Regiment almost until their departure for Luck-

now in December. During that unhappy trying period all cases were recorded, the charts preserved, with one exception, *post-mortem* examinations invariably made and the lesions confirmed diagnosis. On reference to memory and meagre memoranda the prominent symptoms specially noteworthy included headache in twenty-seven instances, very distressing insomnia, vomiting, lumbar pain, prostration, constipation (12) followed by diarrhoea, else persisting diarrhoea (18), foul tongue and breath, dilated pupils, early delirium (9), subsultus tendinum, deafness (9), sordes, intense thirst, iliac tenderness, invariable meteorism, frequent gurgling, epistaxis (4), distressing irritability of the bladder (9), lung complications very common, especially severe in eight instances, and the characteristic eruption very clear on ten fair skins was difficult to recognize on those tanned, bronzed or speckled with prickly heat. A copious eruption appearing late implied increased danger. The pulse commencing small and weak-raced full, and bounding, oft irrespective of a feeble heart; the usual remissions occurred, and towards recovery the very slow soft pulse occasionally intermitted. In a nervous phthisical syphilitic subject it continued rapid so long that secondary ulceration, tuberculosis or phlegmasia dolens were expected, but only resulted in temporary increase of stammering which subsided as strength returned. Abdominal pulsation very common. Hurried respirations were influenced by previous medical histories, by altitude likewise, by habit or occupation, such as playing wind instruments, and in one such instance, complicated with delirium, the breathing suggested coma. The highest temperature with recovery reached 105.7°, but in twelve instances 105° was exceeded. One dying case rose from 99.4° to 104.4°, another from 103.8° to 105.2°, a third from 104° to 105.4°. One recovery suddenly dropped from 102.4° to 97.2°, when least expected; another from 104° to 97.4°, the next day 101°, and a third from 105.4° dropped to 99° without ever rising much higher. These thermometrical vagaries doubtless influenced by hydropathic treatment were extremely alarming, especially with a thready pulse, when beads of clammy perspiration stood on the cold blue face and all symptoms pointed to fatal collapse, yet not invariably. In several instances the highest temperatures were noted in the morning. A few cases (for instance one of the young officers in my house) had a crisis of profuse persistent inoffensive exhausting perspiration as in relapsing fever without unfavorable results, excepting when the patient had no reserve of strength. In a fatal case the condition termed coma vigil attracted attention. Each casualty depended either on perforation, else on intestinal hæmorrhage controlled by no remedy, including ergotine hypodermically. Men, with a previous history of syphilis or dysentery, fared badly. Where the long tube was used, or where as a last resource the intestinal gases were drawn off by careful aspiration, no favorable result followed. As usual the bowels packed in tow, smeared with carbolized oil, were properly bandaged, but in spite of precautions it is feared that cold at night conduced to peritonitis. A number of cases came under the designation either of insidious, latent, or abortive enteric. At the onset the greatest care was necessary to avert bed sores.

The urine at first scanty, acid, ranged in specific gravity from 1024 to 1036, the chlorides considerably diminished in force while in 12, whilst albumen was noted in 6 records. The ochrey liquid alkaline excreta exhibiting the characteristic fætor were disinfected at once before removal for burial (though burning would have been preferable), and the latrine near the special ward was never used by general cases. No complications, such as jaundice, erysipelas, necrosis, or laryngitis remembered, and where a diphtheritic tendency threatened, it was checked by the early administration of chlorate of potash and iron. Besides consulting together we referred instantly to that invaluable book of Murchison's, also to the works of Stokes or other physicians and our experience swells

the increasing chorus of those who praise the treatment by baths gradually cooled. Wet sheets or wet pack so useful at other places here miserably failed, to the best of recollection and belief. Whenever the opportunity and facilities occurred for properly carrying out the bath treatment from the very onset, it was all plain sailing in hospital with European nurses and regulated diet, notwithstanding the distance of the cook houses and the water springs in the valley. Living in houses on the distant opposite hill, the young officers entirely at the mercy of apathetic natives for nursing and food, still naturally preferred to keep out of hospital as long as possible, until the danger of such delay was only too painfully proved. The wife of the hospital sergeant had baths in quarters and her child was saved by quinine enemata. By the mouth, the rectum or hypodermically quinine in small doses did some good, so did mineral acids, but not to be compared with the baths or a splendid trustworthy remedy, the confection of turpentine, which, besides relieving tympanites and clearing clogged up lungs, has some specific action. As an enema, likewise as a local application, turpentine is unrivalled. In the cases of intestinal hæmorrhage the remedy had not fair play. Iodism somehow appears readily induced at Subathoo. Sulphuric acid and opium, acetate of lead and morphia or astringent enemata, especially of perchloride of iron, often controlled diarrhœa. Constipation was never interfered with until unavoidably necessary, and then relieved by mild enemata. Chloral and bromides afforded sleep, so did calomel and soda once or twice, besides reducing temperature. Fomentation or poultices of *datura cannabisa* or *sumalhoo* (growing on the hill sides) relieved rheumatic and neuralgic affections better than morphia hypodermically. The pains were not so agonizing as at other places, but, besides the usual nerve prostration, convalescents complained of intolerable itching and tingling all over. Leeches applied to temples or groins, sinapisms over the same localities, dry cupping of the chest, and galvanism, all proved efficacious when required. The catheter was frequently used. Punkahs were very grateful to the sick. Diet difficulties were complicated by the poor condition of cattle during drought. One lady who personally conducted her household management kindly sent up milk in locked tins, and cows bought for officers sick in quarters were fed on the premises. The young European loathes the beef tea, custard puddings or the stuff called jelly concocted by natives, and superannuated tinned soups provoke diarrhœa, whilst the capricious stomach oft revolts against Liebig or raw meat juice. Very grateful were we to another lady who with her own hands prepared tasty unspiced yet suitable delicacies, although it was difficult to get good eggs, stimulants, tea, cocoa, biscuits covered with good butter came in usefully and after a time when voracious appetites required tough meat or badly boiled potatoes, such craving was restrained by giving *ipecaeuanha* pills. Early in October a detachment of the 73rd encamped at Dharampore, and eventually the whole regiment marched to Lucknow.

Lately at Subathoo various alterations have been made, and the 51st arriving from Peshawur will reap the benefit and doubtless enjoy excellent health, especially if meteorological conditions be such that the rains come in due season.

(To be continued.)

Invaliding of Sepoys.—Under recent orders issued by His Excellency the Commander-in-Chief, Annual Invaliding Committees are to be held at the Head-Quarters of Regiments instead of at the Head-Quarters of Divisions and Districts as heretofore. This will save sickly men a good deal of travelling and toil.

POST-MORTEM REPORTS ON SOME CASES OF CEREBRAL, CEREBRO-SPINAL AND SPINAL DISEASE OR INJURY.

By DAVID WILKIE, M.B., *Junior Civil Surgeon, Allahabad.*

(Concluded from page 39.)

III.—CARIES OF VERTEBRÆ. DOUBLE PSOAS ABSCESS.

A female child, about a month old, belonging to a proclaimed family. Body sent in by the Police on the 28th August 1876
Autopsy.—Emaciated; fists clenched; conjunctivæ and scalp pale. No wound of the fontanelles.

Brain, &c.—Membranes apparently normal. Brain reduced to a pulp by decomposition. A little red fluid in pericardium.

Heart.—Cavities contain dark clotted blood and a little fibrine in the arteries. Vessels stained. Valves normal.

Lungs.—Lungs free, half collapsed, gasy, crepitant throughout, not hyperæmic above and in front, and not solidified.

Spleen.—Spleen not enlarged, very soft and dark.

Kidneys.—Kidneys reduced to a very soft, dirty grey mass.

Liver.—Liver dark and softened.

Stomach and Intestines.—Stomach contains some lumpy curdled milk. Mucous membrane normal. Intestines contain curdled milk: mucous membrane normal, &c., &c.

Psoas Muscles and Vertebrae.—Each psoas muscle above is disintegrated and full of dirty curdy thick pus. The lower dorsal and upper lumbar vertebrae are black and carious in their bodies and transverse processes. There is also a little of the same pus within the spinal canal, but outside the *dura mater* of the cord.

IV.—LIMITED PURULENT MENINGITIS.

Sheobakhsh, aged 60, a prisoner in the Allahabad Central Prison, died on the 6th July 1877. Is said to have had fever for 3 days, which came on daily with shivering and went away with perspiration. On the morning of the 6th, he was free from fever, and took his full diet. At 11 A.M., fever came on. He remained conscious, and died rather suddenly at 3 P.M.

Autopsy.—Aged and thin. Fat layer thin and yellow.

Brain, &c.—Skull-cap rather thin, but heavy, with little cancellous tissue. Not much blood in scalp. A good deal of blood in longitudinal sinus, much subarachnoid fluid. On lower surface of cerebellum, on its middle lobe above, and on the inner faces of the cerebral hemispheres, is purulent material between the *pia mater* and arachnoid. Fine membranes and substance of the brain not congested. Ventricles contain much slightly turbid fluid. Choroid plexus normal.

Spinal Cord.—The spinal cord below the foramen magnum is normal, and is free from pus and lymph.

Heart.—Pericardium contains about ʒi. clear fluid. Heart contains a little thin watery blood. External fat abundant. Valves normal. Cross streaks of superficial fatty degeneration just above the aortic valves, and in the first part of the aorta. Muscle not hypertrophied.

Lungs.—Right lung slightly adherent above and laterally. In the apex it is hard, tough and bluish, but without cheesy matter, cavity, or apparent tubercle. Rest of the lung, except the front, hyperæmic. Left lung hyperæmic, except the very front. Tubes full of frothy fluid; their mucous membrane intensely, deeply, brightly congested, with spots of almost extravasation.

Spleen.—Spleen measures 5 by 3 inches by 1 inch, wrinkled dark, beginning to decompose.

Liver.—Liver measures 10½" by 7" by 2½". Liver and kidneys altered by decomposition.

Stomach and Intestines.—Stomach empty; mucous membrane decomposed, but showing congestion of the ridges. Fæces normal; no worms. Intestines normal throughout.

Aorta.—Aorta stained throughout; superficial fatty degeneration about the mouths of the large vessels of the arch.