APPENDIX.

No. I.

NOTE on the TOPOGRAPHY and GEOLOGY of the Allied Occupation. By DR. SUTHERLAND.

THAT portion of the allied occupation within which Her Majesty's forces were stationed, is about sixteen miles in length, measured from Cape Chersonese to Kamara, and nine miles in breadth from Cape San Georgeo to the cliffs of Inkermann. It covers an area of about ninety square miles.

The country presents certain striking topographical peculiarities, depending on the remarkable geological character of this part of the Crimea.

The lowest point of land within the occupation is Cape Chersonese, which shelves away into the sea. From this cape the coast follows a south-east direction as far as Cape San Georgeo, for about seven miles. It rises very gradually out of the sea, presenting a vertical section of nearly horizontal beds of whitish and yellowish tertiary limestone. The coast rises higher and higher as it approaches the cape, and at that point attains an altitude of upwards of five hundred feet above the level of the sea. A little to the west of the cape, masses of dark-coloured volcanic rocks underlie the tertiary beds, and form the great bulk of the cape itself, and also of the nearly vertical escarpment of the small bay lying immediately to the east of Cape San Georgeo, under the Monastery.

The tertiary beds overlie these rocks as far as the great ravine to the east of the Monastery. The underlying volcanic rocks consist of basalt, amygdaloid, serpentine, and porphyry, with associated minerals, laterite, zeolite, sulphur, &c. Several singular needles of these igneous rocks rise out of the sea along the margin of the bay. One of them, consisting of a pyramid of basalt, gives a marked character to Cape San Georgeo, and is about two-thirds of the altitude of the cape itself. A considerable extent of the outer surface of the igneous rocks is covered with the debris of the tertiary cliffs

above, which becomes detached after rains, and falls into the sea in landslips, one of which occurred during the winter of 1855–56.

The great ravine already mentioned divides, by a rent nearly 600 feet in vertical depth, the stratified tertiary limestone of the plateau from another formation extending from this point to Balaklava, and far to the eastward.

About midway down the ravine, and thence to the bottom, are natural sections of schists, containing selenite and lignite, some specimens of which resemble charcoal. The amygdaloid also crops out through the schists, and is found near the summit of the ravine.

The eastern side of the ravine is formed by an enormous overhanging precipice of reddish limestone, belonging to the jurassic series, full of fractures, and from which huge masses have from time to time detached themselves, and lie piled on the slopes of the ravine below. Underneath this great cliff, which is above 600 feet high towards the sea, are beds of reddish conglomerate of different degrees of fineness and hardness, gradually wasting away so as to leave a long deep hollow undermining the cliff, which has toppled forwards, and is partially separated by a deep rent from the mass of the sea-coast line. The schists underlie these beds of conglomerate.

The coast to the east of the ravine of San Georgeo consists of precipices of the same reddish compact limestone, rising directly out of the sea to the height of from 800 feet to 1,000 feet. Following this line of cliff to the eastward, we find that, a little to the west of the entrance to Balaklava harbour, the cliff is interrupted by a ravine, and rises again into a remarkably characteristic tooth-shaped summit, 608 feet high, also of jurassic limestone.

The coast line of mountain-ridge is at this point broken across by a deep sigmoid fissure, forming the entrance to the harbour of Balaklava. On the west side of the entrance, the rock sinks almost perpendicularly into the water, and on the east side the entrance is bounded by a singular conical hill, 469 feet high, on the summit and side of which are the ruins of the old Genoese Castle of Balaklava. The western slope of this hill consists of masses of the same compact reddish limestone, and the bulk of the hill itself is formed of detached fragments of the same rock, or rather of a brecciated form of it, resting on highly-inclined beds of conglomerate, dipping towards the west. The hill presents, towards the sea, a vertical, or rather overhanging cliff, built up of boulder-like masses of limestone of all sizes, from that of pebbles up to huge fragments of from fifteen to twenty feet in diameter, arranged in regular beds, the smaller below and the larger above. These beds dip towards the west, and lie parallel with the upper surface of the conglomerate on which they have been deposited.

The conglomerate, after sloping upwards to the east from underneath this mass of fragments, forms an almost horizontal ridge, about 250 yards in length from west to east, with highly inclined sides, falling on the south into the sea, and on the north towards a ravine separating the castle rock from the hills, at the foot of which Balaklava is situated. This ridge is about 320 feet above the sea, and on it was constructed the Castle Hospital, which occupied its whole length.

East of the ridge the conglomerate rises, by a very steep ascent, to the height of 1,227 feet, forming another lofty narrow ridge, presenting its end to the sea, and known as "Marine Heights," from its having been occupied by an encampment of marines. To the east of the heights, and 180 feet below their summit, is another ridge of conglomerate, connecting Marine Heights with the mountains above Kamara. Under this ridge the ground begins to fall gradually towards the sea, instead of being precipitous; and the slopes form the commencement of that richly-wooded and beautiful ground falling from the camp of the Royals down towards the waters of the Bay of Balaklava, and joining towards the east the conglomerates and jurassic limestones, which projected for several miles at right angles towards the south, terminate in the huge precipices of Cape Aia, the highest point of which, opposite Laspi, is upwards of 2,000 feet above the level of the sea.

The coast-line extending from Cape Chersonese to this point affords a longitudinal section of the British portion of the allied occupation. It consists of two quite distinct and well-marked portions, the boundary-line between which commences at the great ravine of San Georgeo.

A line drawn from this ravine towards the north-east, curving a little eastward, and ending on the north-eastern angle of the Heights of Inkermann, eight miles distant, divides from each other two districts of country, the topographical and geological characters of which are very different.

The country to the west of this line is about sixty square miles in area, and is the plateau which was occupied by the camp before Sebastopol. The country to the east of the line includes the valleys of Balaklava and the Tchernaia, with their branches, and the sea-coast mountain ridges on which several of the British camps were located.

The ground which was occupied by that portion of the allied army more immediately engaged in the siege opera-

tions, is bounded on the east by a steep escarpment, which presents sections of horizontal beds of light-coloured porous fossiliferous limestone, resting on a steep talus sloping down to the valleys of Balaklava and the Tchernaia. The ground along this eastern margin of the plateau is from 700 to 800 feet above the level of the sea. It rests on the sea-coast mountain ridge at its southern extremity, and dips into the waters of the Tchernaia on the north.

From this latter point, the north side of the plateau is bounded by the nearly vertical precipices of Inkermann, immediately under which flows the Tchernaia, and also by the inner harbour of Sebastopol, as far as Quarantine Bay, from whence to Cape Chersonese the northern boundary is completed by the sea.

From Cape Chersonese to the ravine of San Georgeo, the south-west boundary is formed by the sea-coast precipices, as already mentioned.

The plateau before Sebastopol is thus of a triangular shape, and has the sea on two sides of it.

Very little of the surface is flat. It is, on the contrary, undulating, and consists of slopes and low hills, and of valleys, the general course of which is towards the north-west. As these valleys approach the harbour of Sebastopol and the sea-coast line, they sink rapidly, the ground of the plateau retaining its level, or sinking more slowly than the valleys. The result is that the shallow superficial depressions gradually become deep, narrow ravines, enclosed by vertical precipices, between which the brooks draining the plateau escape into the harbour or sea.

Several of these ravines end in deep creeks, and it is of importance to remark that the ground at the head of these creeks is generally marshy, and is saturated with a mixture of salt and fresh water.

The mass of the plateau, as shown by sections all round it, consists of porous stratified tertiary limestone, rich in fossils, underlaid, on the Inkermann side, by nummulitic limestone, affording an easily worked white building stone, above which, on the slopes of the hills, are loose deposits full of nummulites.

The rock comes to the surface on the edges of the plateau and ravines, but on the slopes and bottoms of the depressions and valleys it is covered to a greater or less depth, but seldom exceeding two or three feet, with light loam, at times approaching, in consistency, to clay.

In dry weather this loam produces a light dust, easily carried about by the wind, but after continuous rain it passes into a very plastic and adhesive clay, sometimes so strong as

to draw off horses' shoes. The clay also occurs in considerable patches, even on the higher points occupied by the British troops.

The surface of the plateau is more or less covered with loose fragments of limestone, which appears to form the common rubble building stone of the country.

The soil, over a considerable extent of the area, is too thin to admit of cultivation, and yields only a scanty herbage, but wherever the soil was deep enough, it had been formerly laid out in farms and vineyards.

There is little or no brushwood on the plateau, except at Inkermann Heights, which were formerly covered, to some extent, with dwarfed oak, but it was uprooted for fuel during the siege.

The eastern part of the allied occupation is very different in character from that of the plateau before Sebastopol.

It may be described as a narrow mountain ridge, rising precipitously to the height of from 800 to 1,500 feet out of the sea, with lateral spurs, mostly covered with brushwood to their summits, and forming a number of lateral valleys, all debouching into the valleys of Balaklava and the Tchernaia. These mountain ridges, with their spurs, consist of compact, reddish limestone, of the jurassic series, sparing in fossils, having the conglomerate underlying it, and in some places merely capping the conglomerate.

These limestones differ in structure from those of the plateau in that they are not porous; they are deeply fissured, and present appearances of stratification, although their general characteristic is that of massiveness.

On the slopes of the hill sides, and in the valleys, there rest considerable beds of debris of various formation. Sometimes it is clay, at others sandy loam, in other cases the debris is formed by the disintegration of the conglomerate, or of the compact limestone, which has a tendency to weather into polygonal fragments of different sizes, by the wasting away either of the more easily destroyed portion of the rock, or of a calcareous matrix in which the harder fragments were imbedded. The limestone, not unfrequently resembles breccia, and fine specimens of this rock are met with.

One of the longest of the secondary valleys, near Balaklava, is the valley of Karani, running nearly parallel with the sea-coast line, and extending from the ridge at San Georgeo to the village of Kadikoi, where it unites with the valley or basin of Balaklava. The village of Karani, at the head of the valley, is about 600 feet above the sea. This was the only lateral valley debouching into the Balaklava basin, which was occupied by the British troops. Both sides

of it are formed by steep hills of jurassic limestone, between which the narrow valley descends rapidly towards the east, as it were by steps, so that when seen from the east it appears to recede not gradually, but by successive and distinct rises.

The slopes on the south side of the valley, from Karani downwards, were all covered with brushwood. Those on the north side are of almost bare rock, powerfully reflecting the sun's rays. The lower part of the southern slope, and the bottom of the valley, are covered with the same loamy clay found on the plateau. The valley of Karani is drained by a little brook running close to its north side, and joining a water-course which empties itself into the head of the harbour of Balaklava. The length of the valley from Karani to Kadikoi is a little more than two miles.

The valley, or rather basin of Balaklava, extends from the Col at the edge of the plateau, eastward as far as the high ground on which the church of Kamara stands. It is inclosed on the south by the sea-side mountain range, and on the north by a long ridge about 400 feet in height, surmounted by a chain of redoubts, at the early part of the seige operations, but which was latterly occupied by French troops. This ridge divides the valley of Balaklava from that of the Tchernaia.

The extreme length of the basin, from east to west, is about four and a-half miles, and its breadth, from the head of Balaklava harbour to the crest of the ridge above mentioned, is about two miles.

The total drainage area, including the mountain slopes and lateral valleys, is not less than eighteen or twenty square miles. All the valleys on the Balaklava side of the ridge constitute part of an inclosed inland basin, the only outlet for the waters of which is into the harbour of Balaklava. The ridge is chiefly formed of grey schists, sections of which can be traced in the defensive works under the Col, and also in the redoubts and cuttings of the ridge. Low, rounded elevations of porous, chalky limestone, rise above the bottom of the basin at two or three points. On the crest of the ridge, at its eastern end, are a number of large erratic blocks of granite lying on the surface.

Similar schists are found in one or two of the lateral valleys, where, becoming disintegrated, they form immense masses of sandy debris, mixed with loam, on which one or two of the camps were situated.

The mountains bounding the south side of the Balaklava basin, east of Kadikoi, consist of conglomerate, capped by masses of jurassic limestone; and the lower slopes are formed chiefly of decomposed schists, especially towards Kamara.

At the east end of the valley is an insulated hill, called Canrobert's Hill. The south side consists of conglomerate, on which rests a mass of compact, greyish limestone, forming the north side of the hill. To the east of the ridge where Kamara church stands, the ground falls rapidly to a stream of water, which rushes through a deep gorge from the valley of Varnoutka to join the Tchernaia. The mountains on each side of the gorge consist of jurassic limestone, rising to the height of 1,500 feet above the level of the sea. A branch of this valley runs southward towards the sea, ascending in its course to the ridge already mentioned as connecting the mountain group to the east of Balaklava with the precipices of Cape Aia. The bottom of this valley is formed of large masses of brown-coloured schists and loam, which extend through the ridge to the sea shore. On the west side of the valley, on the steep mountain slope, were placed the winter camps of the Highland Division in 1855-56.

All the valleys of this district are covered with brushwood, dwarf oak, elm, and a few trees of larger growth. The subsoil generally consists of loam and loamy clay, with the exception of a few spots here and there, similar to those occupied by the Highland Division, where the ground was formed of mixed sand, gravel, and loam.

The soil in the valley of Balaklava itself varies at different points. The lower levels, especially in the neighbourhood of the town, and about Kadikoi, consist of deep, tenacious clay. In other places, the clay is mixed with sand, and there are some spots where the sand comes to the surface. Similar varieties in the surface soil exist in some of the lateral valleys, and also on the mountain sides in the vicinity.

The observed effects of these varieties of surface and soil on this portion of the occupation is, that in cases where the rock is exposed, the rainfall flows rapidly over it into the valleys and accumulates there, flooding the surface after heavy rains, or saturating the soil with water. In other instances, the water is retained for a longer or shorter period in the masses of porous debris on the hill sides, and drains away more gradually, to saturate the ground in the lower levels.

There is no distinct stream in the valley of Balaklava; but there are several watercourses supplied by springs, some of them having only a small quantity of water at ordinary times, and others being nearly dry except after heavy rains.

Many portions of the surface of the valley are so charged with water that it can be readily found by digging down two

or three feet. A large extent of wet surface has often been exposed to the action of the intense sun heat, by the wallowing of buffaloes in parts of the valley where no signs of water were previously visible.

The defective state of the natural drainage was also shown by the greatly increased quantity of water which flowed into the harbour of Balaklava after the deep trenching executed for the roads and railway in the neighbourhood of Kadikoi was completed.

The entire basin of Balaklava used to be covered with rich vegetation and flowers; and a considerable extent of the area was occupied with farms and vineyards.

To the north of the ridge, forming the northern margin of the basin, lies the valley of the Tchernaia. From the crest of the ridge the ground falls gradually to the foot of a chain of hills called "Fedoukine Heights," which rise rapidly to an elevation of 500 feet above the sea level. From their summits there is a rapid descent to the level of the Tchernaia. The valley through which the river flows is broad and tolerably flat. The bottom is formed chiefly of marl mixed with pebbles and chalky debris, and the bed of the river, which is only a few yards wide, is scooped out of the debris to a depth of from four to six feet. Most of the ground is perfectly firm in ordinary states of the weather, but as the river approaches the head of Sebastopol harbour the ground becomes a marsh.

Fedoukine Heights consist of loose chalk with flints mixed with thin layers of the same material.

The northern boundary of the valley of the Tchernaia is formed by Mackenzie's Heights, a long, almost horizontal ridge of precipices of chalk, rising to the height of about 1,000 feet above the level of the sea, and resting on a steep talus extending from one end of the ridge to the other.

The greatest distance from the river to the foot of the heights is about three miles. The intervening space is mostly filled up with chalk hills, having flints in tabular beds running through them. The rainfall on those hills crops out at some distance from the top, and can be traced wetting the chalk along their sides.

The greatest breadth of the Tchernaia valley, measured from its southern boundary ridge to the foot of Mackenzie's Heights, is about six miles, and the length of the wider part below Tchorgoun is about five and a quarter miles to Inkermann Castle, where the precipices of the plateau approach those of Inkermann, and between them lies the marsh at the mouth of the river.

The whole of the valley is covered with grass and flowers, and there are no trees except in the marsh. The chalk hills and valleys at the foot of Mackenzie's Heights, and the slope of the talus are covered with brushwood.

A little below the village of Tchorgoun, in the higher and narrower part of the valley, there is marshy ground; but at a considerable distance from any of the British positions. Close to this village the waters of the Tchernaia are partially diverted into a canal, carried at a higher level than the river, along the foot of Fedoukine Heights on their north side, and round the Inkermann end of the plateau to Sebastopol docks. This canal, and the river itself, yielded an abundant and excellent supply of water for the French and Sardinian troops.

Lying to the eastward of the district we have been describing, and beyond the mountain range to the east of the Highland Camps at Kamara, are two inclosed basins, which were occupied by French troops, and where some British troops were at one time stationed.

These are the valleys of Varnoutka and Baidar; their conjoined drainage area is about 150 square miles, and their lower portions are between 800 and 900 feet above the level of the sea. The slopes of the sea-side mountain range, which compose their southern boundary rise from 1,000 to 1,400 feet above their lower levels. The slopes are formed of conglomerates and jurassic limestones, with schists underlying them, and the slopes are covered with forest trees. There are steep mountain ridges all round, which discharge their waters into the basins, and there is no outlet except through two deep rents in the mountain chains, by which the waters escape into the Tchernaia. The valley of Baidar is at certain seasons filled with fog, which escapes by a gap in the mountain chain near Laspi, and falls like a cataract towards the sea. The positions in the lower part of these basins were not healthy.

The town of Balaklava occupies a somewhat singular situation. The harbour, as already stated, is formed by a cleft through the sea-coast mountain chain, affording, as in the other basins of the district, the only outlet for the waters of the valley of Balaklava, so that if this narrow rent had never taken place, the whole valley, with its lateral branches, would have been a lake. As seen from the sea, there is no appearance either of town or harbour, and it is only after turning the point of the Castle Rock, through the narrow entrance, that the position of the town becomes visible. Once inside the harbour, it has the appearance of a small lake, inclosed on the east, south, and west, by rocky hills

sloping rapidly into its waters, and only open on the north by a gap in the hills, through which a part of the plain, with its northern boundary ridge, and the eastern edge of the plateau before Sebastopol rising above it, are visible.

The town is situated on the east side of the harbour, on a bank of debris resting on a steep hill-slope receiving the surface water from the high ground above it. Where the hills open towards the north, they leave a space of ground between them, which has been formed chiefly by the gradual filling up of the harbour at its north end. It is flat and marshy, and during the earlier part of the occupation, the surface was to some extent covered with shallow pools of fresh and salt water.

The confined position of the town, the marshy ground, and the great extent of bare, rocky surface, from which the sun's rays are reflected, would indicate unfavourable conditions as to health; but there was a good deal of movement in the air generally, through the rocky gap from the bay outside, up the harbour to the valley beyond.

The topographical peculiarities of the allied occupation, and the influence likely to be exerted by the positions on the health of the troops, will be more readily comprehended by referring to the annexed topographical sketches which were taken from a lofty hill above the Col on the eastern margin of the plateau. These sketches include the whole ground occupied by Her Majesty's forces, except the valley beyond Kamara, where the Highland Division was encamped during the winter of 1855–56.

The geology of the Crimea has attracted the attention of scientific men since the time of Pallas and Clarke, but the most accurate account of it is contained in the work of M. Dubois de Montpereux, and in the geological part of Demidoff's work, written by M. Huôt.

The following summary, with the map, gives the details, as extended from personal observation within the area occupied by the allied forces; but there are some questions of interest in the striking geological features of the country, which require further elucidation.

The geological series, from above downwards, includes the following formations:—1. The Newer Tertiary, or steppe limestone. 2. Volcanic cinders and ashes. 3. The Older Tertiary. 4. Nummulitic limestone. 5. White chalk and greensand. 6. Neocomien. 7. Jurassic limestone. 8. Conglomerates. 9. Schists. 10. Erupted volcanic rocks.

1. *The newer tertiary limestone* forms the superficial stratification of the plateau before Sebastopol, and also the higher levels of the country to the north and north-east of

Sebastopol harbour. The siege works were principally excavated in it. This limestone affords good rubble building stone, and also an inferior road material.

2. Immediately under the upper tertiary beds at San Georgeo is *a bed of volcanic ashes* containing shells, which can be traced from the great ravine of San Georgeo along the sea coast to Cape Chersonese, and thence round the inlets of Sebastopol harbour to Karabelnaia.

3. *Older tertiary beds* underlie the volcanic ashes in the cliffs of San Georgeo. They come to the surface at Karabelnaia, and form the Heights of Inkermann, as also the hills bounding the north side of Sebastopol harbour.

4. *The nummulitic limestone* forms the hill-slopes and cliffs of Inkermann, in the ravines of which it has been extensively quarried for building stone. The hill-slopes above the quarries are covered with loose nummulites. The formation again appears in the hills at the head of Sebastopol harbour, extending from thence to the north-east of the line of Mackenzie's Heights.

5. *The white chalk* begins, on the west, at the ruins of Inkermann, where it is mixed with green particles and upper greensand fossils. It forms the line of cliffs and talus of Mackenzie's Heights: also the bed of the lower valley of the Tchernaia, and occupies the area between the slopes of Mackenzie's Heights and the ridge which separates that valley from the basin of Balaklava. It extends eastward along the base of the heights, and fills up the space between them and the jurassic limestone group east of Tchorgoun, rising into round-backed lofty hills. It forms also the line of hills south of the Tchernaia, known as "Fedoukine Heights."

6. *Neocomien beds* appear under the chalk near Tchorgoun, and extend along the western side of Schula valley towards Aitodar.

7. *Jurassic limestone* appears on the west, in the great cliff at the ravine of San Georgeo. It forms the sea coast cliffs and mountain chains to the eastward, and also the mountain groups between the valley of Tchorgoun and the Baidar and Varnoutka basins. The rock is much altered, dislocated, stratified, hard and compact, often fissured, and the fissures filled with indurated red clay. Not unfrequently it caps the conglomerate.

8. *Conglomerates* of different degrees of fineness occur from the ravine of San Georgeo to Baidar valley. Fine grained beds of conglomerate, apparently altered by heat, underlie the jurassic cliff at San Georgeo. Immediately to the north-east of the cliff the formation reappears, and forms part of a chain of hills closing the upper end of the valley

of Karani. The hill on the south side of the entrance to the valley above the bazaar at Kadikoi also consists of the same formation. Marine Heights and the hills to the east are wholly or partially formed of conglomerate, as are also the southern and western slopes of the Varnoutka basin. Part of the mass of Cape Aia consists of the same rock.

9. *Schists*, apparently belonging to the Lias, underlie the conglomerate beds in the ravine of San Georgeo. They reappear on the south and eastern sides of the basin of Balaklava, under the Col, and in the ridge separating Balaklava basin from the valley of the Tchernaia. They are found in large masses in the valleys to the east of Kamara, from whence they extend southwards to the sea shore. They occur in the basins of Varnoutka and Baidar, and in the undercliff below Laspi.

10. *Erupted volcanic rocks* form the vast picturesque masses of Cape San Georgeo. They underlie the upper and lower tertiaries there, and they protrude themselves at intervals among the jurassic limestones and schists along the south coast of the Crimea to the eastward.

No. II.

Notes on Food and Drink, Canteens, &c.
By Dr. Milroy.

Food and Drink.

The supplies were, and had been for many months, abundant. Fresh meat was served out three or four times a week, and vegetables, fresh and preserved, were liberally supplied. A pound and a-half of soft bread, or a pound of biscuit, was the daily allowance to each man. The former was always eaten; much of the biscuit was not, and was thrown away. The ration of salt meat, too, was often not consumed; the fresh always was. There was, however, at all times no small waste, from the heads, feet, &c., of the slaughtered animals not being used.

Two ounces of rice, and the same quantity of sugar, with one ounce of coffee, or a quarter of an ounce of tea, were also served out daily to each soldier; pepper and salt as required. Cocoa had been occasionally tried, but the men did not relish it, seemingly from the insufficient allowance of sugar, although it is so much liked on board ship.

The articles of food most missed by the soldier were flour and peas. Both are very nutritious, and afford means at the same time of varying the constant recurrence of broth and boiled meat for dinner. It was the opinion of the medical officers generally that they would advantageously form part of the soldier's mess. They are easy of transport. Cheese also was always much in request. Many of the men remarked that it served to check looseness of the bowels, and they bought it largely at the canteens. It is certainly a most useful article of food, and well suited for the field and on the march.

The almost entire disappearance of scurvy from our army, during the last twelve months of the occupation, while it continued to exist in other parts of the allied camp, affords a convincing proof how much some forms of disease, which have often been most destructive to armies, may be prevented by attention to one set of hygienic requirements.

The daily allowance of spirits to each man was one gill. Generally speaking, the men got it *neat*. The first half-gill ration was often served out the first thing in the morning. Young recruits, just arrived, would now and then refuse their ration for a time, but they soon overcame their aversion, and took it as readily as others. The habit is too easily acquired. Even the Turks, and other natives in the Land Transport Corps sometimes drank their allowance, for it was served out to them also. Generally, however, they sold it to the British part of the force, to the no small injury of the latter.

In consequence of the increased amount of intemperance after the cessation of the siege, from the greater facilities of purchasing spirituous liquors in the camp, the attention of the Commander-in-chief was formally drawn to the subject. A board of officers was convened, and, upon their recommendation, the daily allowance of rum was reduced to one-half, while that of sugar was correspondingly increased.

Cooking.

The usual arrangement was that two men were told off from each company, the one as cook and the other as his assistant. The cook acted for a week; then the assistant took the duty, and another man was appointed to assist him; and so on. Each soldier had thus in his turn a fortnight at the work. The cook was relieved from ordinary regimental duty, but not the assistant.

In the Cavalry, one kitchen generally served for a squadron, or two troops; two men acted as cooks, and there were two others to fetch water and hew the wood, &c.

One of the camp-kettles in common use served for preparing the food of seven or eight men. The larger ones, known as the Flanders-kettle and which will cook for twelve or fifteen men, were seldom seen, except among the Artillery, who can attach them on the march to the gun-carriages.

The mode and appliances of cooking varied not a little in different parts of the camp. Sometimes the fuel was merely laid across a few stones on the ground, and a fire lighted and kept burning, as it best might be, in the open air. At other times, the ground was scarped down a few feet, or a low wall of stones put up as a screen, and then a row of holes scooped out to receive the kettles. This was more frequently seen in the French, and also in the Turkish camps, than in our own. The Turks, who are adepts in simple cooking, had made, in some of their camping-grounds on the road to Baidar, small ovens of stone and dab for cooking their food.

In most of the regimental camps, however, something of a rude kitchen had been contrived, either by digging a pit and covering it over, or building it with rough stones and mud. Each company had sometimes its own cooking-place; while in other cases there was but one for every two or four companies, or a still larger one served for the whole regiment.

Besides the ordinary camp-kettles which had been served out, the men had very generally got hold of some larger utensils which they found much more convenient. This was usually a powder-case;—it cooked the rations of forty men or more. The Naval Brigade had some large kettles or boilers, extemporised from iron tar or paint barrels, by cutting them in half and fitting handles and wooden covers to them. The fuel went much further; and the cooking was both easier and better than when there were a number of small kettles to be attended to. With a little management, too, a quantity of warm food was more easily kept ready for the men on their return from the trenches or other exposed service. It was, of course, always a great advantage when the tea and coffee were not prepared in the same vessels which had just been used for cooking the meat rations; yet this was, on the whole, not very frequently the case.

In addition to the above contrivances an American or some other form of stove, the gift of the commanding officer or of friends at home, was met with in most of the regimental kitchens. The object of them all was to economise fuel and facilitate cooking for a number at a time.

Some commanding officers continued to the last to prefer the ordinary camp-kettle for their men to any larger utensil, on the ground that the former being so much more easily carried on the march, it is best to accustom the soldier to the use of what is served out to him. The men themselves greatly preferred the larger vessels, as the various shifts and expedients they had recourse to clearly showed.

After the 9th of September, when the work in the trenches ceased, and the troops began shortly afterwards to make preparations for the winter, a great improvement took place in almost all the cooking-places. Throughout the whole summer the hospital kitchens had been, on the whole, kept by the medical officers in a most creditable condition. Now many of the regimental kitchens also became extremely neat and convenient; while others—and this, too, sometimes in their immediate contiguity—continued to be dark, dirty, and stifling with smoke.

The large iron boilers, which were brought up from the barracks and other buildings in the Karabelnaia district of Sebastopol, contributed much to the comfort of the troops* during the winter of 1855—6, as well as to the saving of fuel and consequently of transport labour. Each boiler would cook the rations of from sixty to eighty men. The men themselves remarked that the fuel, which before was required for a company, would now often do for the whole regiment. This was the case when the boilers were properly set in stone work, so as to have a small fire-place underneath. At the side of the boiler, an old powder case, or a preserved vegetable canister, was sometimes fixed in, and served as a cooking oven.

In some of the camps, large ovens were constructed, and a considerable quantity of bread was baked, to be either served out in the rations, or sold to the troops.

The Army Works Corps were generally supplied with cooking-stoves, provided with a boiler and a large pot, the one for preparing the tea or coffee, and the other for the meat rations.

Canteens.

Almost every regiment had its own canteen; occasionally there was but one between two regiments, and in a few instances there were two in a regiment, one for the men, and the other for the officers. The canteen was very generally kept by some of the foreign suttlers that followed the army, Italian, Greek or Levantine. The commanding officers of some regiments however—the Scots Fusilier

* M. Soyer, who had done so much to improve the cooking establishments in the hospitals, &c., at Scutari, and who was then in the camp, gave many useful suggestions for improving the cooking of the soldier.

Guards for example—would not give their permission to that class of people in their camp, and required that the canteen should be in the charge of a man belonging to the regiment. When this was the case, it was directly under the management of some of the officers, who took upon themselves the trouble of providing the stores, &c. The canteen of the 47th regiment was upon this plan, and the men paid less, and were better served in consequence. The Grenadier Guards had their own "battalion stores" under the charge of a serjeant of the regiment, The articles were purchased in Balaklava by one of the officers.

The prices usually charged in the ordinary canteens, were:—

	s.	*d.*		*s.*	*d.*
Bottled porter or ale	1	8	to	2	0
Draught beer, per quart	1	0	„	1	8
Tenedos, or other Greek wine, per bottle	1	6	„	2	0
Flour, per lb.	0	8	„	1	0
Cheese per lb.	2	0			
Butter per lb.	1	8	„	2	0

The liquid measures were generally much under the English standard, so that the actual charges were often much higher than the above prices indicate. In most canteens, spirituous liquors were not allowed to be sold, except per bottle; in a few, however, they were openly retailed at 6*d.* per glass.

In the canteens which were under the more immediate direction of the officers, the prices charged were considerably less than the above, and the quality of the articles, of course, more to be depended on.

It was the universal opinion that the whole canteen system in the field might be altered with advantage, and that better articles, at a much lower price, might be put within the reach of the soldier, by arrangements between the different departments of the public service itself.

Clothing.

Although the troops had been abundantly provided with woollen clothing to wear next the skin, and they were, moreover required by a General Order to do so, many of the men neglected this important preservative of health, until the cold weather began to set in. This neglect had been over and over again observed to be followed by sudden attacks of diarrhœa among the men, when they were at night in the trenches, or on other duty, exposed to the great alterations of temperature so frequent in the Crimea. It was chiefly among the young soldiers who had recently arrived, and who were from other causes the most liable to such disorders, that the neglect was found to exist. The

old campaigners, and all the officers without exception, wore flannel throughout the year. In some regiments, the surgeons took the useful precaution of occasionally inspecting all the men, to ascertain that they wore their woollen skin clothing, and many attacks of illness were doubtless thus prevented.

The medical officers generally were also of opinion, that the waterproof capes and jackets supplied to the troops tended very materially to preserve the health, as well as to increase the comfort, of the men. During the hot weather, the light fatigue jackets had been found most acceptable and useful.

No. III.

Notes on Ships of War. By Dr. Milroy.

In consequence of the very fatal outbreak of malignant cholera in the fleets at Varna in the preceding year, when general alarm was occasioned in the land and sea forces of the allies, and the expedition to the Crimea was thereby considerably delayed, the Lords of the Admiralty considered it advisable in the summer of 1855 to put the Commission in communication with the Admiral in command and with the principal medical officer of the Black Sea fleet, in the event of epidemic sickness again prevailing in the squadron.

On the occasion referred to, the "Britannia," carrying the flag of Vice-Admiral Dundas, had been visited with extraordinary severity. Between one-half and two-thirds of the crew were smitten with the pestilence in its milder and more severe forms. Of 229 attacked with developed cholera, no fewer than 139 perished, or about 13 per cent. of the entire crew (1,040 in number). Nearly the whole of this dreadful mortality took place within four or five days. There was no death among the officers.

Other ships of the fleet, chiefly line-of-battle ships, suffered much at the same time, but none to the extent of the "Britannia."

The circumstances which had occasioned the excessive virulence of the disease on board the Admiral's ship appear to have been these. She arrived at Varna at the end of July, her crew at the time in excellent health, and the ship thoroughly clean throughout. Diarrhœa began to occur

immediately afterwards, and increased from day to day with occasional attacks of cholera, which had made its appearance both on shore and among the shipping. It was, therefore, thought advisable to put to sea in the hope of getting rid of the sickness, by leaving the anchorage near the shore. For the first day, the change seemed to do good; but from the following night, when it was found necessary to close the lower deck ports, things rapidly became worse, and next morning the dreadful attack commenced. The men seemed to have been poisoned by the impure air they had breathed during the night. The violence of the disease continued for the next four days, until the ship returned to Varna, and the whole crew were transferred to other vessels. From that moment, it rapidly subsided and ceased, without being communicated or doing any injury whatever to those on board these vessels. A more striking example of the deadly effects of impure air in an epidemic season, and of the all but infallible means of arresting the evil, cannot be imagined.

A minute inspection of the "Royal Albert" was made by Dr. Milroy, in company with Dr. Brien the principal medical officer, and subsequently of the "Queen," with Dr. Deas, Inspector-General of the fleet. Especial attention was paid to the arrangements on board ships of war, which are generally believed to have most influence in predisposing the crew to attacks of epidemic diseases, and in rendering these attacks formidable. The foremost of these is the amount of accommodation between decks for the men at night. In line-of-battle ships, the lower gun deck is reserved for this purpose; in two-deckers, the marines as well as the seamen sleep there, but in three-deckers, the marines and boys occupy the fore part of the middle deck. From 600 to 800 men, according to the strength of the crew, are thus usually berthed on the lower or main deck. By the relief of watches every four hours, there may never be more than one-half these numbers in their hammocks at one time; but nevertheless the whole have to sleep on that deck from night to morning. The state of the atmosphere must depend on the efficiency of the means for ventilation, by which the breathed air can be removed and fresh air introduced. When all the ports are open, there is of course free perflation, and the hatchways over head serve for the escape of the heated impure air; but when the ports are closed, the only means of admitting fresh air is by the hatchways, with or without the aid of windsails, so that the same openings serve the double purpose of entrance and escape. The close and offensive state of the between-decks of a ship of war, within two or three hours after the men have turned into their hammocks during the first watch, proves how quickly the atmosphere becomes tainted; and the evil of course becomes worse afterwards. Sir William Burnett, the late Director-General of the Medical Department of the Navy, has observed, in reference to the causes of the great mortality on board the "Britannia," "It will thus be seen that the whole ship's company were, during the greater part of the night, so situated that they could not help breathing an atmosphere which was not only well nigh exhausted of all its vital support, but poisoned by the effete products of respiration and by the other emanations which escape from the living body, whether in health or disease."

The immunity of the officers upon that occasion was doubtless owing chiefly to their having a larger amount of breathing space allowed them.

On board the "Royal Albert," and in other *screw* line-of-battle ships, most of the officers have their cabins on the orlop deck, where all the midshipmen and mates also sleep. This arrangement, introduced of late years, must serve to render the atmosphere in the main deck still more impure; the heated breathed air from the orlop deck passes into it. The officers' cabins are apt to become quite stifling when the scuttles are shut, more especially when the furnaces are lighted.

The accommodation for the sick in screw ships, as in the "Royal Albert," is, in several respects, inferior to that on board sailing ships of the same class. The sick-bay is much smaller, occupying only one side of the upper deck forward instead of its entire breadth. It is not nearly so well ventilated, and does not admit of being so well ventilated. It is, moreover, exposed to contamination of atmosphere from the faulty arrangements of the water-closets, which have been adopted in the new ships. By the closet of the sick-bay being placed forward in the ship's eyes, and its shoot communicating with the large shoot from the men's latrine in the head, offensive effluvia are continually being driven back into the hospital, to the disgust of the patients and attendants. This nuisance is much complained of by the medical officers. It is, moreover, made worse by the midshipmen's closet in the recently constructed ships being put immediately outside the bulk-head of the sick-bay, instead of being at a distance from it on the middle deck as in other vessels. On going into the sick-bay in the "Royal Albert," the noxious exhalations from this closet were very perceptible.

In some new ships the stock-pen, too, has been brought so much more forward than it used formerly to be, that it is in direct proximity to the sick-bay. There is less

freedom of circulation of air around it, and the effluvia from the live stock are proportionately more offensive.

The latrine accommodation for the crews of ships of war appears to be quite insufficient at all times. In some epidemic seasons, this defect must be not merely inconvenient but positively injurious.

The experience of our Black Sea fleet in 1854 afforded another instance of what is from time to time occurring in the navy—an extraordinary amount of sickness and death on board some ships in epidemic seasons. On almost every such occasion, the overcrowding of the men, and the defective ventilation of the between-decks at night appear to have been the chief predisposing and aggravating causes. A foul state of the hold may have been sometimes present at the same time; but so much attention is paid in the present day to thorough cleanliness of every part of a ship of war, that this source of mischief is comparatively rare.

That the ventilation of the between-decks and of the cabins is capable of being greatly bettered by sufficiently simple means cannot be doubted. Still it is very questionable whether by any means it can be made so perfect as to render the air at night as pure as is desirable, or even safe in certain seasons, while the crew continue to be crowded together on one deck, and that deck the lower one. At least one-half of the best sleeping space in a ship of war is, in ordinary circumstances, left unoccupied. It is only made available when there is much sickness on board, and then it is used as part of the sick-bay. There appears to be no other reason for its non-occupation at other times but the practice hitherto of the service. Free space and pure air are, however, as necessary for the prevention of disease as for its mitigation and arrest.

The changes in the accommodation for the well and sick, adopted of late in the new screw line-of-battle ships, have had the effect of diminishing the amount of space, without any concomitant improvement in the ventilation of the decks. This point requires the more notice, as the heat on board a steamer is of course greater than in an ordinary sailing ship, and the atmosphere is liable to become more oppressive. Many of the most fatal outbreaks of pestilence in the navy of recent years have occurred in steamers.

Several troop-ships and transports in Balaklava harbour were inspected by the Commission.

No. IV.

ABSTRACT of the DIARIES of JAMES NEWLANDS. ESQ., Civil Engineer, and of MR. JAMES WILSON, Inspector of Nuisances, relative to the Cleansing and Scavengering operations carried out at the Scutari Hospitals, from March 8, to July 7, 1856.

March 1855.

6*th.*—Mr. Newlands reached Constantinople in company with the Sanitary Commissioners.

10*th.*—Messrs. Freeney, Aynsley and Wilson, the three Inspectors of Nuisances attached to the Sanitary Commission, arrived at Constantinople this day.

From the 8th to the 15th, Mr. Newlands rendered such assistance to the Commissioners as was required. Scavenging operations were commenced at the several hospitals on the Bosphorus, and Mr. Wilson being installed at Scutari, and his own work being completed at Constantinople, Mr. Newlands received instructions from the Commission to proceed along with Messrs. Freeney and Aynsley, the two other Inspectors of Nuisances, to the Crimea; they embarked on board the steam transport "Brandon," and left Constantinople for Balaklava the same afternoon.

The cleansing operations at Scutari were commenced as soon as the necessary men and materials were obtained. Flushing cisterns for cleansing the sewers at the Barrack and General Hospitals had to be erected, and a little delay took place in consequence.

A gang of native labourers having been placed by Lord William Paulet under the direction of Mr. Wilson, they were daily employed in sweeping every part of the neighbourhood of the hospital buildings, and streets in their vicinity. The main sewers were opened and cleansed, and were afterwards flushed twice and sometimes three times a-day, and the privies were regularly examined, cleansed daily, and deodorized with peat charcoal.

A place of deposit was selected for the filth and rubbish, which was each day collected and carried by labourers to the appointed place.

The flushing of the sewers at the hospitals absorbed much of the labour at Mr. Wilson's disposal, as the water used for the purpose had mostly to be carried up from the Bosphorus to the hospital; the supply there not being abundant enough to be used for flushng.

Mr. Wilson inspected cleansing operations at the hospital at Kulali, as well as at those at Scutari, once or twice a-week; taking care that the cleansing operations at Kulali, which were done by the purveyor's men, were being properly carried out.

In the same way, cleansing at the Palace Hospital was, from the 14th of April, 1855, done by men acting under the orders of the Purveyor there, Mr. Wilson frequently inspecting the work. The following is an abstract of the diary:—

Weekly Abstract of Mr. Wilson's Diaries.

Week ending March 24.

Thirteen men, on an average, employed in cleansing the surface of the ground in the vicinity of the Barrack Hospital and at Kulali, in removing the refuse, burying animals, &c. During the week there were collected and removed from the vicinity of the Barrack Hospital 202 hand-carts or baskets full of filth, rubbish, and offensive matter. Two tons of filth were removed at Kulali. The carcases of 15 dogs and 2 horses were buried and the sewers of the Barrack Hospital were flushed three times.

Week ending March 31st.

The cleansing operations were extended to the General Hospital and Palace Hospital this week. The number of men employed was 20 on the average. The ground about both Hospitals, and that portion of the village nearest the Barrack Hospital was swept clean. A large sewer within the barrack square was opened, by order of the Commissioners, and 42 hand-carts of filth removed from it. The sewers connected with the privies were opened and cleansed, and 26 hand-carts of filth removed from them. A sewer at the General Hospital was also opened, and cleansed, and 14 hand-carts of filth were removed from it. Water was carried to the flushing tanks, and the sewers at the Barrack Hospital were flushed 19 times in the course of the week. The total filth and refuse removed from the vicinity of Barrack, General, and Palace Hospitals during this week, was 354 hand-carts or baskets full, and the carcases of 7 dead animals were buried. Peat charcoal was used in the cleansing operations.

Week ending April 7th.

The ground about the Barrack, General, and Palace Hospitals was swept as usual, also part of the village of Scutari; an offensive sewer at the Barrack Hospital was cleansed. The average number of men employed during the week was 25. There were 297 hand-carts or baskets full of filth removed. Water was carried to the flushing tanks, and the sewers and privies at the Barrack Hospital were flushed 21 times. Peat charcoal was used to deodorize the privies. The hospital at Kulali was inspected. Peat charcoal was used for deodorizing the privies. The ground round the hospital was cleansed and the privies flushed.

Week ending April 14th.

The average number of men employed this week was 20. The ground about the hospitals was swept as usual, and 215 hand-carts or baskets full of filth were removed. Water was carried to the flushing tanks, and the sewers at the Barrack Hospital were flushed 19 times during the week. The carcases of 2 horses, a cow, and 4 dogs, were buried.

Week ending April 21st.

Several large foul sewers were opened at the Barrack Hospital by order of the Commissioners; peat charcoal was applied to deodorize their contents, and above 100 hand-carts of filth were removed from them. The ground around all the hospitals was cleansed. The filth and refuse collected and removed during the week, amounted to 417 hand-carts or baskets full. Water was carried to the flushing tanks, and the sewers and privies at the Barrack Hospital were flushed out 24 times. Peat charcoal was applied to the privies every day. A dead horse was buried. The average number of men employed during the week was 26.

Similar cleansing works were carried out during the two succeeding weeks.

Week ending May 12th.

An average of 24 men employed during this week. The cleansing operations at all the hospitals inspected as usual. There were 284 hand-carts or baskets of filth removed from the vicinity of the Barrack and General Hospitals. Water was carried, and the sewers at the Barrack Hospital flushed out 23 times. The privy drains were also flushed by the aid of the fire engine, several tons of water being used for the purpose.

Similar cleansing works were carried out during the week ending the 19th.

Week ending May 26th.

The usual cleansing operations were carried out at the Barrack and General Hospitals, and the other hospitals, which are cleansed by the purveyor's men, were inspected, and found in a satisfactory condition. An average of 25 men were employed during the week, in sweeping, removing filth, and carrying water to the flushing tanks. The sewers and privies at the Barrack Hospital were flushed out 24 times, and 329 hand-carts or baskets of filth were swept up and removed. A dead buffalo was also buried. The privies were deodorized with peat charcoal.

Week ending June 2nd.

There were 25 men employed on cleansing at the Barrack and General Hospitals during the week. The hospitals at Haidar Pascha and Kulali inspected as usual, and found to be clean. There were 335 hand-carts or baskets full of filth swept up and removed from the vicinity of the Barrack and General Hospitals. Water was carried to the flushing tanks at the Barrack Hospital, and the sewers were flushed 23 times during this week. The flushing tanks for cleaning the sewers at the General Hospital were completed at the end of this week, and the sewers were flushed out twice.

Week ending June 9th.

The external cleansing of the hospitals at Haidar Pascha and Kulali was inspected and found to be well done. Cleansing operations carried on at the Barrack and General Hospitals by a daily average of 22 men, and 295 hand-carts of filth and rubbish swept

up and removed. Water carried to the flushing tanks at the Barrack and General Hospitals, the sewers and privies of both hospitals were flushed out 40 times during the week. Two dead horses buried.

During this week Mr. Newlands, on his return from the Crimea, examined carefully the state of the cleansing works under Mr. Wilson's inspection, and had every reason to be satisfied with their efficiency. He reported the hospitals, externally, to be in a very different condition than they were in when first visited by the Sanitary Commissioners.

Week ending June 16th.

There were 26 men employed on cleansing operations at the Barrack and General Hospitals, 405 hand-carts and baskets of refuse were swept up and removed. Water carried for flushing the sewers, and those of the Barrack and General Hospitals flushed out 20 times each, in the course of the week. The other hospitals were also inspected.

Week ending June 23rd.

All the hospitals visited as usual, the cleansing operations inspected and found satisfactory. There were 23 men employed during this week at the Barrack and General Hospitals, in sweeping, removing filth and rubbish, and in carrying water to the flushing tanks. The sewers and privies at the Barrack and General Hospitals were flushed out 24 times each, and 380 hand-carts of rubbish and filth swept up and removed.

Week ending June 30th.

The average number of men employed this week in cleansing and carrying water at the General and Barrack Hospitals was 20. The ground in the vicinity of both hospitals cleansed as usual, and 348 hand-carts of refuse removed. There were 48 flushing operations carried out at the sewers and privies of both hospitals, and one dead horse buried. The other hospitals were visited and found to be clean.

Week ending July 7th.

The usual cleansing operations were carried out with 21 men. The ground in the vicinity of the Barrack and General Hospitals, and also around the new depôt huts was cleansed, and 354 hand-carts of refuse removed. Water was carried to the flushing tanks of both hospitals and the privies and sewers of each hospital were flushed out 24 times in the course of the week, making 48 flushing operations. The other hospitals were inspected as usual, and found to be clean.

The same cleansing operations were continued until Mr. Wilson left Scutari.

No. V.

ABSTRACT of DIARY of JAMES NEWLANDS, ESQ., and MESSRS FREENEY and AYNSLEY, relative to Cleansing Operations carried out at Balaklava.

March 1855.

19*th.*—Having reached Balaklava the previous evening, Mr. Newlands proceeded to Head-Quarters, and had the honour of an interview with Lord Raglan. His Lordship gave orders that every facility should be afforded for the necessary examinations at Balaklava.

20*th.*—During this and the two following days, a minute examination was made of the harbour, the village of Balaklava, and its precincts.

On the east side of the harbour, the shore was covered with putrid filth; in creeks formed by the jetties on that side, floating carcases, parts of slaughtered animals, and many bellies were seen in a putrid condition.

Statistics were obtained of the slaughtering on board vessels in the harbour, which at that time was crowded, and it was found that not less than eighty sheep were slaughtered daily on board ship, and the blood and offal thrown into the harbour. It was impossible even to approximate to the number of fowls killed daily, the entrails of which were also thrown overboard into the harbour.

The berthing place for newly arrived transports being chiefly in the neighbourhood of the Ordnance Wharf, caused an accumulation of many of the above-named nuisances, in the creeks between the Ordnance and Cattle Wharves, and between the ships lying there. The transport ship "Brandon," on board of which the Inspectors lived on their first arrival at Balaklava, was rendered unwholesome by fœtid exhalations from the water around the vessel.

On the north or upper part of the harbour, the water was found to shoal, and the whole of its margin to be a compost of decaying animal and vegetable matter, emitting a most offensive stench. Part of the continuation of the low land opening into the plain of Balaklava, which is swampy ground, was found to have been converted into a burial-ground, smelling most offensively. The west side of the harbour, having a steep shore, was almost free from nuisance, except at Cossack Bay, where several carcases were floating.

From the absence of proper latrines in the village, it was found that in the lower part of the ruins of the Genoese Castle on the slope of the hill itself, and in almost every place in Balaklava which was screened from observation, there were accumulations of ordure.

The bed of the stream at the south-east of the harbour was also in a most filthy condition, and the whole neighbourhood of this locality was covered with parts of slaughtered animals, with manure and with garbage of other kinds. In the midst of this filth, a considerable population was living in tents.

An uneven piece of ground at the rear of the Naval Brigade Magazine, and another between that and the Commissary-General's office, used as a station for transport mules and drivers, was in a filthy condition.

From a want of names to the streets, it is not easy to indicate, precisely, the locality of nuisances that were observed; but one may be particularized, as its virulent nature called for the most prompt remedy; it was at the back of the rum stores, where, on the site of a dismantled house, and in the yard belonging to it, human ordure covered the ground to a depth of some inches, a small apartment in this yard was inhabited.

On this day the thermometer indicated 70 in the shade, and towards evening the bad smells in and over the valley were sickening.

During the whole day the village of Balaklava was crowded with baggage animals and their drivers, and with persons from the camp coming and going.

23rd.—Dr. Gavin having reached Balaklava the previous evening, Mr. Newlands, showed him the various localities demanding attention, and laid before him memoranda of suggestions as to the way of dealing with the evils in question.

24th.—Mr. Newlands went with Dr. Gavin to Head-Quarters, had an interview with Field-Marshal Lord Raglan, and stated to his Lordship that to carry out the proposed cleansing operations, 50 such men as the railway navigators would be required.

26th.—Occupied in drawing up report on the cleansing measures for Balaklava, and in making copies of the same.

27th.—Major Mackenzie, Assistant Quartermaster-General, was to-day enabled to grant two huts for the use of the Inspectors, much inconvenience having been felt whilst living on board ship, for want of some place on shore to which messages and communications could be sent.

A requisition made upon the authorities for men and tools; but as none could be obtained either on this, or the two following days, the Inspectors were reduced to comparative inactivity.

30th.—Went this morning by appointment to Lieutenant-Colonel Harding's, the Commandant of Balaklava, and had 41 men told off for use. Marched the men to the office of the Royal Engineers, but found, that as no order had been given for tools, none could be obtained; the labourers were, in consequence, discharged.

At 9 o'clock inspected the harbour in company with Rear-Admiral Boxer, and fixed on a site for a slaughtering-wharf, and on one for embarking the sick.

31st.—Made a further inspection of the village and harbour of Balaklava.

April.

2nd.—A requisition for tools upon the officer commanding the Engineers having been obtained, Mr. Newlands was enabled to set to work the men placed at his disposal, under the superintendence of the two Inspectors, Messrs. Aynsley and Freeney.

3rd.—Accompanied Dr. Gavin this morning to inspect a portion of the cavalry camp near Kadikoi.

Forty-three labourers, 10 wheelbarrows, 12 shovels, and 20 picks, having been granted to day, the Inspectors were directed to employ them as follows:—

Nine of the men to remove and pile up a quantity of timber lying scattered over a piece of vacant ground behind the Commissariat rum store, and to begin levelling the ground. The surface of this ground was covered with human ordure, in many places to a depth of several inches, the place being, at this date, the resort of workmen employed in the various stores, of sailors from the shipping lying off the adjacent quay, of the natives living in the vicinity, and also of many of the soldiers coming daily to Balaklava from the front.

The other labourers were employed in removing and burying large quantities of offensive matter at the back of the Naval Brigade Magazine, and in levelling the ground so cleansed. This place had been used as a stand for Commissariat ponies, and about 40 tons of manure and filth had been allowed to collect on the margin of the stream which flows from the Castle ravine past the Brigade Magazine. Some portions of this refuse being dry, the Inspector had it set on fire, and thus got rid of part of it, and in some measure lessened the bad smell proceeding from the remainder.

4th.—Continued general inspection.

Thirty labourers having been granted this morning, 6 of them were employed on the ground behind the rum store in finishing the levelling, and in otherwise improving the place. Four loads of quicklime, and two bags of charcoal were also distributed on the surfaces.

Some Maltese were living in this yard, three of whom were at the time lying ill with fever.

The remaining 24 labourers were employed behind the Naval Brigade Magazine, and with very beneficial results. The whole of the horse dung and manure was removed, and the surface of the ground sufficiently levelled to prevent any water or liquid refuse from stagnating and becoming offensive.

5th.—Went this morning with Admiral Boxer to select a dirt barge to be employed in conveying to sea the refuse from the ships and the village. A boat having been fixed on for the purpose, Admiral Boxer undertook to have a new deck put upon it.

Thirty labourers were again put at the disposal of the Commission. They were employed on the ground near the Naval Brigade Magazine, as a number of tents had formerly been pitched in this neighbourhood, when the ground was a good deal broken up and uneven.

The old sites that had been cleared for the tents, being to some extent sheltered by the earth thrown up round them, had become places of deposit for all kinds of filth by the men at the Cattle Pier, the Commissariat drivers and others.

These deposits, the Inspectors now proceeded to have covered over with earth and gravel, and the ground so levelled as to prevent any such accumulations in future.

During the forenoon, six of the labourers were employed in removing the filth, from that portion of the old Castle which was lowest down the hill, and also from the various hollows along the stream flowing down the Castle ravine. Two large holes were then dug, and the filth placed therein, a quantity of old mortar (to a depth of 5 or 6 inches) from the ruins, and then earth being

thrown over the animal matter. A dead horse found lying on the hill side at the back of the Naval Brigade Magazine was also buried.

6*th.*—Went on board the steam ship "Severn" to see Dr. Sutherland and Mr. Rawlinson, who had arrived from Constantinople, and afterwards proceeded with them to inspect the work in hand.

Thirty labourers having been granted this morning, they were employed by the Inspectors during the forenoon in cleansing the margin of the harbour near the Ordnance Wharf—this being the berthing place for the largest class of transport steamers—and in dragging the garbage and other filth that had collected in the shoal water on to the shore. The smell from this offal was most offensive and sickening. Six large holes were then dug, and the filth buried, quicklime being freely scattered over it, before it was finally covered with ashes and earth.

In the afternoon the men were employed in covering with lime and earth the remains of a large heap of manure near the Castle ravine, a portion of which had been burnt, under the direction of the Inspectors, on the 3rd instant.

7*th.*—To-day 30 men were assigned, all of whom were employed in cleansing the bed of the Castle ravine stream for about 50 yards of its course, being the space between where it issues from the ravine, and where it falls into the harbour. The whole of the filth and garbage that had accumulated in the stream was removed and buried, and the margin of the harbour, where the bellies of slaughtered animals and other refuse was floating, was dragged, and the offal so collected was buried. The margin of the harbour and stream for about ten yards was likewise covered 6 inches deep with lime and fresh earth. The water of the stream, which had previously flowed in an indiscriminate manner over the whole space between the ravine and the harbour, so that foot passengers could hardly cross it, was confined to a channel about 2 feet in width, by 6 inches in depth, and a sufficient fall given it, so that any refuse which may hereafter accumulate can be easily removed.

The crew of the steamer "Tonning," lying off the Cattle Pier, laden with sheep and bullocks for the Commissariat, were throwing large quantities of manure into the harbour. From 5 to 8 tons of manure were thus disposed of. The Inspectors called the attention of the harbour police to the circumstances.

8*th.*—Engaged in drawing up some extended proposals for improving the sanitary condition of Balaklava, and the vicinity.

Thirty men were handed to the Inspectors, who employed them on the same work as the preceding day; but towards afternoon the weather was so unfavourable, that nothing could be done after 3 o'clock.

9*th.*—Completed the proposals commenced yesterday. The weather stormy and wet; no outdoor work could be proceeded with.

10*th.*—On the Inspectors attending at the usual hour and place for parading the labourers, they were informed by the non-commissioned officer in charge, that some of the natives were sick, that others had been sent to the front, and that the few who remained were required by the Town Adjutant.

The Inspectors therefore made a minute inspection throughout Balaklava.

11*th.*—Mr. Newlands was with the Commission to consider his report and proposals.

The military authorities were again unable this morning to grant any labourers for the work of the Sanitary Commission.

12*th.*—Attended at a meeting of the Sanitary Commission, on the subject of a communication to be presented to Field-Marshal Lord Raglan, on the state of Balaklava and the harbour.

No work was done to-day, as the military authorities continued to be unable to supply the requisite labour.

The Inspectors being, therefore, unemployed, they again made a thorough examination of the village and harbour, both of which were found to be in a very filthy state.

No improvement had been made in the condition of the houses or ground, facing the quay, the surface being very dirty, more especially near the railway saw-mills and the charcoal stores. The ground, which had been cleansed and deodorized by the Inspectors on the 4th instant, was becoming foul again, as it continued to be the resort of the natives and others living, or working, in the immediate neighbourhood.

The margin of the harbour, opposite the then quarters of the Gendarmerie Impériale, and near the Ordnance Wharf, was likewise in a filthy state, with garbage floating on the surface of the water. In front of the Naval Brigade Magazine there was a quantity of offal, and there was more near the Cattle Pier; on the margin of the harbour, where the Castle ravine stream enters it, there were also several bellies floating, and the carcase of a dead sheep, and behind the Naval Brigade Magazine a dead mule had been lying some days unburied.

In the yard attached to the Commandant's house a latrine was in a very offensive state.

The railway labourers had erected a latrine for their own use at the back of five huts in their occupation, and sunk a soil pit about ten feet deep.

Behind the Police Office, at the side of the road leading to the Castle Hospital, there was a hole sunk in the rock, and used as a soil pit. The smell from it was most offensive. Within a few feet of this hole there was a tent pitched in the occupation of men in the employment of the Commissariat.

A latrine for soldiers had been made in Mount Street, and two others for officers not far from it. The public latrine was offensive, and stood in need of an application of charcoal, or lime and earth. Near the General Hospital there was another latrine, and an offensive smell from it was perceptible at the upper end of the village.

13*th.*—Attended at a meeting of the Sanitary Commission, and inspected the native mule camp. Also wrote a letter on the withdrawal of the men who had been previously at work, and a report as to the dirt barges.

The Inspectors having attended at the Town Adjutant's Office were informed that he had only 23 men at his disposal, and that they were required by him.

The Inspectors, therefore, continued their inspection of the village and harbour, and found several bellies and other garbage floating about. During the day there was a very offensive smell near the Ordnance Wharf, and also, towards sunset, from the upper end of the harbour and graveyard. The dead mule, behind the Naval Brigade Magazine, alluded to in yesterday's diary, was still unburied.

14*th.*—This morning drew up a statement of the manner in which the Inspectors had been employed since their arrival in the Crimea.

The Inspectors, on attending at the Town Adjutant's, were told that there were only 25 labourers available for work, and that none could be spared for the service of the Sanitary Commission.

15*th.*—Having been consulted by Admiral Boxer as to the duties of the Harbour Police, Mr. Newlands drew up the necessary document and rode up with it to the hut of the Sanitary Commission.

There were no labourers available this morning.

16*th.*—Went on board the "Australia" to procure a supply of peat charcoal.

The Inspectors, continuing still to be without any labour, inspected the cattle slaughtering-place at the head of the harbour, near the lime kiln, found it in a most filthy state.

17*th.*—Attended this morning at the Town Adjutant's Quarters at 6 o'clock, expecting that men would be assigned, but ascertained that none would be available until after 12 o'clock, when 23 labourers would be told off for sanitary work.

Nine days had elapsed since the Sanitary Commission last had any labourers granted them.

Having instructed Mr. Freeney to be ready to receive the men, proceeded to make an inspection of the harbour and village. Afterwards attended a meeting of the Commission, and furnished them with an estimate of the number of men and materials required to carry out the necessary cleansing operations.

Twenty-three labourers being handed over to the Inspectors after dinner, they employed them on the margin of the harbour between the Ordnance and Cattle Wharves, in cleansing and liming. The carcases of two calves, several bellies and other garbage were buried, lime being plentifully strewn over them.

The Inspectors next had a quantity of lime strewn over the heaps of filth in the yard in front of the church, and the Chaplain's Quarters, and over similar accumulations lying between the last-named house and that of the Quartermaster-General's Department.

Three barrows of lime and a quantity of charcoal were likewise thrown into the public latrine in Mount Street, and similar quantities into a latrine in front of the General Hospital huts. These places, both of which were previously very offensive, were greatly improved by the above application.

The dead mule that had been lying at the back of the Naval Brigade Magazine was also buried to-day, lime being thrown over the carcass before it was entirely covered with gravel and earth.

18*th.*—Mr. Newlands confined to his hut by fever.

Twenty-two labourers were handed over to the Inspectors, who

employed them at the yard behind the Commissary-General's in removing a large quantity of filth that had been allowed to accumulate, and in levelling and liming the surface of the ground. A heap of manure near the old Greek Church was also limed, and the sloping ground, in front of some tents occupied by soldiers attached to the Commissariat, was likewise cleansed and lime strewn over the surface, a quantity of stagnant water collected here, had been very offensive for some days preceding. The Inspectors next caused the latrine in the yard of the Commissariat Office to be deodorized with lime and charcoal, and a dead bullock (that had died after being landed) to be towed out to sea and there sunk.

During the day a fatigue party of the Guards employed in pulling down the yard walls in front of the English Church, and of the houses intervening between it and the Quartermaster-General's, these walls having hitherto served as screens for the deposit of refuse and filth. This work had been begun by Tartar labourers before they were transferred to the Inspectors of the Sanitary Commission, and was finally completed by soldiers. Later on in the day, the Guards' fatigue party employed at the wharf at the upper end of the harbour.

19*th.*—Attended a Commission meeting respecting the report to Field-Marshal Lord Raglan, on men and materials required to carry out cleansing operations; 24 labourers came to work, but not until a late hour. They were again employed at the yard behind the Commissary-General's Quarters in covering over the filth with about a foot of earth, and in otherwise improving the condition of the place.

Eight of the Tartar labourers were employed in cleansing an old surface drain at the Commissariat Wood Yard, and in filling up with earth and gravel a number of holes in front of the same place, in which stagnant and putrid water had collected and become so offensive, that the storekeepers complained of being made sick and obliged to leave their duty in consequence.

20*th.*—Engaged in an inspection of the vicinity of the Castle Hospital, the condition of which was found much improved; and in preparing a report on the works in progress.

Twenty-three of the labourers were at work under the inspectors, eight of them at the yard behind the Commissary-General's quarters, and the remainder at the Commissariat Wood Yard, making an underground drain to convey refuse water from the yard of the Commandant's Quarters, and in otherwise improving the surface and filling up holes on the quay. A dead mule from near the French Commissariat Yard, was towed out and sunk at sea, the French Authorities objecting to its being buried near their store.

21*st.*—Twenty-four labourers employed during the day in levelling the surface and covering over filth at the yard behind the Commissary-General's, and in cleansing the margin of the harbour.

22*nd.*—Twenty-two labourers at work at the yard behind the Commissary-General's, and in cleansing the bed of the stream flowing down the Castle ravine.

23*rd.*—Went to the camp of the Highland Brigade along with Dr. Sutherland and Mr. Rawlinson.

Twenty-five labourers employed on work similar to that of yesterday. In the afternoon a portion of them were directed to deodorize the latrines at the General Hospital, and the Main Guard, in Mount Street, and at the quarters occupied by the Turkish labourers, and also the one at the Castle Hospital. The Inspectors also had a quantity of lime carried to the head of the harbour, to mix with gravel intended for the more effectual covering of some dead horses, whose carcases had been buried only a few inches below the surface.

24*th.*—This morning inspected the present state of the whole of the village and harbour of Balaklava, and the precincts of the Castle Hospital. Afterwards proceeded to Head-Quarters with the Commissioners for an interview with Field-Marshal Lord Raglan, but found that his Lordship was engaged.

Returned to Balaklava, and directed the Inspectors to employ the men in covering over the graves at the head of the harbour.

The nineteen labourers assigned to the Commission to-day, were employed at the head of the harbour, in covering the dead bodies and those places where stagnant water and filth had collected, the latter being from twelve to eighteen inches in depth. Whilst thus engaged, a body of Tartar labourers, under the direction of a non-commissioned officer, were employed in driving piles at the head of the harbour, and the Inspectors of the Commission were enabled to assist in this work, by ordering their men to fill in the water space behind the piles with earth and gravel.

25*th.*—Accompanied the Commissioners to Head-Quarters by appointment, and proceeded thence with them, and Colonel the Honourable A. Gordon, to inspect the camp and the regimental hospitals.

Twenty-three men employed this day by the Inspectors on the same work as yesterday, the Eupatorian labourers continuing their work of pile-driving and embanking. The latter men, who were acting under the military authorities, are much stronger and more active than the men assigned to the Sanitary Commission Inspectors.

Fatigue parties of soldiers continued to be employed on the roads near the village, and on the quay near the Railway Yard.

26*th.*—Engaged in drawing up statements, to be presented to Field-Marshal Lord Raglan, as to the mode of carrying on the future sanitary and cleansing operations.

Twenty-five men assigned to the Commission were employed under the superintendence of the two Inspectors, at the head of the harbour in covering over the surface of the old burial ground, a dead horse, lying near the lime kiln, was likewise buried, lime and charcoal being thrown into the pit along with it.

27*th.*—Went with Dr. Sutherland and Mr. Rawlinson, to the camp of the Highland Brigade.

Twenty-seven labourers were at work to-day under the Inspectors, of whom 15 were employed at the head of the harbour, the remaining 12 being engaged in digging two latrine pits at the Native Hospital Huts above the Mule Camp outside the village, and in cleansing the surface of the ground around the huts.

28*th.*—Twenty-nine labourers employed to-day under the superintendence of the Inspectors of the Commission, for finishing the latrine pits begun yesterday at the Native Hospital, and the remainder at work at the head of the harbour covering the graves and levelling the ground.

The weather very warm, and complaints begun to be made about the offensive smells from the ground at the head of the harbour, which was wet and marshy, one side being bounded by the road which connected Balaklava with the front, and along which the whole traffic of the army was conducted.

This marshy space had served as the burial-ground for the men at or near Balaklava during the winter of 1854-55, the bodies in many instances being merely laid on the surface, and then earth heaped over them.

The warm weather now hastened decomposition, and the effect of this was sometimes visible on the top of the grave mounds, the stench being so great, that the labourers on the ground had to be changed every hour, until the surface had been covered with a coating of gravel about twelve inches deep.

To cover the whole ground effectually, was a work of some duration, considering the quantity and quality of the labour assigned. A great part of the labour consisted in carrying the gravel to cover the graveyard from the opposite side of the railway and main road, which bounded it, the gravel having to be carried on the men's shoulders in small baskets, that would not hold above a stones weight of material, there not being a sufficient supply of either carts or wheelbarrows.

29*th.*—Made an inspection of the village, and of the ground at the foot of the Castle ravine.

Twenty-nine men at work to-day, under the Inspectors at the graveyard at the head of the harbour.

30*th.* Twenty-five men at work to-day under the superintendence of the two Inspectors, covering the graveyard at the head of the harbour, lime and charcoal being used with the gravel where necessary.

May.

1*st.*—A letter was this day received by the Commission, stating that Field-Marshal Lord Raglan had acceded to a proposal made by the Commissioners relative to carrying on the cleansing and other sanitary works.

Twenty-six labourers were employed to-day at the same work as that on which they have for some time past been engaged.

2*nd.*—Mr. Newlands, in compliance with the orders of Field-Marshal Lord Raglan, this day made a requisition on General Simpson, the chief of the Staff, for—

500 Men,
40 Horses and Carts,
250 Spades,
250 Picks,
50 Wheelbarrows.

32 labourers were set to work on the graveyard at the head of the harbour, in addition to 75 others who were made over later on in

the day; but this supply of 107 men was lessened by the subtraction of 25, who were taken away by the Town Adjutant, Lieutenant Deacon, he having received orders to send them up to Head-Quarters.

After having waited some days the following articles were this day granted to Mr. Newlands:—

15 Wheelbarrows,
30 Pickaxes,
20 Shovels,
20 Spades.

Lime and charcoal continued to be used in different parts of the village, as well as at the graveyard.

3*rd.*—The embarkation of the Highland troops for Kertch to-day, somewhat interfered with the works. Labourers very inefficient, six natives being either unable or unwilling to do as much as one Englishman.

Seventy-five men at work under the Inspector, 63 at the graveyard at the head of the harbour, and 12 filling up hollows in the road near the Sick Wharf, beside the Royal Engineer's Office, stagnant water, which smelt offensively, having collected in the holes in the road.

4*th.*—In company with Lieutenant-Colonel Harding, the Commandant, inspected sites for proposed buffalo pond; the earth excavated to be used in the covering of the graveyard.

Seventy-three men at work to-day, covering the graveyard, and spreading lime and charcoal where necessary; also in removing manure and refuse from the yards and houses in the village, especially from stables.

5*th.*—An idea of the very inefficient labour at the disposal of the Inspectors, may be gathered from the fact, that it took 12 natives two entire days to dig two pits, each 10 feet long, 3½ feet wide, and 8 feet deep.

Seventy-two men were at work at the head of the harbour, covering the English graveyard, and scattering lime over some parts of Turkish burial-ground near the lime kiln. The Director of the the Land Transport Corps having made over some carts to the Sanitary Commission, a portion of the men had to be employed as drivers.

6*th.*—One hundred labourers at work to-day at the head of the harbour, and in driving carts carrying gravel and ballast.

7*th.*—Though the works proceed very slowly, a perceptible improvement visible in the state of the ground at the head of the harbour, the smell much diminished.

8*th.*—A minute inspection of the harbour and its approaches was this day made, every little inlet being entered and examined. A great amount of filth, and many paunches and bellies were found floating about.

9*th.*—One hundred labourers at work to-day under the Inspectors on the graveyard at the head of the harbour.

10*th.*—Heavy rain during the whole day put a stop to all out-of-door operations. Furnished the Commission with a copy of his report on Balaklava of April 7th.

11*th.*—The heavy rain continuing, all out-of-door work at a stand, the native labourers refusing to turn out, in spite of every exertion used to make them.

The roads again converted into sloughs, there being no provision for the water escaping, so that they became mud streams. In some places, the walls built to retain the ground next the harbour gave way during the wet weather. From the same cause the work done at the graveyard has been damaged.

12*th.*—Seventy-five men made over this morning, and employed in clearing the channels all along the flooded quays.

At Kadikoi the mud was as deep as in winter. The smell from the graves yet uncovered very offensive, but there was none perceptible in that portion of the ground which had gravel spread over it.

13*th.*—Ninety-six men having been made over, were directed by the Inspectors to continue the same work as yesterday, and to drain away any water that had settled on the covered or on the uncovered portions of the graveyard.

14*th.*—Ten carts were issued this morning, but found them, as Colonel M'Murdo had stated, not at all adapted for the work. Ninety-six labourers handed over, were employed in covering part of the graveyard where the stench is the worst. Some of the men were also employed in removing the accumulations of litter from the village to the hill side to be there burned.

Twenty men of the number assigned in the morning withdrawn during the day for some special service.

The quays along the harbour having been formed with the filth and manure from the village, began about this time to emit an intolerable stench. Decaying animal matter at the Ordnance Wharf, also, having become very offensive, Rear-Admiral Boxer requested to give instructions for its removal.

15*th.*—Seventy-five men (30 of them for only a portion of the day) and 10 carts told off this morning, and employed in covering the graveyard, and in removing the stable and other manure from the yards and quarters in the village to the hill side near the lime kiln and Turkish burial-ground, this spot chosen both for its convenience, and because the ashes of the manure, when burnt, may be used to deodorize the graves at the Turkish burial-ground.

The stench from the uncovered part of the graveyard at the head of the harbour, extremely bad. Any one working over the graves for an hour became sick and affected by diarrhœa, so that the Irish drivers of the carts granted to the Commission, refused to work, and the Inspectors were obliged to give the other labourers stimulants at hourly intervals.

16*th.*—Mr. Newlands drew up a report on the state of the works at Balaklava, for the Commission. A letter addressed to Mr. Beattie, C.E., requesting him to take the manure from the railway stables in trucks, as the carts cannot get near them. There was an outbreak of cholera to-day at the mule camp outside the village. Seventy-five labourers and 7 carts were made over to the Commission, and employed at the graveyard at the upper end of the harbour, and in carting lime and charcoal to it.

17*th.*—Seventy-five men and 9 carts having been made over to day, were employed under the supervision of the Inspectors, on the same work as yesterday and the days preceding.

18*th.*—The smell from the harbour very bad to-day, and the slaughtering-wharf, recommended to be made, was still incomplete.

Seventy-five men and 10 carts were at work under the Inspectors at the graveyard at the head of the harbour.

The dirt barge furnished by Rear-Admiral Boxer, was this day moored at a convenient spot in the harbour, to receive the refuse from the village and from the shipping.

19*th.*—Seventy-four men and 10 carts were made over to the Commission to-day. Twelve of the men directed to take the dirt barge out to sea and empty it, and afterwards to deodorize the latrine at the back of the main guard. The remainder of the men engaged on the same work as on the preceding days.

20*th.*—Seventy-five labourers and 9 carts at work as on the preceding days.

21*st.*—A large quantity of manure under the old camp of the 71st Regiment was burned.

Inspected the quays, along with Mr. Rawlinson, and found that the work there going on more satisfactorily; the men under the Commandant's orders being engaged in pulling down the old houses on the west side of the railway, and making good the ground along the quays, with the materials so obtained. No provision was, however, made for drainage.

During the inspection to-day, it was noticed that the harbour, south of the Ordnance Wharf, was much cleaner than it had yet been, and that the quays were less encumbered with filth. Seventy-four labourers and 10 carts were employed as heretofore, with the exception of six men engaged in filling the dirt barge.

22*nd.*—Seventy-five labourers engaged at the head of the harbour, but no carts could be obtained, as they were all needed to assist in the transport of stores and baggage for the men going on the expedition to Kertch.

24*th.*—Seventy-three labourers at work at the head of the harbour, as heretofore, and Lieutenant-Colonel Harding placed 2 mule carts at the disposal of the Inspectors, but most of the gravel had to be wheeled from the bed to the graveyard in barrows, or else carried in small baskets on the men's shoulders, at a great loss of time and labour.

25*th.*—Seventy-three workmen, with 3 carts granted by Lieutenant-Colonel Harding, the Commandant, were employed at the head of the harbour.

26*th.*—The same number of men and carts were at work to-day at the same place.

27*th.*—Seventy-five men and 3 carts at work to-day, but nothing could be done after 11 o'clock in consequence of the heavy rain.

28*th.*—Seventy-five men at work to-day, all of whom were engaged in sweeping and cleansing the town, and in opening the channels after the heavy rain of yesterday.

The heavy rain of Sunday was found to have washed away portions of the gravel from the graveyard, and to have become stagnant in some parts of it. Where this was the case, the heat of the sun acting on the moisture, and on the animal matter below the surface, produced a stench almost intolerable. Seventy-three men and 10 carts were made over to the Inspectors, who employed a portion of the labour in cutting surface channels through the graveyard, to carry off the stagnant water into the adjoining water-course, as well as the formation of the ground would permit.

30*th.*—One hundred and fifty labourers and 8 carts (the latter not assigned till 10 o'clock A.M.), were this day granted, and employed under the superintendence of the Inspectors, in covering the graveyard at the head of the harbour with a second coating of gravel, a quantity of lime and charcoal being used along with it.

31*st.*—One hundred and fifty labourers and 7 carts employed on the same work as yesterday.

June.

1*st.*—One hundred and fifty labourers and 7 carts again at work until noon, when, in consequence of the excessive heat, and in accordance with orders recently issued, the men returned to their camp until 4 P.M. After this hour the labourers were engaged, under the Inspectors, in removing filth from the margin of the harbour, and in general cleansing.

2*nd.*—One hundred and fifty labourers and 7 carts employed in the same work as yesterday up to mid-day. After 4 o'clock they were engaged in cleansing the margin of the east side of the harbour.

3*rd.*—One hundred and fifty-six labourers and 7 carts again employed on the same work as yesterday.

4*th.*—One hundred and fifty labourers and 7 carts at work at the graveyard, and scraping and cleansing the roads.

5*th.*—One hundred and fifty labourers and 7 carts at work at the graveyard, and filling up a number of holes near the Turkish burial-ground, where stagnant water had collected; also in removing a quantity of filth from the Commissariat yard.

6*th.*—One hundred and fifty men and 7 carts at the same work as yesterday, and also manure burning.

7*th.*—Mr. Newlands left Balaklava this day on board the "Hydaspes," steam transport on his return home to England.

One hundred and fifty men and 7 carts were employed on the same work as yesterday during the forenoon, and afterwards in cleansing the margin of the harbour, and macadamizing the road along the east side of the harbour.

8*th.*—One hundred and fifty labourers and 7 carts were employed on the same work as yesterday.

9*th.*—One hundred and fifty labourers and 7 carts again similarly employed.

10*th.*—One hundred and fifty labourers and 7 carts again employed at the graveyard, and in cleansing the margin of the harbour.

11*th.*—One hundred and twenty labourers and 7 carts at work at the graveyard, and 30 in the removal of filth from the margin of the harbour near the Ordnance Wharf.

12*th.*—The same number of men and carts as yesterday at work at the graveyard, and near the Ordnance Wharf.

13*th.*—One hundred and seventeen men and 7 carts at work at the graveyard, and 33 near the Ordnance Wharf.

As the water shoaled very much all along the margin of the harbour, south of the Ordnance Wharf, and as the greatest part of the disembarkations, and many of the shipments of sick take place there, the Inspectors were directed by the Commission to make a loose stone quay wall outside the filth, and thus give a depth of from two to three feet of water.

14*th.*—One hundred and fifty men and 7 carts at work, most of them at the head of the harbour, a few engaged in pulling down the lime store near the house occupied by the French Gendarmerie.

15*th.*—A festival day among the natives, and none of them therefore at work.

The Inspectors, in the course of their examination to-day of the village and harbour, detected a very offensive smell, proceeding from a number of dead bullocks, whose carcases had floated under the rocks at the Castle Hospital. The circumstance reported to the Commission.

16*th.*—One hundred and fifty men and 7 carts at work, most of them at the graveyard, and in quaying the margin of the harbour, the remainder engaged in covering with lime and charcoal, the native graves on the hill side behind the new Greek Church.

17*th.*—One hundred and fifty men and 7 carts at work, 120 at the same work as yesterday, and 30 in pulling down some old and filthy houses in which fever cases had occurred.

18*th.*—One hundred and fifty men and 7 carts on the same work as before, and in filling up with lime and earth unwholesome ground opposite the Commissariat Stores.

19*th.*—One hundred and fifty men and 7 carts at work as before.

20*th.*—One hundred men and 7 carts at work to-day. The reduction in the number of labourers was owing to a number of Tartars having left Balaklava.

21*st* to 23*rd.*—One hundred labourers and 7 carts, were each day employed on the same work as heretofore. On the 23rd, a quantity of lime carted to various places along the margin of the harbour, for the purpose of deodorizing.

24*th.*—The whole of the labourers at the disposal of the Inspectors were employed in cleansing the roads, and in opening out the water-courses that had become choked up during the thunderstorm of last night, and the heavy rain of this morning.

25*th.*—The labourers were employed in various parts of the village on work similar to that of yesterday.

26*th.*—Seventy labourers and 3 carts employed at the grave-yard and the head of the harbour, and 30 men engaged at the margin

of the harbour, south of the Ordnance Wharf, until 12 o'clock, when all the labourers were taken away to cleanse the roads and break stones.

27*th.*—Eighty labourers and 3 carts employed at the graveyard and the head of the harbour, and 20 near the Ordnance Wharf as yesterday. At noon the men were directed to remove a number of old and filthy houses, and to continue the repairing and cleansing of the quay.

28*th*, 29*th*, and 30*th.*—During these three days, the workmen were employed as follows:—

Seventy-five men and 3 carts at the upper end of the harbour, and 25 at the quay near the Ordnance Wharf until noon; the whole of the men and carts in the afternoon working at the repair of the quay.

On the last of these days the Sappers began to drive piles at the upper end of the quay, nearly opposite the Royal Engineer Yard, preparatory to forming a better and more permanent wharf in deeper water. The Inspectors assisted in this work, by directing their labourers to fill in stone and gravel at the back of the piles.

July.

1*st* to 4*th.*—The two Inspectors, having the same supply of men and carts, continued to employ them on the same work as during the last few days, with the exception of 6 men, who were told off to sink a latrine pit at the back of the main guard.

5*th* to 13*th.*—During this period, the Inspectors had, each day, at their disposal 98 labourers and 4 carts, who were employed as heretofore at the head of the harbour, near the Ordnance Wharf, and on the quays.

On the 5th instant another latrine pit was dug near the Ordnance Wharf.

14*th* to 20*th.*—During this period the same number of men and carts continued to be placed at the disposal of the Inspectors, who employed them in the same works as heretofore.

On the 14th instant, a third latrine pit was dug at the foot of the Castle ravine, for the use of the men on duty in this part of Balaklava.

21*st.*—The same number of men and carts were employed till noon on the same works. They were then directed by the Inspectors to thoroughly cleanse the margin of the harbour, from one end of it to the other, of every kind of filth perceptible.

22*nd.*—The same number of men and carts were employed in the same places as yesterday and the days preceding; 10 of the men engaged in burying the carcases of 6 bullocks and 1 horse, found lying dead near the bazaar at Kadikoi.

23*rd.*—The Inspectors, Messrs. Freeney and Aynsley, being required in England, left Balaklava this day.

No. VI.

ABSTRACT of JOURNALS of M. WALLING, ESQ., Surgeon, Her Majesty's Ship "Wasp;" EDM. NOLLOTH, ESQ., M.D., Her Majesty's Ship "Leander," and T. M. COSTELLO, ESQ., Surgeon, R.N., relating to the Sanitary and Medical Visitation and Inspection of Transport Ships in Balaklava Harbour, between May 22, and September 19, 1855, during the prevalence of Asiatic Cholera.

M. WALLING, ESQ., Surgeon, H.M.S. "WASP."

May.

22*nd.*—Conferred with Sanitary Commissioners respecting the sanitary condition of the ships in harbour and their crews, and as to the sanitary measures to be adopted, in consequence of having received an order to that effect from Rear-Admiral Boxer.

Examined 20 vessels situated in the upper part of the western side of the harbour. Left directions on board each for the better observance of sanitary precautions. Represented to Admiral Boxer the necessity for removing certain small (Italian) vessels anchored on the west side of Cossack Bay, out of the harbour, as they were throwing overboard decayed fruits, &c., which all floated into the harbour.

23*rd.*—Visited all the vessels situated on the lower part of the western side of the harbour. Met with several unimportant cases. Advised the masters as to cleanliness, whitewashing, ventilation, the use of chloride of zinc, pumping the ship out, and where to apply when in want of medical assistance. Also what remedies to use in case of necessity or on the appearance of cholera. Received an order from Admiral Boxer to act in conjunction with the Sanitary Commissioners.

24*th.*—At 6 A.M. visited the "Bella Leandra," (a Sardinian barque). Found a seaman who was attacked, at 2 A.M., with cholera, in a state of collapse. Directed the necessary remedies. Returned at 9 A.M., and found the patient better. Ordered everything to be cleared out of the forecastle, and the forecastle to be cleansed and whitewashed. Ship to be frequently pumped, and chloride of zinc to be used. Directed suitable remedies for the patient, but they were not sent for, and the man died at one P.M. Body to be immediately taken out to sea.

This ship was not clean. Her cargo consisted of salt beef, pork, hay, &c. Two other men are ailing, apparently from slight febrile attacks.

Cholera appeared on board the "Chester." Ordered out of harbour.

Visited the "Medora," "Mary Ann," and "Paramatta," on board of the latter of which there was a man suffering from slight purging. "John Bowes," "Iron Age," and "Melbourne"; also

many small Turkish, Maltese, and Italian vessels, attending to cases met with, and directing sanitary precautions for all.

Directed Admiral Boxer's attention to the filthy condition of Ordnance Wharf, near which the "Chester" had been lying when cholera appeared on board.

25*th.*—Visited the "Bella Leandra." No further appearance of cholera. The two sick men improving. Directed further measures of cleanliness. Ordered powdered charcoal to be thrown about among the cargo where there was any injurious smell perceived. Visited cases of purging on board the "Medora" and "Paramatta." Visited the following vessels, and also several trading ships:—"Lady Russel," "Othello," "Lilly Dale," "Amity," and directed the requisite sanitary precautions.

26*th.*—Visited the "Bella Leandra," and found the sanitary precautions nearly completed, as directed. The two sick men improving. Met with a case of mild fever in the "Faith," and another on board the "Paramatta." Inspected the "John Bull," "Zebra," "Bruiser," "Abundance," "Sir J. Easthope," "Imperial,' "Faith," "Lion," (captain sick with fever,) "Cheshire," "Canadian," "Clyde," &c. Most of these ships were in a satisfactory sanitary condition, and any improvements that were found requisite were made. The "Imperial" had been carrying cattle, and was far from clean in any part. Like all cattle ships, she had boards nailed loosely down to the deck, under which animal excrements accumulate and cannot be dislodged except by tearing up the boards each time.

27*th.*—Had a conference with Dr. Nolloth and Dr. Costello, with a view to dividing the ships in the harbour into three parts for the convenience of visitation. Visited fever cases on board the "Faith," "Paramatta," and "Bella Leandra." Examined some sma Greek vessels.

28*th.*—Increase of fever. Represented the state of the beach to Admiral Boxer. Visited the following ships:—

"Faith;" the two cases of fever improving.

"Paramatta;" one case of diarrhœa and one of fever.

"Bella Leandra;" cases improving.

"Columba;" captain ill of fever.

"Isabella Blyth," and "Pursuit;" ordered lime-washing, &c., for both.

"Ann and Isabella;" several slight cases.

"Isabella;" ordered sanitary precautions to be taken.

29*th.*—Communicated with the Sanitary Commissioners respecting the condition of the eastern beach of the harbour, the cattle-folds, and slaughtering-place.

Visited the fever cases and found them improving. Fever appears of a mild type. Its onset frequently resembles cholera, being preceded by purging.

Inspected the "Elizabeth Nicholson," "Iron Age," on board which were two cases of fever. The "Imperial," which had two cases of fever and one of diarrhœa.

30*th.*—Visited "Candia," on board which a man died of diarrhœa last night. Inspected the eastern side of the beach. Visiting the following ships:—

"Paramatta," which had three cases of fever; "Imperial," two cases choleraic fever; "Iron Age," one case choleraic fever; "Isabella," one case of choleraic fever; "Jarrow," one case of fever; "Regina," one case of diarrhœa; "Columba," one case of fever. Directed all the other cases to be sent on board the "Wasp," to be treated when able to attend.

31*st.*—At 9 A.M., visited the "Edina," and found a case of cholera on board. Visited the other cases, also the "Ariel," where there were two cases of choleraic fever. The "Gomelza," a case of fever. Visited also the "Pursuit," "Jane Elizabeth," "Eva," "Defender," "Charles Richard," "Challenger," "Jarrow," and suggested any sanitary precautions that appeared requisite.

June.

1*st.*—Called to "Columba" at 5 A.M., to see the nephew of Admiral Boxer, who had been seized with cholera. He died at half-past 12.

The master of the "Isabella Ann" was attacked with cholera at 2 A.M.; was seen at 4 A.M., and died at 3½ P.M. Visited the following vessels:—

"Sir John Easthope," one case of fever; "Imperial," one case of fever; "Jarrow," one case of choleraic fever; "Regina," one case of diarrhœa; "Isabella Blyth," three cases of fever, and one of diarrhœa; "Columba," one case of fever; "Walmer Castle," one case of fever. Much filth of all sorts collected among the inner tier of ships.

2*nd.* The new cases visited to-day occurred on board the following ships:—"Walmer Castle," one case of choleraic diarrhœa; "Billow Queen," one case choleraic diarrhœa; "Sir G. Pollock," one case choleraic fever; "Isabella Blyth," two cases of fever; "Phœnix," three cases of choleraic diarrhœa; "Challenger," one case diarrhœa; "Pursuit," one fever case; "Odin," one of diarrhœa.

Represented to Admiral Boxer the necessity for sending the "Isabella Blyth," out of the harbour, as she has had already seven cases on board. Ordered to anchor outside.

3*rd.*—The following new cases were visited:—

"Gomelza," one case cholera; "Imperial," one case diarrhœa; "Jarrow," one diarrhœa, and one case cholera—this vessel has several men sick; "Sir G. Pollock," one case cholera; "Isabella Blyth," one case cholera; "Gutmansthal," one case cholera; "Columba," one case diarrhœa; "Walmer Castle," one case diarrhœa; "Challenger," two cases fever; "Pegasus," one case fever; "Odin," one case fever; "Young England," one case diarrhœa. All the cholera cases had suffered from previous diarrhœa. Six of the affected ships were recommended for removal out of harbour.

At 10 P.M. visited the "Corfu;" a case of cholera had occurred, which was sent to hospital.

4*th.*—Visited "Young England," one case fever, and "Alcides," one case diarrhœa; "Wasp," one case cholera; "Jarrow," master attacked with fever; "Progress," one case of cholera and one of fever; "Snowdon," one case of fever; "Columba," two new cases of fever; "Challenger," one case of fever. All fever cases were preceded by choleraic symptoms.

"Belgravia," one case fever. Observed a larger quantity than usual of offal, filth, &c., amongst the closely packed shipping, where I also found most disease.

The "Gomelza" and "Isabella Blythe" (two cases fever) sent out to sea.

5*th.*—Called to the "Alcides" at 5 A.M., and found a man with all the symptoms of cholera. Inspected forecastle, and found it dirty and ill-ventilated. Ordered it to be immediately cleared out, and chloride of zinc used, then to be whitewashed, and the bow port to be knocked out.

Visited all the old cases.

"Young England," one case diarrhœa; "Charles Richards" and "Walmer Castle," one new case of fever on board each. Recommended the removal of several sickly ships out of harbour.

6*th.*—Summoned at 4·30 A.M. on board the "Peace." Found the master ill of cholera, who died at 7 P.M.

Called to "Troubadour," at 5 A.M., a case of cholera had been attacked through the night—said to have had no previous diarrhœa. Found three new cases of diarrhœa, and one case of fever on board the "Charles Richards" and "Sir G. Pollock;" and four diarrhœa cases on board the "Gomelza," "Othello," and "Jane Elizabeth."

All fever cases are still more or less complicated with vomiting, purging, &c.

Many ships sent outside the harbour.

Fever, diarrhœa, and cholera increasing. Most of the fatal cases occur in ships moored close to the eastern beach.

7*th.*—Visited "Charles Richards;" found one case of cholera, and one case of diarrhœa; found a case of cholera on board the "Princess Royal;" also a case of cholera on board the "Jane Elizabeth; "and another on board the "Quartus;" found three cases of diarrhœa, and one of fever on board the "Lord Warden," "Imperial," and Sir John Easthope;" called at 10 P.M. on board the "Holyrood," where three men had been attacked with diarrhœa, one of which was choleraic.

8*th.*—Another case of diarrhœa on board the "Charles Richards." Cholera appears on the decline, which appears to be mainly due to the removal of so large a number of vessels out of the harbour, and the liberation from among the ships of a large quantity of offal and filth which has been carried out to sea by the north-east winds. Drunkenness has a marked effect in predisposing to attacks of cholera. Existing cases of disease were visited and found improving. A cholera case on board the "Charles Richards;" another on board the "Tonka;" and a new case of diarrhœa on board the "Holyrood;" a case of diarrhœa on board the "Union," which ended in cholera, and one case of fever on board the "Chevalier."

9*th.*—Visited the "Princess Royal," one cholera case on board; visited the "Cochrane," which has brought 180 mules from Messina. Her lower deck contains an immense quantity of dung, &c., the stench from which, and from the bilges pervades the whole ship. The captain sent one case of cholera to hospital at 10 A.M., a second occurred at 5 P.M. I reported this ship for removal from the harbour until she be well cleansed, ventilated, and whitewashed, and disinfec-

ting fluid used. The men had suffered from previous diarrhœa. The following new cases occurred:—"Walmer Castle," one diarrhœa; "Cochrane," one diarrhœa; "Union," the master has severe diarrhœa, which will probably terminate in cholera.

10*th.*—The "Cochrane," sent outside the harbour last night, has some new cases of diarrhœa on board to-day.

Visited all the old cases.

11*th.*—Examined the "Kangaroo," and found her in a very insanitary condition. She had brought 250 cattle, and had on board a large number of dead cattle in different stages of decomposition, and an immense quantity of dung, animal excretions, &c.

The stench was horrible, and pervaded every part of the ship. Recommended that she should land her live oxen, and proceed to sea to bury the dead bullocks immediately, and clean ship, using chloride of zinc, charcoal, whitewashing, &c.

One case of choleraic diarrhœa on board the "Pursuit;" and a case of cholera has occurred on board the "Quartus."

There were new cases on board the the following vessels:—

"Jane Elizabeth," one case of cholera; "Holyrood," three cases diarrhœa; "Othello," one choleraic diarrhœa; "Faith," two cases diarrhœa; "Imperial," "Sir J. Pollock," and "Union," four cases choleraic diarrhœa.

12*th.*—"Union," chief engineer attacked with cholera this morning. She is a clean ship, but the probability of her being a sickly ship induced me to advise her removal out of harbour.

Four new cases of diarrhœa on board the "Jane Elizabeth," "Odin," and "Imperial."

13*th.*—Inspected the "Black Sea" which had just landed mules. Her between decks contains a large quantity of animal excretions, and she is in an unwholesome condition. Found four cases of choleraic diarrhœa on board which probably would have run into cholera, if the ship remained in her present state and position.

Advised her leaving the harbour, to clean.

Found two cases of remittent fever on board the "William Oldham," both of which had commenced with purging, &c. Also a case of fever and a case of diarrhœa on board the "Holyrood." Visited all ships where there were cases of sickness.

14*th.*—"Walmer Castle," two new cases of choleraic diarrhœa or fever. One new case of diarrhœa on board the "William Oldham." "Troubador," one new fever case. Inspected "Kangaroo," and found satisfactory progress being made in the sanitary measures recommended. Eastern side of the beach still in a most unsatisfactory state, especially above the vegetable wharf.

15*th.*—Was attacked with vomiting and purging during the night. The master of Her Majesty's ship "Wasp" was attacked in the same manner. Mr. Cooke, Assistant Surgeon, visited the shipping having sick on board. The following new cases occurred, "Mary Ann," one case fever. "Faith," one case diarrhœa. "Peace," one case diarrhœa.

16*th.*—Mr. Cooke again inspected the ships, and reported four new cases of diarrhœa on board the "Volunteer," "Faith," and "Abundance," and one new fever case on board the "Walmer Castle."

17*th.*—Visited ships where the cases required it, and inspected a number of ships of which the sanitary condition was good.

18*th.*—I have not seen anything like a case of cholera since the 12th instant, yet cases of diarrhœa, frequently choleraic, occur daily, and which, if neglected, would probably run into cholera. I think it fortunate that early and active measures have been adopted to check the late visitation of cholera. Almost every individual is suffering from the excessive heat, and has derangement of the stomach and bowels, dyspepsia, &c. Visited the sick on board ship. A new case of fever, and one of diarrhœa occurred on board the "Faith." There was a case of diarrhœa on board the "Volunteer," and a case of fever on board the "Walmer Castle." Inspected a number of ships, and suggested the requisite sanitary precautions.

19*th.*—Visited the "Hannibal" which had brought mules from Genoa. Found a quantity of dung on the sand ballast, which I ordered to be removed, and a quantity of charcoal to be thrown over the ballast. Pointed out where ventilation and lime-washing were required. She had a crew of 11 men, but no sick. Visited the "Joseph Sheppard," apparently a very clean ship. Suggested ventilation, &c. Found one case of choleraic diarrhœa, and one case of apparently mild fever. Visited all ships where the sick required it.

20*th.*—Visited ships as usual. Found "Walmer Castle" very sickly, all more or less complaining. Six men were suffering from febrile diarrhœa. The master of the "Edina" suffering from severe choleraic diarrhœa.

21*st.*—Visited ships. The choleraic case on board the "Edina" has put on dysenteric symptoms. A new case of fever on board the "Walmer Castle." Another on board the "Peace," and a third on board the "Phœnix." A case of choleraic diarrhœa on board the "Peace," and two cases of diarrhœa on board the "Princess Royal" and "Phœnix."

22*nd.*—An immense number of slight bowel complaints, almost every person complaining more or less. The following new cases were met with:—"Edina," two choleraic diarrhœa; "Walmer Castle" two cases of fever with purging; "Joseph Sheppard," two cases choleraic diarrhœa.

23*rd.*—Many of the cases of diarrhœa under treatment have taken a dysenteric form. Some are severe. Two new cases of diarrhœa occurred on board the "Pursuit" and "Abundance."

24*th.*—Two new cases of dysentery on board the "Pursuit." Diarrhœa cases have a dysenteric rather than a choleraic form.

25*th.*—Fever and dysentery are now the prevailing types of diseases. A case of choleraic diarrhœa occurred on board the "Edina," and two cases of diarrhœa on board the "Snowdon" and "Zealous." Dysenteric cases very uncontrolable by treatment.

26*th.*—A thunder storm on the 23rd had damaged the quays and increased the impurity of the atmosphere by stirring up and exposing the filth The following new cases were met with: one cholera on board the "Peace;" one cholera on board the "Simoom;" one choleraic diarrhœa on board the "Walmer Castle;" one choleraic fever on board the "Union," and one fever case on board the "Sir G. Pollock.'

27*th.*—Both cholera cases seen yesterday have died. Two cases of fever have occurred on board the "Oscar," and three cases of diarrhœa on board the "Princess Royal," "Walmer Castle," and "Vigilant." The "Peace," on board of which there have been two fatal cases of cholera, is a charcoal ship, and has still many tons on board. She has also been a sickly ship, which shows pretty clearly how little power charcoal possesses as a disinfectant.

28*th.*—A case of cholera on board the "Edina," which has been a very sickly ship; "Faith" (brig), two diarrhœa cases. I directed the forecastle of this ship to be whitewashed, and the place ventilated by removing the bow ports. Four new cases of diarrhœa and one of fever on board the "Pursuit," "Edina," "Simoom," and "Oscar."

29*th.*—Dysenteric cases intractable. A case of fever and another of diarrhœa occurred on board the "Alster."

30*th.*—Two new cases to-day; one choleraic diarrhœa on board the "Ocean Queen," and one diarrhœa on board the "Young England."

July.

1*st.*—Visited the ships where the sick required it, and also several ships lately arrived in harbour, to inquire into their condition, and to direct sanitary arrangements. Two new cases of diarrhœa were found on board the "Alcides" and "Walmer Castle."

2*nd.*—The following new cases occurred to-day: "Simoom," two diarrhœa cases; "Walmer Castle," one choleraic diarrhœa and two diarrhœa; three cases of diarrhœa on board the "Pekin," "Princess Royal," and "Peace," and one fever on board the "Young England." The "Walmer Castle" is an exceedingly sickly ship. New cases of diarrhœa and mild fever occur every day amongst her officers and men. The cause is obviously the unwholesome state of the eastern beach, close to which she has been moored for several months.

3*rd.*—The harbour is becoming again filled with shipping. Two new cases of diarrhœa occurred on board the "Queen," and one case of fever on board the "Richard Ingram."

4*th.*—Cholera in my division appears to be kept under. I have not met with a case since the 26th ult., and cases of dysentery do not increase, yet there are a large number of men under treatment. The following new cases have occurred to-day:—"One case of choleraic diarrhœa on board the "Sapphire" yacht, one fever on board the "Walmer Castle," and six cases of diarrhœa on board the "Pursuit," "Alcides," "Queen," "Ocean Queen," and "Walmer Castle."

5*th.*—Called on board the "Faith" this morning; found a large number of sick and ailing. She arrived yesterday from Constantinople. The following new cases were placed under treatment:—Four cases of diarrhœa, one of fever, and one of dysentery, on board the "Faith," "Sir G. Pollock," "Abundance," and "Peace."

6*th* to 9*th.*—Six new cases of diarrhœa, one of which was choleraic, and six cases of fever, were put under treatment on board the "Walmer Castle," "Faith," "Sir G. Pollock," "Oscar," "Riverdale," and one case of diarrhœa at the Naval Depôt.

10*th.*—Cholera appears to be quite kept under, and dysentery does not seem to increase. Diarrhœa has, in some cases, run into dysentery, which is very severe and uncontrollable, especially when the patient has suffered from the same disease in India. One new case of diarrhœa occurred on board the "Pekin."

11*th.*—On going my daily round among the ships to-day, I found the harbour, especially the upper part of it, very full of vessels, and an immense increase in the quantity of floating debris, such as dead animals, offal, &c., among the shipping, the stench from which was very offensive. Called the attention of the harbour police to this. One new case of cholera occurred on board the "Hetton," and three new cases of diarrhœa on board the "Catherine," "Walmer Castle," and "John Baynon." The "Hetton" is moored close to the beach, on the eastern side of the harbour, and opposite her are two pools of decomposing vegetable matter, bread, onions, and cucumbers, the stench from which is most powerful.

12*th.*—Visited all ships where the sick required it. Four new cases of fever, and two of diarrhœa, were seen on board the "John Bull," "Margaret Elizabeth," "Peace," "Walmer Castle," and "Anne Baker." One of the fever cases had strong symptoms of cholera.

13*th.*—The offensive pools on the beach, which were reported on the 11th, have been filled up. Much offal floating amongst the shipping. Directed the harbour police to see to its removal. Two new cases of fever, and one of diarrhœa, on board the "John Bull," "Alcides," and "Witch."

14*th* and 15*th.*—Visited the ships, as usual, which had sick on board; also several Sardinian vessels, and directed the necessary sanitary measures. There is one new case of fever, and one of diarrhœa on board the "Hetton" and "Zealous."

16*th.*—A case of cholera occurred on board the "Dolphin;" three cases of fever and one of diarrhœa occurred on board the "Rosario," "Alcides," and "Queen." The cholera case had symptoms resembling those of fever.

17*th.*—Two cases of cholera occurred on board ship within the last twenty-four hours. One of these cases occurred on board the "Pursuit," in a man who had convalesced from dysentery. The second case took place on board the "Prompt." There have been six new cases of diarrhœa and one of fever on board the "Imperial," "Columba," "Faith," "Diadem," "Sir G. Pollock," and "Alcides."

18*th.*—Five new diarrhœa cases, and three cases of fever, were met with on board the "Imperial," Columba," "Sir .G Pollock," "Zealous," "Georgiana," "Helen," "Faith," and "John Baynon."

19*th* to 22*nd.*—A case of cholera occurred on board the "Walmer Castle" on the 20th. There were nine new cases of diarrhœa, one of dysentery, and five of fever on board the "Columba," "Zealous," "Diadem," "Walmer Castle," "Pursuit," a Belgian brig, "Alcides," "Alster," and "Hetton." The "Walmer Castle" has improved greatly in health since she was drawn about fifteen yards further away from the filthy beach. The sick on board ship have been attended, and newly-arrived vessels have been inspected, and the necessary sanitary measures recommended.

23*rd.*—The "Walmer Castle" having been a sickly ship, I have

been anxious to find out the reason, as the ship appeared to be clean and sweet, chloride of zinc having been freely used for deodorizing. On cleansing out the ship's hold lately, a quantity of decomposing salt provisions was found, the stench from which was very bad. Three new cases of diarrhœa, and one of fever, were met with on board the Belgian brig, "Riverdale," "Walmer Castle," and "Pursuit."

24*th* to 26*th*.—Visited all ships having sick on board. Many cases of fever of a low type continue under treatment, and occur daily in those ships close to the eastern beach. The weather hot, oppressive, and most debilitating, with frequent heavy showers. There has been one case of choleraic diarrhœa on board the "Riverdale," and ten new cases of diarrhœa, and two of fever, on board the "Witch," "Eagle," "Zealous," "Walmer Castle," "Anne Baker," "Alcides," "Columba," "Diadem," "Georgiana," and "Peace."

27*th* to 31*st*.—The following new cases have occurred:—One case of choleraic diarrhœa on board the "Zealous," and ten cases of diarrhœa, ten cases of dysentery, and four of fever, have occurred on board the "Anne Baker," "Walmer Castle," "Riverdale," "John Baynon," "Zealous," "Eagle," "Columba," "Elizabeth," "Sir G. Pollock," "Diadem," "Peace," "Pursuit," "Defender," and "Rosario." The sick were all visited as usual, and several small trading vessels, with decomposing grain and vegetables on board, were visited, and the requisite sanitary measures ordered. The heavy rains and great traffic have converted the entire beach and road into a filthy puddle. It is amongst the ships close to this beach that three-fourths of the cases of cholera in my division have occurred. Fever and dysentery are always prevalent in that quarter.

August.

1*st*.—In consequence of the heavy rain, the eastern side of the harbour is deep in very offensive mud. There has been a case of cholera on board the "Isabella Blythe," and a case of dysentery on board the "Pudgona."

2*nd*.—The hot sun acts powerfully on the eastern beach after th rain. There are two new cases of cholera, one on board the "Mar garet Elizabeth," and the other on board the "Candid." There is a case of diarrhœa and one of dysentery, also on board the "Margaret Elizabeth." The ship is pretty clean; but is moored close to the grain wharf. The "Candid" is lying off the Ordnance Wharf, and has just landed a large cargo of Cavalry horses; the horse-boats smell strongly of animal excretions. There is a new case of dysentery, also, on board the "Swift."

3*rd*.—Visited the ships as usual. A new case of cholera on board the "Diadem," lying off the Grain Wharf. There has been a new case of diarrhœa on board the "Walmer Castle."

4*th*.—Three cases of fever, three of dysentery, and one of diarrhœa, have occurred on board the "Margaret Elizabeth," "Queen of the Dark," "Pudgona," "Usworth," and "Dido."

5*th*.—There has been a new case of cholera on board the "Zealous," and one of fever on board the "John Bull;" one case of dysentery on board the "Priscilla," and one of fever on board the

"Alcides." The part of the harbour where these vessels are lying is very full of ships; and I observed large quantities of garbage floating amongst them to-day.

6*th*.—The crowded state of the harbour, and the moist condition of the beach, under the action of a powerful sun, have led to a considerable increase of fresh cases to-day. There has been a new case of cholera on board the "John Baynon," and another on board the "Riverdale." There have been four new cases of diarrhœa, three of dysentery, and two of fever on board the "Old England," "Robert Ingram," "Usworth," "Haulbowline," "Arab," and "Sir G. Pollock;" I was obliged to send a cholera case to hospital, as the vessel had to put to sea. I have not done this before for some time, as nearly all the cases died, though generally sent in the early stage, I suppose from loss of time, or the change and fatigue during the transport.

7*th*.—There have been five new cases of diarrhœa, one of dysentery, and three of fever, on board the "Defender," "John Bull," "Robert Ingram," "Francis Beckly," "Faith," "Riverdale," "Recruit," and "Pursuit."

8*th*.—A case of cholera occurred on board Her Majesty's ship "Wasp," a case of choleraic diarrhœa on board the "Zealous," and one of diarrhœa on board the "John Bull."

9*th*.—A case of cholera occurred on board the "Riverdale," another on board the "Queen Victoria," and a case of diarrhœa on board the "Queen."

10*th*, 11*th*, *and* 12*th*.—On these days there were four cases of choleraic diarrhœa, three cases of diarrhœa, four cases of dysentery, and two cases of fever, on board the "Georgiana," "Walmer Castle," "Zealous," "Sir G. Pollock," "Mary Young," "Riverdale," "Old England, "Antagonist," "Elizabeth," and "Pursuit." The master of one of the vessels told me, that he looked upon the unwholesome state of the beach, as the cause of his having lost four of his men from cholera.

13*th and* 14*th*.—There have been four new cases of fever, two of diarrhœa, and one of dysentery, on board the "John Bull," "Georgiana," "Sir G. Pollock" and "Pelham."

15*th and* 16*th*.—A case of cholera occurred on board the "Bucephalus." Three cases of diarrhœa, three of dysentery, and one of fever, took place on board the "Sir G. Pollock, "Ulrica," "Alcides," "Elizabeth, "Ellen," and "Queen."

17*th*.—A case of cholera occurred on board Her Majesty's ship "Wasp." Six new cases of diarrhœa, and one case of fever were met with on board the "Volunteer," "Georgiana," "John Bull," "Finchley," "Ellen," and "Zealous."

18*th*.—Visited ships, and attended to all cases as usual which still continue numerous, although new cases appear to be becoming much less frequent. A case of cholera has occurred on board the "Riverdale," the patient positively denies having had any previous diarrhœa.

19*th*. Three cases of diarrhœa occurred in the "Baraguay d'Hilliers," "Francis Barret," and "Riverdale."

20*th*, 21*st*, *and* 22*nd*.—Three cases of cholera occurred on board Her Majesty's ship "Wasp." All the men attacked were employed in a harbour-boat. They were much exposed to the sun, and had great facilities for procuring liquor. All recovered except one. There have been four new cases of diarrhœa, one of dysentery, and one of fever, on board the "Mary Young," "Alcides," "Robert Ingram," "Priscilla," "Georgiana," and "Stephen Huntley."

23*rd to* 28*th*.—Ships visited as usual. The harbour-master has promised to limit the number of ships in my division, and to leave a passage between them for ventilation. The weather has improved, and the eastern beach is dry. The number of new cases has fallen off considerably. During these five days, there were only two new cases of diarrhœa, two of dysentery, and there were also seven cases of fever on board the "Panama," "John Bull," "Irene," "Jane Anson," "Priscilla," "Raleigh," "Lady A. Lambton," "Ulrica," "Haulbowline," "Sarina," "Helen," "Chapin," "Mary Young," and "Rose."

29*th to* 31st.—Sick visited on board ship as usual, and recently arrived vessels inspected, and the requisite sanitary measures ordered. The following new cases have occurred. Five cases of diarrhœa, three of dysentery, and four cases of fever on board the "Irene," "Zealous," "John Bull," "Panama," "Sabrina," "Priscilla," "Hannibal" and "Aid."

September.

1*st to* 19*th*.—During this interval, the health of the harbour rapidly improved, and the inspection was finally discontinued on the representation of the Sanitary Commission, on the last of these days. There was no more cholera, there were only six cases of diarrhœa, three of dysentery, and six cases of fever on board the "Georgiana," "Retriever," "Raleigh," "Aid," "Bucephalus," "Mary Gibson," "Hannibal," "Daring," "Alice Walton," and "Poictiers." A number of cases of remittent fever have occurred during the last two or three weeks on board Her Majesty's ship "Wasp," caused, I fear, by the gradual accumulation and exposure of a large surface of mud at the top of the harbour. The "Wasp" is the nearest ship, and lies broadside on to it.

On shortly reviewing the past period, it may appear that epidemic cholera has been prevalent, and often fatal, especially in the locality to which I was attached, yet I consider the way in which the disease was kept under, and the smaller comparative mortality than might have been reasonably expected, to be a subject of congratulation. During the winter and spring, I have often looked forward with feelings of alarm to the approach of summer, and the effects of its scorching sun, especially when examining the filthy beaches, the unwholesome condition of cattle-folds, slaughtering-places, and graveyards, in the latter of which might have been seen, every day during winter, several bodies placed in one shallow grave, and but scantily covered with earth. The favourable way in which the summer has passed, appears to me to be entirely due to the exertions of the Sanitary Commissioners who, on the first appearance of the epidemic, in May, immediately instituted the most active measures for its suppression. This was done by directing Admiral Boxer's attention to the necessity for every ship in the harbour being visited by competent medical officers, to ascertain the actual amount of disease in the harbour, to institute sanitary measures, and to leave directions with the masters, in the event of bowel complaints occurring on board their vessels.

The ships were afterwards divided into three divisions, and a medical officer appointed to each, who made a daily ship-to-ship visitation, attended to all cases that occurred, saw that all sanitary measures of cleansing, ventilation, &c., were carried out, and that early attention was paid to bowel complaints. These measures were very efficient, in spite of the continued unwholesome condition of the eastern beach and other places, near which most of the fatal cases occurred. It is to be lamented, that a good corps of at least 300 labourers, for filling-up and improving the surface, was not provided, in order that these important measures might have been completed early in May, instead of permitting the surface to remain in so unhealthy a state.

It would be a measure of some importance in the management of a closely crowded harbour, to have a convenient place established where any master of a ship could apply for proper remedies for any prevailing epidemic, for it is seldom that the most suitable medicines are to be found in the chests of merchant ships. It has often happened to me, on being called to a case of cholera, perhaps in a state of collapse, to find that generally castor-oil, often rhubarb, and sometimes salts and senna, had been given to the patient. It would be advisable to include some such provision in the harbour regulations.

EDWARD NOLLOTH, ESQ., M.D., Surgeon, H.M.S. "LEANDER."

May.

19*th*.—In consequence of an order received from Admiral Boxer I proceeded to examine the ships on the south-east side of the harbour, between the entrance of the harbour and the Ordnance Wharf. On this date I found no cholera or other disease of any importance. One of the principal measures suggested for maintaining a healthy condition of the crews, was to keep as few ships as possible in the harbour.

27*th*.—Made arrangements with Messrs. Walling and Costello, as to the division of the shipping which each of us was to take under our charge. It was agreed that I should have charge of the north-west side of the harbour.

28*th*.—Visited the "Medora," and found two cases of diarrhœa on board. This ship was lately purchased for a coal depôt, and is as clean as could be expected.

On board the "Daring" found the master suffering from diarrhœa, and one case of intermittent fever.

Called to the "Koh-i-noor," with ordnance stores aboard, to a case of cholera, which died in the course of the night.

29*th*.—Inspected the "Rose Gasparin," (Austrian), laden with barley and hay. Ship clean, but the berths confined, and the ham-

mocks hanging up. Ordered them to be removed during the day. Boarded also two small Italian vessels with chopped straw, &c. Found them quite clean and the crews healthy. Inspected a Turkish brig, and found her healthy; also the "Messenger," clean and healthy. These vessels were lying in Leander Bay. Inspected the "Ariel," "Œolo," (Greek), "Forth," "Helena," "Neapolitan," "Junius," "Imperiale," (Austrian), "Surinam," on board of which I discovered two cases of diarrhœa; "Sorti," (Maltese), which had one case of diarrhœa, "Paulina," (Austrian), "Ethernus," (Servian Danube), on board which there were two fever cases, an Austrian vessel in which there was one case of intermittent fever, and found two cases of diarrhœa on board the "Orion." All of these ships were perfectly clean.

30*th.*—Visited all the sick on board ship. Inspected the following vessels, "Tempe," (Neapolitan), "Armadigge," (Austrian), "Trovatore," (Maltese), "Sylvan," "Teresa Hanna," (Austrian), "Circassian," "Nova Pieta," (Neapolitan), "Fannia," (Turkish), "Aurora," (Austrian), "Elizabetta," (Neapolitan). Found on board these ships three cases of diarrhœa and two cases of fever. Inspected, also, eight or ten Turkish large boats, and found them quite clean and the crews healthy.

31*st.*—Visited the vessels on board of which there were sick. Inspected the "Koh-i-noor," on board of which there were two cases of diarrhœa; also the "Duna," "Maria di Porto," (Austrian), and "Staatzrath von Rock," (Mecklenburg); also the "Talavera," with ordnance stores and some horses on board. There were several cases of choleraic diarrhœa on board, and the ship did not look very clean.

June.

1st.—Reported to the Admiral that the north-western side of the harbour is in a satisfactory condition, a small quantity of offal only having been occasionally seen, and the border of the harbour being free from offal or filth of any kind. Visited the ships with sick on board, and found all progressing favourably.

Visited the "Paramatta," lying at the upper part of the harbour, and found five cases of choleraic diarrhœa. She is being loaded with dirty blankets, linen, &c., to take to Malta to be washed. Spoke to the Admiral to send her to sea as soon as possible. Inspected the "Bella Leandra," (Sardinian), "Lillydale," "Giuseppe Secondo," (Austrian), "Prince Oscar Frederick," (Norwegian), and "Staatzrath von Rock." Two cases of diarrhœa on board these vessels. There was a case of cholera on board the "Gutmansthal" in the afternoon.

2*nd.*—Visited the ships with sick on board, and found them all going on favourably. Eight cases of diarrhœa and four of intermittent fever under treatment.

3*rd.*—Visited a case of cholera on board the "Duna," and another of choleraic diarrhœa on board the "Paramatta;" a case of cholera occurred on board the "Elizabetta," (Neapolitan), and another case of cholera on board the "Corfu." There was also another fresh case of diarrhœa on board the "Lillydale." Visited the ships with sick on board.

4*th.*—Inspected the "Koh-i-Noor," and found several cases of choleraic diarrhœa. The "Duna" is ordered to sea. A severe case of choleraic diarrhœa was found on board the "San Nicolai;" there was also a case of fever on board the "Diana."

Admiral Boxer was seized with cholera to-day on board the "Jason," outside the harbour; he had had diarrhœa the previous day. A case of cholera occurred on board the "Edward."

5*th.*—Admiral Boxer died at 12·30 A.M.. Case of cholera on board the "San Nicolai." Visited the vessels with sick on board, also several newly-arrived Austrian ships. A new case of diarrhœa on board the "Pigeon."

6*th.*—A case of cholera on board the "Koh-i-Noor." Another case of cholera on board the "Lillydale;" also a case of continued fever on board an Austrian ship. Visited all other sick cases.

7*th.*—Several fresh cases of diarrhœa on board the "Lillydale," and one case of cholera. "City of London," one case of cholera. Health improving.

8*th.*—Visited sick ships. "Œolo," two cases slight fever. A good many ships gone outside the harbour within the last two or three days. A new case of cholera occurred on board the "Cochrane," and there was a fatal case of cholera on board the "Talavera" (there is a surgeon on board), there are several severe cases of choleraic diarrhœa on board this vessel. She is not clean. I inspected the holds and berths, and requested that they might be whitewashed.

10*th.*—At 4 A.M., went two miles outside the harbour to visit the mate of the "Challenger," and found him ill with cholera. Three cases of diarrhœa on board the "Osmanli." Visited sick in other ships. Another case of cholera occurred on board the "City of London," (cattle-ship), and at midnight a case of cholera occurred on board the "Rambler."

11*th.*—At 6 A.M., a very sudden and bad case of cholera occurred on board the "Nova Pieta." All the cases of diarrhœa, fourteen in number, on board the other ships are doing well. There are four slight fever cases of the intermittent type under treatment.

12*th.*—Visited the "Sally." There was one case of cholera, and five cases of choleraic diarrhœa on board. Other cases also visited.

13*th.*—The following new cases were visited to day—"Surinam," one case of fever (remittent), "Messenger," two fresh cases of diarrhœa, "Lillydale," one fever case, "Union," one fever case.

14*th.*—Three fresh cases of diarrhœa occurred on board the "Lillydale." One fresh case of diarrhœa and one of fever on board the "Messenger." A new case of fever also occurred on board the "Rambler." Other cases attended.

15*th to* 16*th.*—Health of the harbour better. There were between these dates, twenty-two new cases of diarrhœa and one of fever on board the ships "Surinam," "Œolo," "Odin," "Queen Victoria," "Orient," "Koh-i-Noor," "Maria di Porto." One case of cholera occurred on board the "Rose Gasparin," on the 24th.

27*th to* 30*th.*—A case of choleraic diarrhœa on board the "Aurora" passed into cholera, and two fresh cases of choleraic diarrhœa occurred on board the same vessel. A case of fever, and five cases of diarrhœa occurred on board the "Gibraltar," which had just arrived with

horses and mules from Sinope. Eleven cases of diarrhœa and two cases of fever had likewise taken place on board the "Silvum," "Orient," "Odin," "Magnet," "Rose Gasparin," "Lillydale," and "Koh-i-Noor." All other cases of sickness on board ship were attended to.

July.

1*st.*—A case of cholera, and one fresh case of diarrhœa, occurred on board the "Rose Gasparin." Nine new cases of diarrhœa took place on board the "Odin," "Gibraltar," "Lillydale," "Orient," and "Koh-i-Noor."

2nd to 7th.—No new case of cholera. All sick attended to as usual, and the diarrhœa less severe in character. There have been fifteen new cases of diarrhœa, two cases of dysentery, and two of fever on board the "Koh-i-Noor," "Odin," "Dover," with horses on board, "Mary Ann," with troops, "Rose Gasparin," "Pekin," "Orient," "Gibraltar," and "Lillydale." The "Odin" has gone out of harbour.

8*th to* 18*th.*—During this interval there were two fresh cases of cholera, eight cases of diarrhœa, one of dysentery, and ten of fever, on board the "Pekin," "Prediola," "Civility," "Caduceus," and "Charity." The two cholera cases occurred on board the "Pekin," which was in a dirty state, and was directed to be cleaned, white-washed, and to have chloride of zinc applied.

From the 18th July till the ship visitation was finally discontinued, on the 19th September, there were treated three new cases of cholera, sixty-six cases of choleraic diarrhœa, nine of diarrhœa, nine of dysentery, and twenty-three cases of fever. During the time the cholera prevailed in the harbour, there were about 300 cases of diarrhœa on board Her Majesty's ship "Leander," which was stationed at the south-east angle of the harbour all the time.

Dr. Nolloth makes the following remarks on the results of the medical inspection of the shipping in the north-west division of the harbour.

About the 2nd June, epidemic disease in the form of intermittent and remittent fever, cholera, choleraic diarrhœa, and dysentery, made its appearance.

The suggestions made to the masters of ships were always willingly attended to, and, where practicable, carried into effect.

As far as my experience will allow me to judge, epidemic disease was found to prevail, more or less extensively, according to the greater or less apparently insalubrious position of the ship or ships. Thus, sickness has been much more rife on the south-east than on the north-west side of the harbour, which latter is quite free from the many sources of vitiation found on the opposite side.

Particular ships appeared to suffer in proportion to the greater or less neglect of their cleanliness or ventilation.

Disease, whether fever or diarrhœa, when it once made its appearance, became more general where the men were dirty, and more than usually packed together. In some instances, dirty clothes and linen, &c., had been allowed to accumulate in the bunks.

On the north-west side, the sickness was greatest in ships towards the top of the harbour, and diminished as soon as such ships were removed either to the entrance or just outside the harbour.

In some instances, the nature of the cargo seemed to exert considerable influence in the production of disease. The "Paramatta," on board of which cholera and choleraic diarrhœa continued for several weeks, had a large quantity of soiled blankets, &c., on board for conveyance to Malta. Another affected ship, the "Pekin," was a dirty and damp coal ship. Two other affected ships were loaded with patent fuel. Fever and choleraic diarrhœa were very prevalent in small vessels which had hay, chopped straw, and barley on board, and where the air was strongly impregnated with the scent of these articles.

When disease once got into a ship (English at least) where no spirituous liquors were allowed, the general health of the crews seemed to be much improved when those stimulants were prescribed. The "Paramatta," "Koh-i-noor," "Lillydale," and "Pekin," &c., were instances of this.

The cattle-ships have proved to be always the most sickly. The "Charity," one of these, had ten cases of low fever, contracted apparently, however, at Sinope, where the disease was prevalent.

It seems to be a matter of great importance, that seamen, during the prevalence of an epidemic, should be as much dispersed throughout the ship as convenient, so as to be enabled to breathe an atmosphere already vitiated, as little further contaminated by human breath as possible.

T. M. Costello, Esq., Surgeon, R.N.

May.

24*th.*—I have this day arranged with Dr. Nolloth, Surgeon of Her Majesty's ship "Leander," and Mr. Walling, Surgeon of Her Majesty's ship "Wasp," to undertake for my share of the labour the medical charge of all the transports and private vessels lying on the south-eastern shore of the harbour, and extending from the Railway store to Castle Point, at the entrance of it.

The first step I took was to make a ship visitation, to ascertain whether they were clean, to suggest that where the crews lived be whitewashed, to cause wind-sails to be hoisted, to recommend the employment in the holds (more especially where the bilge water had an offensive smell) of the various deodorants in their possession, whether Sir William Burnett's solution of cloride of zinc, or Crewe's disinfectant fluid, to apply for medical assistance early in cases of diarrhœa, and, finally, to point out what measures to adopt in case of cholera till medical assistance could be procured.

For the week previous to the appearance of the epidemic, diarrhœa was more prevalent than usual. Between the 21st and 24th May six cases of cholera occurred: of the six cases, five happened on board of the steam transport "Chester," laden with charcoal, and lying close to the Ordnance Wharf, where animal and vegetable decomposition is always going on, and where a most offensive smell, more particularly during the night, is observable. The accommodation for the crew was better than is usually to be found in vessels of her class; the water was good and ship clean. I immediately caused the apartment occupied by the men to be cleaned and whitewashed, wind-sails to be

hoisted, the sufferers to be sent to the Military General Hospital, and at my recommendation, the Principal Agent for Transports sent her to anchor in the bay. No fresh case of cholera occurred subsequently, but there were five cases of diarrhœa, which readily yielded to ordinary treatment. Four of the five cases of cholera terminated fatally I have since learnt.

The other case of cholera occurred on the 23rd of May, on board the transport "Clifton," laden with a quantity of shot and shell, lying in the tier under the Castle, in a man who had been employed previously on boat service, and who had spent much of the time close to the wharves at the north-western end of the harbour. This case terminated fatally.

25*th.*—Fifteen cases of diarrhœa under treatment to-day. No case of cholera in my district. Visited the "Sir John Easthope," "Mary Anne," "Royal Victoria," "Cumberland," "Nymph," "Belgravia," "Clifton," "Edward," "Earl of Shaftesbury," "Stephen Huntly," and "Alster."

26*th.*—One case of cholera occurred on board the "Alipone," horse transport, lying close to the Ordnance Wharf. Ordered the place where the men slept to be whitewashed, the between decks to be scrubbed and whitewashed, wind-sails to be hoisted, and the ship to be pumped out.

There are, in addition, two cases of diarrhœa, and one of intermittent fever.

Recommended to Captain Heath that as few vessels as possible be kept in the harbour, and likewise pointed out to him what a prolific source of disease existed while dead animals were floating about the harbour.

27*th.*—A little in excess of the average number of sick, owing to the increase of diarrhœa and febrile complaints. No fresh case of cholera in my district.

The masters of transports generally are very ready to carry out all sanitary suggestions. Six fresh cases of diarrhœa.

28*th.*—One case of cholera occurred on bard the "Gomelza," a transport, laden with chopped straw, and lying close to the Vegetable Wharf, where the stench from the decomposition of onions is so offensive, that it invariably produces nausea in my own person. There was premonitory diarrhœa, for which the man neglected to take any remedy. The ship was clean, the water good and provisions wholesome. Ordered the men's accommodation to be whitewashed, a solution of chloride of zinc to be sprinkled on it, cloths saturated with it to be suspended from the beams, and some poured into the hold. Three fresh cases of diarrhœa.

29*th.*—One case of cholera occurred on board the "Edward," transport, laden with bread and pork, and lying in the tier under the Castle. The ship is clean and free from any offensive smell. This man ultimately recovered. Four cases of choleraic diarrhœa on board of the "John Bowes," steamer, lying close to to the Ordnance Wharf; and two cases of choleraic diarrhœa in the "Lion," cattle steamer, lying also close to the Ordnance Wharf.

30*th.*—One case of cholera on board of the "Lion," at the

Ordnance Wharf. The master reports to me, that the smell from the shore at night is sometimes almost insupportable.

June.

1*st* and 2*nd.*—On neither of these days did any cases of cholera occur in my district. Some cases of fever in the steamers employed carrying cattle. Hitherto these vessels were prohibited from throwing overboard (it being contrary to the harbour regulations) the dung, &c., which remained after the cattle were landed, but as sometimes considerable delay occurred in the coaling of these ships, it followed that the crews were exposed during this period to the effluvia from these accumulations.

The rule at present observed, is for these vessels, immediately they land their cargoes, which occupies generally from one to three or four days, to proceed out of harbour, and there throw overboard all dung, &c., clean the between decks, and then return to harbour and coal if they require any. A manifest improvement in the health of the crews results from this sanitary measure. There are but few of these ships in which intermittent fever does not exist.

3*rd.*—One case of cholera in the hired vessel "Persagno," lying off the railway saw-mill, amidst a crowd of shipping, where the entrails of animals killed on board ship lie floating about in a state of decomposition. The "Belgravia," transport, lying near the last named vessel, has six cases of diarrhœa, two of continued fever, and one of scurvy. Some others of the crew have a scorbutic taint. The accommodation on board this ship is commodious, dry, and well ventilated. I have recommended a daily issue of 1lb. of potatoes, and 4oz. of lime-juice to the men with a scorbutic taint, and 1 oz. of lime juice three times a week to the remainder of the men.

4*th.*—Admiral Boxer was seized with cholera this morning, on board of the steam transport "Jason," at anchor in the bay, whither he had removed at my suggestion on the 1st; he at that time having been suffering from diarrhœa. His case terminated fatally twenty-three hours after the seizure. A fatal case had happened in the vessel he had been previously living on board of.

5*th.*—Two cases of cholera in the "Isabella Blythe," hired vessel, laden with grain, lying close to the beach near the railway saw-mill. I mainly refer these cases to the unhealthy locality where the ship lies. Many of the cases of diarrhœa under my treatment, present a choleraic type to-day.

6*th.*—A good many ships have been sent out of harbour, and offensive matters floating about that have hitherto escaped observation are now easily seen, and are being removed. Seven fresh cases of diarrhœa.

7*th.*—Scorbutic cases on board "Belgravia" decidedly improved under the use of the potatoes and lime-juice. A marked amendment also in the cases of diarrhœa on board her.

8*th.*—Two cases of cholera to-day; one on board of "City of London," which terminated fatally. This man was moribund when I was called to see him, and I learned that he had laboured for some days under premonitory diarrhœa. The other case occurred on board of

the hired vessel "Tonka," lying abreast of the Commissary-General's house. The place in which the men are berthed on board of this ship is very confined, the external air having access only through a small square hatch on the upper deck. Two cases of choleraic diarrhœa on board of the cattle steamer "Lion." Three cases of fever under treatment progressing favourably.

9*th*.—Two cases of cholera to-day; one on board of the "New Pelton" steamer, laden with rum, and lying close to the beach in front of the commissariat stores, where some barley is lying in a state of fermentation. The ship is clean and sweet, but the smell from the shore is highly offensive. There are likewise three cases of diarrhœa, two of them choleraic. Upon my suggestion, this vessel was sent out of harbour at once, to lie in the bay. The other case of cholera was on board of the "Cochrane" horse transport. He was in a state of collapse when I saw him, and died shortly after being removed to hospital. There are two cases of choleraic diarrhœa on board the French brig "Actif," lying close to the railway saw-mill, where offensive smells always exist.

10*th*.—Visited "Sultana," "Wallace," "Daring," Cumberland," "Lion," "Earl of Shaftesbury," "Edward," "Star of the South," "Gauntlett," "Kangaroo," "City of London," and "Royal Victoria." Two cases of cholera to-day; one on board the "City of London," lying close to the beach, and to the northward of the Ordnance Wharf, and the other on board the "Royal Victoria" cattle steamer, lying at the Cattle Wharf. The latter vessel has very bad accommodation for her crew, and on my suggestion the after-steerage is to be occupied by all men unfit for duty. Three of her crew are suffering from diarrhœa, and one from intermittent fever. "Kangaroo," cattle steamer has three cases of diarrhœa, and one of fever. "Sultana" has three cases of diarrhœa.

11*th*.—Four cases of diarrhœa on board the "Protomelia;" one case of cholera on board the "City of London," lying in the same locality as indicated yesterday; one case of diarrhœa on board the "Snowdown" steamer, lying at the Ordnance Wharf.

12*th*.—Four cases of diarrhœa on board the "Mary Gibson," lying in the tier under the Castle; five cases of diarrhœa on board the "Gauntlett." Both ships are very clean, but the crews are much exposed to the sun in performing ship's duties. In all instances where cholera appears in a ship, I order whitewashing, the employment of whatever deodorants they possess, and the most efficient means of ventilation.

13*th*.—One case of cholera on board the "Cumberland" cattle steamer, lying at the Cattle Wharf. She has, in addition, three cases of diarrhœa, one of continued, and one of intermittent fever.

14*th*.—One case of cholera to-day on board the "Gauntlett," laden with ammunition, and lying close under the Castle, where there is an accumulation of feculent matter. The subject of it is an old man, and the case terminated fatally. Visited "Gauntlett," "Snowdown," "Vigilant," "Cumberland," "Royal Victoria," "Edward," "Mary Gibson," "Earl of Shaftesbury," and "Star of the South." Two cases of diarrhœa on board the "Cumberland" cattle steamer. There is at all times a most unpleasant ammoniacal

odour in the cattle steamers, from the urine of the animals saturating the ballast, or whatever lies at the bottom of the vessel. I have recommended water being poured in, and then discharged, but it does not remove the odour.

15*th*.—"Phœnix," one case of dysentery and two of diarrhœa; "Dinapore," three cases of diarrhœa. The cases of diarrhœa on board the "Gauntlett" are improving, as likewise those on board the "Edward." Sent a case of continued fever to hospital from the the "Royal Victoria" cattle steamer.

16*th*.—One case of cholera occurred on board the "Levant," which I sent to hospital; one case of diarrhœa on board the "Eliza;" and three in the "Snowdown" steamer, lying at the Ordnance Wharf.

17*th* and 18*th*.—A considerable reduction in the number of cases under treatment, but referable, in some measure, to the diminution of the number of vessels in my district. No new cases;—discharged to duty many of the diarrhœa cases.

19*th*.—The cases of diarrhœa on board the "Earl of Shaftesbury," "Star of the South," "Edward," and "Protomelia," are slightly improved. There is very little animal matter floating about in my district; and I have urged upon the masters of transports to cause the men who kill sheep, &c., on board their ships, to remove the entrails, &c., without the harbour.

20*th*.—No new cases to-day.

21*st*.—One fatal case of cholera occurred on board the steamer "Gibraltar," lying on the northern shore; "Kangaroo," cattle steamer, two cases of dysentery.

22*nd*.—Two cases of cholera to-day. One on board the steamer "Rajah," lying in the crowded tier under the Castle. The accommodation for the crew on board of this ship is very confined, owing to the large number of men she carries. The other case occurred in the foreign ship "Odin," where the men live in a place to which air has access only by means of a small hatch. There are two cases of diarrhœa in the "Prompt," one case of fever and three of diarrhœa in the "Cumberland" cattle steamer.

23*rd*.—Visited "Star of the South" "Prompt," "Kangaroo," "Gauntlett," "Earl of Shaftesbury," and "Oscar." Three cases of diarrhœa in the "Oscar," four in the "Kangaroo," and one in the "Gauntlett." Enjoined the masters to a strict attention to cleanliness and ventilation.

24*th*.—No cases of cholera.

25*th*.—"Royal Victoria" cattle steamer, three cases of diarrhœa, and one of intermittent fever. No other cases to-day. The cases of diarrhœa which occur in the stationary ships are almost confined to the boat's crews, who spend much of their time on the beach, and who have, therefore, facilities for committing excesses in drinking which those on board do not, fortunately, enjoy.

26*th*.—Two cases of cholera to-day; one the master of the "Black Boy" steamer, lying in the bay, and recently returned from Malta, whither she had gone with a cargo of winter clothing that had been used by the army. He had premonitary diarrhœa of many days' standing, which he neglected. The case terminated fatally. The

other case occurred on board of the "Cormorant," horse steam transport, just arrived, and lying near the sawmill. The case terminated fatally. There are, likewise, three cases of undeveloped fever in this vessel.

27*th.*—One case of cholera on board the "Phœnix," and three cases of diarrhœa; two cases of choleraic diarrhœa in the steamer "Hollander," laden with ammunition, and lying under the Castle. The accommodation for the crew is very crowded, and I have suggested that some of them should sleep on deck, under an awning, and likewise a better observance of cleanliness where the men are berthed. Four fresh cases of diarrhœa on board the "Edward," one case of fever in the Spanish steamer "Calabria," horse transport, lying at anchor on the northern shore.

28*th.*—One case of diarrhœa on board the "Zealous," and one of dysentery in the "Earl of Shaftesbury."

29*th.*—No fresh cases to-day; remaining ones progressing favourably.

30*th.*—One case of dysentery and one case of diarrhœa on board the "Kangaroo" cattle steamer. Harbour much cleaner of offal than I have observed it to be hitherto. When it was more crowded, offensive matters floating about escaped the notice of those whose province it was to tow them out to sea.

July.

1*st.*—Marked improvement in the sanitary condition of my district; no new cases to-day.

2*nd.*—Two cases of diarrhœa on board the "Louisa," one of them with choleraic symptoms. No other fresh cases.

3*rd.*—Two cases of diarrhœa in "Metropolitan" steamer.

4*th.*—The choleraic type which many of the cases of diarrhœa presented, has disappeared, and they yield to one or other of the usual remedies.

5*th.*—One case of diarrhœa in the "Albatross." The two cases of diarrhœa formerly reported in the "Hollander" steamer have assumed a dysenteric type, and appropriate treatment has been adopted.

6*th.*—Five cases of diarrhœa on board the steamer "Oscar," and one of fever. No cases of cholera, that I can hear of, in the harbour. The greater cleanliness observed, and the thinning of the shipping, has, I believe, contributed to this improvement in the health of the crews of the transports.

7*th and* 8*th.*—No fresh cases of any description.

9*th.*—Two cases of diarrhœa in the "Albatross," one in the "Dinapore," and one in the "Lion." Sanitary state of my district satisfactory.

10*th.*—One case of dysentery in the "Caroline," cattle-steamer. No new cholera cases to-day. Visited a large number of ships, and enjoined a continuance of those sanitary observances hitherto in use, and which are being attended with such satisfactory results.

11*th.*—One case of diarrhœa in the "Mary Eleanor," two in the "Helen," and two in the "Prompt." There is no urgent symptom in either case.

12*th.*—Two cases of diarrhœa in the "Prince of Wales" steamer, just arrived from England with ammunition and clothing. One of the cases of diarrhœa presents some choleraic complications which I have not observed for many days. The ship is clean, and the water good. I regret much to see the harbour filling again, leading, as it does, to the presence of offal, &c., between the ships, the crowded state of which, preventing the authorities from tracing the offenders, and of discovering even, in all instances, the nuisances.

13*th.*—Two cases of choleraic diarrhœa in the "Rajah" steamer, and one in the "Wide Awake." Cases on board "Prince of Wales" much improved.

14*th.*—Two cases of diarrhœa in the "Cumberland." The steamers employed carrying cattle, are the most unhealthy vessels in my district. The prevailing diseases on board of them are intermittent, remittent, and continued fever, diarrhœa, and dysentery. They are seldom in harbour more than a few days, say from two to seven days. There is at all times a pungent ammoniacal odour in them, from everything in the lower hold being saturated with the urine from the animals, and which no washing, or pumping out of the hold entirely removes. Zinc is used plentifully in these ships.

15*th.*—I was this day requested to inspect the steamer "Emperor," recently arrived from Alexandretta, with horses. This ship is clean, considering she has so recently discharged her cargo. The accommodation for the crew is spacious and well ventilated, the water is good, and fresh provisions have been issued for many days. While at Alexandretta, three cases of intermittent fever occurred, and no new cases occurred till some few days after her arrival in the harbour of Balaklava. She was seven days on the passage. There are now twelve cases, five being intermittent and seven remittent. Instead of sending this vessel for another cargo of horses to some ports near at hand, I recommended her being sent to Malta in the place of some other vessel intended for that destination, which has been acted upon.

16*th.*—One case of dysentery on board the "Baraguay d'Hilliers," and one on board the "Ormelie." No cases of cholera have occurred in my district since the 27th of June.

17*th.*—Two cases of diarrhœa on board the "Wide Awake."

18*th.*—One case of cholic on board the "Carl Henrich." No fresh cases to-day.

19*th.*—One mild case of fever on board the "Walmer Castle." This ship is kept clean; but I learn that her crew have been very sickly. She has been lying in harbour for many months, close to the Engineer's Store.

20*th.*—One case of diarrhœa on board the "Mandarin," and three cases on board the "Ayrshire."

21*st.*—One case of diarrhœa on board the "Amelia."

22*nd.*—Two cases of diarrhœa on board the "Cormorant," and one in the "John Bull."

23*rd.*—No cases of cholera have occurred in my district since the 27th June, a period of twenty-six days.

Total number of cases of cholera, thirty-two; of whom six re-

covered, twenty died, and six whose fate I have not learned. I am unable to give the total number of cases of diarrhœa and fever, as the vessels in which many of them occur, are suddenly ordered to sea, and I thus lose sight of them for a time. In conclusion, I have to observe, that much benefit has resulted from the sanitary measures adopted in the harbour since the invasion of cholera.

From this period, weekly returns of sick on board ship were made out by Mr. Costello, from which it appears that during the week ending July 2, five cases of cholera, forty-one of diarrhœa, four of dysentery, and ten of fever were under treatment.

During the week ending the 16th July, there were twenty-nine cases of diarrhœa, seven of dysentery, and fourteen of fever under treatment; and for the week ending the 23rd, thirty-five cases fo diarrhœa, four of dysentery, and seventeen of fever were treated. There was a new case of cholera, in the course of the following week ending July 30th. There were also twenty new cases of diarrhœa, three of dysentery, and three of fever.

During the next three weeks ending August 19th, there were about sixty new cases of diarrhœa, eight of dysentery, and twenty-eight of fever; and during the week ending the 19th, there were two new cases of cholera, which were the last that occurred in this division of the harbour.

The other forms of zymotic disease, still continued however, and between the 19th of August and the 19th September, when the ship inspection ceased, there were seventy-one new cases of diarrhœa, twenty-six of dysentery, and twenty-seven of fever brought under treatment.

No. VII.

Abstract of Statement of Works executed at Scutari under Mr. Hugh Unsworth, Surveyor to the Sanitary Commission, and Abstract of the Labour employed thereon from November 11, 1855, to May 12, 1856.

November 1855.

Mr. Unsworth, having reached Constantinople from England on the 11th November, commenced operations on the 17th, and ascertained the probable yield of water from the wells at Haidar Pascha. Levels were then taken to ascertain the gradients of the drainage proposed to be laid down, and the whole of the works and buildings at Haidar Pascha were inspected in company with Dr. Sutherland and Major Gordon, R.E. From the 20th to the end of the month, the Engineer was engaged in the preparation of a detailed plan showing the proposed drainage works at Haidar Pascha, and of a report upon the contemplated sanitary improvements, in accordance with general instructions he had received from Mr. Rawlinson before leaving England. The report having been submitted to Major Gordon, who made his written comments thereon, was finally laid before Dr. Sutherland, and sent by him to Major-General Storks for approval.

December.

On the 6th December, the sailing transport, "Mary Ann," arrived at Scutari, bringing out thirty-four workmen of the Army Works Corps, masons, bricklayers, carpenters, blacksmiths, fitters, and labourers, and a selected cargo of materials for the proposed improvements to be executed under the Sanitary Commission.

Various obstacles prevented the discharge of the "Mary Anne" till towards the end of the month. During the end of December and the commencement of January, there were employed in this duty:—

Workmen	26	days
Soldiers on fatigue	36	„
Native Labourers	139	„
Arabas	51	„

The first work on which the carpenters, who had come out by the "Mary Anne," were employed, was that of building the required hut accommodation for the workmen.

As a large cavalry camp was being formed at Haidar Pascha, and the roads were in an extremely defective state, the Surveyor commenced the construction of the roads, at the request of Major-General Storks; and during the latter portion of December, he was enabled to bare the rock, to obtain the necessary materials for the new road at Haidar Pascha, to work and cart stone from the quarry to Haidar Pascha, and to form 130 lineal yards of footpath.

The labour engaged was as follows:—

Soldiers on fatigue	554	days
Arabas	6	„
Donkeys	70	„

Before commencing the road, it was necessary to drain the ground, for the double purpose of improving the sanitary condition of the area to be occupied by the camp, and for protecting the roads. Accordingly, 730 lineal yards were laid with three and four-inch tile drains, brushwood and broken stones being filled in above.

January 1856.

The work of road-making was rapidly proceeded with during the month of January, 1,320 superficial yards having been formed, and covered with ballast nine inches thick, and with broken stones four inches thick. On this work, and in the carting of materials from the cemetery and the sea beach to Haidar Pascha, the following men and materials were employed:—

Workmen	156	days
Soldiers on fatigue	1,264	„
Native Labourers	7	„
Mule Carts	204	„
Donkies	74	„

It was found necessary to build a sea wall, six feet high, at the

point where the sewerage was to be discharged; and during January, in preparing the foundation and cutting stone for the wall, there were engaged:—

Masons and Workmen	.	49 days
Native Labourers	. .	82 „

The first of the new sewers commenced was one of 15-inch earthenware circular drain-pipes; the cutting of the trench for this sewer, during January, occupied:—

Workmen	. . .	82 days
Native Labourers	. .	271 „

The road near the hareem and the Palace Hospital being flooded and impassable in wet weather, it was determined to make an open water-course, 120 yards long, to carry off the superfluous water, and drain the road.

The labour employed at this point, during January, amounted to:—

Workmen	. . .	24 days
Soldiers on fatigue	. .	22 „
Turks	. . .	6 „

The carriage of stoneware pipes from the quay, after being landed from the "Mary Anne" to the Palace and Barrack Hospital, was effected by:—

Workmen	. . .	12 days
Native Labourers	. .	51 „
Soldiers on fatigue	. .	43 „
Mule Carts and Arabas	.	29 „

The carpenters and four masons of the Army Works Corps continued to be employed in preparing the requisite hut accommodation for the men, and in putting up workshops for their use at Haidar Pascha.

At the Barrack Hospital, the Surveyor prepared a plan, and made out an estimate of the works and water supply, to guard against the chances of fire at the hospital and barrack buildings.

February.

The construction of the roads at Haidar Pascha was continued during February, when 1,080 superficial square yards were prepared, and covered with broken stone, four inches thick. The ground was thorough drained with four-inch tiles; 280 yards of footpath were also formed and metalled. These works, and the procuring and carting of the broken stones, and other necessary materials, employed the following labour, &c.:—

Workmen	. . .	73 days
Soldiers on fatigue	. .	847 „
Native Labourers	. .	30 „
Mule Carts	. . .	155 „

The following drainage works were executed this month:—

Cutting trench, and laying 520 lineal yards of 15-inch pipe, from five to eight feet deep, building three man-holes, each three feet six inches diameter, with stone inverts, one having a metal, and the other two wooden covers.

Cutting trench, and laying 110 yards of 12-inch pipe, from four to five feet deep, with two man-holes, at the Barrack Hospital.

Laying 340 yards of 6-inch drain pipe at Albert Row, and fixing one gully, two man-holes, and twelve stench-traps to receive the refuse waters from the huts, also conveying into the new sewer, the refuse water formerly discharged into the valley between Albert Row and Victoria Barracks.

The works above described were executed by:—

Workmen	. . .	99 days
Native Labourers	. .	485 „

Dressing stone for man-holes, and building thirty yards of sea wall, six feet high, with coping, dressed stone invert, and a cover at the mouth of the sewer, the apron being twelve feet long and eight feed wide, employed the following labour and carriage:—

Masons and Bricksetters	.	69 days
Native Labourers	. .	33 „
Mule Carts	. . .	4 „

Additional watering troughs being needed for the cavalry horses at Scutari, the requisite quantity were constructed by:—

Carpenters	. . .	15 days
Masons	. . .	2 „
Soldiers on fatigue	. .	8 „

Some of the private quarters at the Barrack Hospital were provided with soil-pans and flushing cisterns, and connected with the drain at Albert Row.

Six soil-pans were also fixed at the south-west angle of the Barrack Hospital, with a supply of water from the Turkish cistern.

Four soil-pans, three kitchen-sinks, three stench-traps, a flushing-cistern, and eighty yards of 6-inch pipe-drain, were placed at the huts of the workmen.

The labour employed on all of the above alterations and new constructions during the month of February was as follows:—

Carpenters	. . .	108 days
Native Carpenters	. .	33 „
Bricksetters of the Commission		37 „
Fitters	„ .	22 „
Labourers	„ .	34 „

March.

Draining and forming roads at and near the hospitals continued during March. About 900 lineal yards of surface drains were laid in places where the ground was impassable for either man or horse. 480 square yards of new road were completed and covered with broken stone, four inches thick. The footpath was continued at Haidar Pasha, and about 1,300 yards of the old road near the hareem of the Palace Hospital were covered with broken stones.

The execution of the above, together with getting and breaking stone, and the carriage of the same, occupied the following labour, and carts:—

Workmen	22	days
Soldiers on fatigue	520	„
Native labourers	177	„
Mule carts	130	„

The drainage works were also continued, and a 9-inch pipe sewer laid, 320 yards in length, and four feet deep, with two man-holes. An old Turkish drain was taken up, the refuse deodorized, fresh earth filled in, and the place flagged over.

There were employed on the above during the month :–

Workmen	32	days
Bricksetters	10	„
Masons	4	„
Native Labourers	282	„

The privy accommodation at Haidar Pascha and at the Barrack Hospital, was extensively rearranged during this month. At the former an old latrine was provided with proper flushing apparatus, and accommodation for ten men at a time.

At the Barrack Hospital thirty-six soil-pans, with new seat boards, and six urinals (all with flushing cisterns, and 6-inch vertical soil pipes discharging into a horizontal 9-inch pipe sewer), were put up in the north-east angle of the building. The floors of the closets and urinals were laid with flags, gutters formed in the floor to take away the surface water; down pipes and stench-traps, being also provided.

To supply the soil-pans and urinals a flushing cistern, capable of holding 2,000 gallons, was constructed and put up, with pipes and valves complete. A pump and pipes were also attached for the purpose of supplying the cistern with water, and fourteen new and fourteen old doors were put on to the closets and urinals.

The labour engaged on the above works during the month of March, was as follows :—

Carpenters	188	days
Masons,	47	„
Bricksetters	75	„
Fitters	17	„
Labourers	71	„
Native Labourers	93	„

On the sea-wall at the outlet of the sewerage, and in the constructing of a man-hole and inspection shaft for the 9-inch sewer, the following workmen were engaged :—

Masons	33	days
Bricksetters	15	„
Labourers	8	„
Native Labourers	49	„

The sailing transport " Alceste," having arrived in the Bosphorus with a supply of deals for the works under Mr. Unsworth's charge, the following men were employed in discharging her :—

Workmen	14	days
Turkish Labourers	25	„

In assorting drain pipes for use, there were engaged :—

Native Labourers	43	days

and in pitting horse dung, which had accumulated from the Cavalry Barracks in such quantities as to become a nuisance :—

Military Prisoners	38	days

April.

During the month of April, the greater part of the labour at the disposal of the Sanitary Commission was employed in replacing the Turkish privies at the Barrack Hospital with soil-pans, with the requisite fittings and connections to afford them a good and plentiful supply of water. Two additional latrines were also constructed with provisions for cleansing the soil-boxes with the hose of the fire-engine, this means of flushing having been tried and found to answer very well.

The labour employed on the above work during April was as under :—

Carpenters	367	days
Bricklayers	190	„
Masons	169	„
Fitters	31	„
Labourers and Navvies	90	„
Native Labourers	155	„

The drainage work consisted of cutting a trench for, and laying 280 lineal yards of 9-inch pipe, and of cutting, laying, and filling in of about 700 lineal yards of surface drains, the materials employed for the latter being bushes, broken stones, and earth.

The men employed were :—

Carpenter	1	days
Navvies	101	„
Native Labourers	309	„

The construction of man-holes for the drains employed :—

Carpenters	13	days
Bricksetters	11	„
Masons	9	„
Native Labourers	6	„

There being nuisance from the stable manure, and difficulty being experienced in burning it in heaps, it was determined to construct one or more furnaces with the view of consuming the manure more speedily and effectually.

The construction of the furnaces, and the burning of the manure occupied the following labour during the month of April :—

Bricksetters	28	days
Carpenters	22	„
Masons	4	„
Navvies	71	„
Native Labourers	114	„

May.

In consequence of the news of the peace, the works of the hospitals were suspended early in the month.

From the 1st to the 12th, the works in progress consisted of laying a further length of 9-inch pipe at Haidar Pascha on which there were engaged :—

Navvies	36	days
Native Labourers . .	27	„

The construction of furnaces, and manure burning, engaged:—

Bricksetters . . .	31	days
Carpenters . . .	10	„
Navvies	31	„
Native Labourers . .	6	„

The construction of the water-closets at the Barrack Hospital occupied the following amount of labour:—

Carpenters . . .	63	days
Masons	23	„
Plasterers . . .	7	„
Bricksetters . . .	6	„
Fitters	2	„
Navvies and Labourers .	14	„

No. VIII.

Report on the Sanitary Condition of the Royal Naval Brigade, before Sebastopol, in the Winter of 1854–55. By William R. E. Smart, M.D., late Surgeon to the Royal Naval Brigade Hospital, Balaklava.

As the Royal Naval Brigade, whilst serving in the Crimea through the severity and privations of the winter 1854–55, possessed an unquestionably better sanitary condition, and showed a much less amount of mortality by the same types of disease, than the main body of the army, of which it was an integral part, it has been suggested that those facts in its history that seemed to influence the general health of the seamen may contain some useful teachings towards the amelioration of the causes of disease that exist or are generated among men long stationed in camps.

The information collected in this paper is derived partly from casual notes made by myself during the period in question, and partly from such intelligence as I have been able to amass from officers and men who served with the Brigade through the siege of Sebastopol.

To present the data so as to facilitate the arrival at definite conclusions, they are arranged under several heads:—

I.—The predisponents to health or to disease affecting the seamen, previous to their disembarkation.

II.—The comparative frequency, in each month, of those diseases peculiar to the situation, and the mortality attending them, the only standard of which, that I am able to render, as one complete in itself, is from the list of men sent to my charge for hospital treatment.

III.—The nature of the clothing and diet provided for the Brigade, the amount of labour performed, and the degree of exposure undergone by the seamen. And—

IV.—Deductions from the data thus arranged, of those circumstances that may be reasonably advanced as most conducive to superiority of sanitary condition.

On the first head it is to be noted that as the army embarked at Varna in the last week of August, and the fleet sailed from Baljik on the 6th of September, the seamen continued to enjoy a diet of fresh meat and vegetables a week later than the soldiers.

At the time of sailing, the cholera had become extinct in the ships of war, but it was introduced into some of the transports among the troops, and continued to display cases among the regiments throughout the voyage to the Crimea.

The army landed at Old Fort on the 14th of September. It fought the battle of the Alma on the 20th of that month, underwent unaccustomed exposure and fatigue up to the 2nd of October, which was the date of disembarkation of the Naval Brigade.

During this eventful period, the seamen were enjoying the shelter and the regularity of diet of their ships, and were, for the most part, performing their ordinary duties.

On the landing of the Brigade at Balaklava, it was at once supplied with tents, which was an advantage not yet possessed by the troops.

From these preliminaries of the campaign, it is evident that the Royal Naval Brigade commenced the winter compaign under far more favourable circumstances than the regiments with which it was allied, and was, consequently, in a much better condition to withstand the first impulse of the morbific causes generated on the camp.

In short, the seamen had been victualled on fresh meat and vegetables to a later date than the troops. They remained sixteen days later under their ordinary circumstances, undergoing no unusual fatigue or exposure, enjoying uniformity of diet, regularity of meals, and a plentiful supply of wholesome water; and as soon as they landed they obtained camp shelter.

Advantages like these, operating towards the end of autumn, must have exerted a very important influence on the sanitary state of the Brigade, or on the phenomena of disease developed in it during the ensuing winter months.

I shall now attempt to trace out, under the 2nd head, "The

Extent of Disease and Mortality," adopting as my principal source of information the monthly returns of the hospital under my charge, believing them to be a fair criterion, as they embrace all cases of severity necessitating removal from the camp, excepting, however, such as were so rapid in their changes as to prohibit an attempt at removal.

In the following table, then—

The "Number of Cases of each Camp Disease, and the Mortality in Hospital," are abstracted from the several monthly returns sent into office.

The "Mortality in the Camp" itself is derived from two sources; from the "Diamond's" Complete-book, while the Brigade was borne on her Supernumerary List; and subsequently to that, from information afforded me by Dr. Jenkins, who had charge of the camp.

The "Mortality enumerated amongst Men sent from this to their own Ships," includes every case that ever came to the knowledge of Dr. Jenkins or myself, in answer to inquiries diligently made.

The "Total Mortality from Disease" among men belonging to the Royal Naval Brigade, compiled from these sources, is as correct, and as complete as I can render it. It shows "the ratio of mortality to mean strength," but not "that of mortality to disease," as I have not at my disposal the monthly camp returns, from which alone the "total disease" can be ascertained. Therefore this table professes to give the mortality in the Brigade, and the cases sent for hospital treatment, without including the cases cured on the camp.

"The mean Strength of the Brigade" was maintained by drafts of men from ships, to fill up vacancies by death, wounds, sickness, or defaulture; and thus a greater number of men were exposed to the morbific causes extant in the camp than is indicated by the mean ratio of strength shown in the table. The information concerning victualling is the most accurate to be obtained from the "Diamond's" log, for the time the Royal Naval Brigade was borne on her books; and I am much indebted to Mr. Browne, paymaster of the Brigade, for references kindly made to his accounts for the particulars of later date.

For many valuable hints concerning the arrangement of duties in the camp, and the affairs of the seamen in battery, I have to thank Mr. Duigan, who served in the trenches several months as surgeon of the Brigade.

ROYAL NAVAL BRIGADE.—Winter of 1854-55.

Mortality from Camp Diseases.—Returns of ditto received for Hospital treatment.—Abstract of Fresh Victualling, &c.

1854-55.	Fevers.			Diseases of Digestive Organs.							Phthisis.	Death from ditto.	Scurvy.	Rheumatism.	Frost-bite.	Total cases sent for Hospital treatment.	Total deaths in Hospital.	Victualling—Anti-Scorbutics.				
	Continued.	Periodic.	Deaths from ditto.	Collapsed Cholera.	Choleraic Diarrhœa.	Deaths from ditto.	Diarrhœa.	Dysentery.	Deaths from ditto.	Jaundice.								Mean strength of Brigade.	Fresh meat supplied.	Fresh Vegetables supplied.	Lime-juice.	Oranges supplied.
																			lbs.	lbs.	Days.	No.
October	13	..	..	14	9	4	45	49	..	7	..	..	..	5	..	142	4	1,200	3,500	300	1	..
November	7	16	1	4	..	..	73	50	..	..	..	..	3	23	..	176	1	1,230	5,000	3,000	4 (432 lbs.)	..
December	10	9	1	4	..	2	15	2	..	1	..	..	3	2	..	46	3	1,346	11,040	18,800	4	..
January	6	3	..	..	..	..	12	9	1	..	..	..	7	8	1	46	1	1,256	6,222	7,300	5	6,624
February	1	..	..	..	..	..	2	2	2	..	..	..	1	1	..	6	2	1,030	1,493	1,446	17	14,400
March	1	..	..	..	..	..	..	..	..	2	..	..	..	1	..	5	..	1,023	3,488	3,818	10	2,160
April	..	..	..	1	..	1	..	..	..	..	1	1	..	..	..	2	2	1,333	2,930	6,357	..	..
Totals in Hospital	38	28	2	23	9	7	147	112	3	10	1	1	14	40	1	423	13	1,262	34,673	44,021	51	23,184
Deaths in Hospital	2					7			3			1					13				
„ on board their own ships	2					..			4			..					6				
„ in the Camp	4					16			1			..					21				
Total Deaths from disease between 2nd October and 30th April	8					23			8			1					40				

In this table there are some remarkable features.

Fevers were of the continued type in October, while the men were undergoing fatigue under a hot sun. In November, when the rains had set in, the prevailing type was the remittent or endemic; and after a prolonged continuance of wet, with increasing privation, and coldness of weather, the remittent fevers assumed typhoid symptoms, with complications either of pneumonia or of dysentery.

Bowel Diseases.—Choleraic disease presented its highest intensity in October, when the men were first brought into relation with the morbific causes existing among the troops. It maintained intensity to the end of December, and then declined; but its cognate and milder ally, serous diarrhœa, was not absent through the winter months. The dysenteric or inflammatory form became pathologically more severe, although numerically less frequent, after November. This increase of intensity in individual cases was owing to the introduction of the scorbutic cachexy, that greatly modified the bowel diseases, by implanting a tendency to ulceration of the mucous surface, especially of the large intestine.

Scorbutic Disease commenced in November. Its first indications were pains of the limbs, mostly of the lower extremities, and aggravated diarrhœa, often lienteric, which required, in its treatment, that regard should be had to the scorbutic taint of the system.

The cases classified "Scurvy," are here restricted to those which presented lesions of the capillary vessels, and some disintegration of the soft solids on the external surface.

As I apprehend that some of the cases classed "Rheumatism," in the early part of the winter, may have been of the scorbutic cachexy in its milder manifestations, the entries for that disease are shown in the table.

This should, however, be borne in mind, that the entries for rheumatism underwent an almost unaccountable decrease in December, cotemporaneously with the supply of warm clothing; while scurvy, in the restricted sense defined above, did not disappear until after January, subsequently to a distribution of succulent fruits, in addition to a fuller allowance of lime-juice.

Tubercular Disease.—The almost entire absence of this cachexy, is equally remarkable with the inordinate predominance of other forms of disease.

Amid so great privation and exposure, it would be natural to expect, that unsuspected hereditary predisposition would develop itself into tubercular disease of the lungs or glandular system; but from these maladies there has been, on the contrary, a remarkable exemption. During the winter months there was no case of phthisis dismissed from the brigade. In March and May there was one in each month.

At first sight, this immunity would seem to foreshow a very healthy climate, one, at all events, not propitious to the development of "tuberculosis;" this conclusion cannot, however, be accepted without further experience of Crimean winters.

Some importance attaches to this, that when causes productive of generic diseases, especially those of epidemic or of endemic origin, or of those that expend their morbific impulse on any particular set of organs are predominant, then other sets of organs possess a certain

amount of immunity from diseased actions that ordinarily develop themselves in their tissues.

Death of a part from its being frozen, termed *Gelatio*, was unseen in the Naval Brigade; the only case admitted into hospital did not go beyond the degree of "chilblain," in which, although severe, the part was restored to its natural function without loss of continuity. It occurred in the person of a negro.

This very remarkable exemption of a large body of men from the destructive effects of low temperature, that was producing great suffering among other corps encamped around them, appears to me to afford strong presumptive evidence of a higher grade of constitutional power belonging to each individual, to resist depressing causes. It will be seen too, as we proceed, that the seaman owed his safety, in this particular, mainly to his having to undergo a minor degree of exposure, while unsubjected to extreme want of suitable cloth ng And with especial reference to this point, it may be remarked, that it was often observed while these things were occurring, that the seamen of the Brigade contrived a variety of coverings of sailcloth, or tarpaulin, lined with blanket, for the protection of their legs and feet. It is very probable also that sailors, who are much accustomed on board ship to go barefooted, and to stand thus in water when assisting in "cleaning decks," possess from this habitual exposure unusually strong arterial power in their extremities, and are, on that account, somewhat fortified against impressions of cold that would be locally mortal to those who have minor powers of endurance.

The table makes it very evident, that the forms of disease prevalent in October and November, declined greatly in December and January, and disappeared almost in February.

This decrease of disease was undoubtedly, in a great measure, the consequence of an improvement in diet, in which the most marked advance was made in December, when the seamen received also an adequate supply of warm clothing. The larger issue of antiscorbutics in January must have contributed greatly to the same beneficial result. The former mitigated the effects of exposure, and the latter eradicated the scorbutic taint. But an important element in the constitution of the Brigade itself, already hinted at, contributed more than any other circumstance, in my opinion, to keep up the general standard of health of the Brigade, and to produce in particular this early amelioration; it is this:—

The mean strength of the Brigade was sustained by draughts of men from the fleet, whose stamina had not been lowered by camp life. Of those men who had landed in October, there was, in addition to the constantly occurring casualties, a very large dismissal in December and January, of parts of the crews of Her Majesty's ships "Britannia," "Trafalgar," "Vengeance," "Bellerophon," "Retribution," and "Arethusa," that were about to return to England.

By this withdrawal, the effective force of the Brigade was half renewed, as at least 600 men who had gone through the worst part of the winter were replaced by others who came on the scene possessing undebilitated constitutions, to derive all the benefit of the experience of camp life gained by those of their shipmates already stationed there.

I have no data in figures to guide me, but I conceive that by this constant infusion of new men into the Brigade, the mean strength of 1,200 was made up by not less than 2,000 individuals. This is an all-important feature in contrasting the sanitary condition of the Brigade with that of any purely military body in co-operation with it.

The ratio of Mortality to Mean Strength is surprisingly small, even with all these allowances, as it is found not to have exceeded $3\frac{1}{2}$ per cent. for the winter period of seven months, or $5\frac{1}{2}$ per cent. per annum.

With reference to the cases of *death on board their own ships* inserted at the foot of the table, it may be necessary to explain, that owing to the limited accommodation afforded by the "Diamond," as hospital-ship, it became necessary, whenever overcrowding of her maindeck was apprehended, to send away to their own ships at Kazatch, or in the Bosphorus, such men as had recovered so far as to admit of removal without apparent risk or danger.

The selection of cases for removal devolved on myself, and was often performed under the pressure of circumstances; and it may have occurred that there were occasional relapses among cases thus sent away; nor is it to be wondered at that some of them may have proved more adverse than was calculated on previously to removal. Notwithstanding which, I have not heard of more than six fatal cases having occurred, and these are appended to the table as having "died on board their own ships." Making, then, the fullest allowance for such casualties, the inference may be fairly drawn from the experience of this hospital-ship, that the diseases of the Naval Brigade, in the winter of 1854-5, were not essentially of a very fatal character; and that under ordinary means of treatment, combined with proper shelter and appropriate food, the mortality was moderate.

In detailing the facts connected with the third point, viz., in estimation of the comparative influence of the circumstances usually regarded as the "exciting causes" of the diseases that prevailed through the camp, the following order will be adhered to: —

1st. The Victualling,
2nd. The Clothing, and
3rd. The Duties of the Seamen.

The facts concerning the victualling shall be arranged under the heads of:—

Quality and Quantity of Food issued;
Regularity of Supply, as dependent on Conveyance;
Arrangements of Messing in Force in the Camp;
Means and Modes of Cooking;
Supply of Fuel.

Quality and Quantity of food issued.—After departure from Baljik, in Bulgaria, a month elapsed without any issue of fresh meat, and through October and November the supply was very small, and does not appear to have exceeded three days in each month. In December a larger quantity, probably amounting to nine days' rations with vegetables, was supplied; but from the 6th of September to the

1st of January, the total daily allowances of *fresh meat, with or without vegetables*, do not appear, as far as I can ascertain, to have exceeded fifteen. After the 1st of January, the quantity decreased from what it had been in December; but this was the less felt, as the system was then commenced of allowing the seamen their savings-money, as on board ship, on provisions not issued to them; through which alteration they obtained the means of making purchases for their messes. *Salted meats* were drawn in the usual quantity of 1 lb. per man, in beef or pork, on alternate days. *Biscuit* was always issued in ample quantities. *Flour or peas* were not issued at any time; but in lieu of them, an additional quantity of bread was given, $\frac{1}{2}$lb. in place of the allowance of flour, and a $\frac{1}{4}$lb. in that of pease, on alternate days. *Rice* was issued in small quantities about the middle of November; but this supply had ceased early in December. *Cocoa* was not given earlier than January, and up to that time the men had received a double allowance of tea. *Rum.* On first landing the allowance was increased to $1\frac{1}{2}$ gills; but towards the end of November the system was adopted of giving that quantity to those men only who were going to the trenches, while those remaining in the camp, received one gill.

Lime-juice and other Antiscorbutics.—In the early part of the campaign, the quantities issued were small. The earliest supply that I can find record of is on the 27th of October, when 288 lbs. or six days' rations, and again on the 5th of November, when 144 lbs., or three days' rations, were sent from the "Diamond" to the camp.

I do not find that any further supply was available until January, but in February and in March there were ample quantities of it.

Oranges and lemons, in quantities sufficient for the use of the sick, were received in December; and, in January, a more liberal importation admitted of a moderate, though general distribution in the camp, kept up though a period of eight weeks.

The Victualling of the Brigade was always distinct from that of the army, the supplies being, at first, drawn from Her Majesty's ship "Diamond," and then from its own Naval Brigade Commissariat at Balaklava.

Regularity of supply as dependent on Conveyance.—From an early date the Brigade was never absolutely without mules, but the number allowed was inadequate to the exigency; so that, during the winter months, it became necessary to perform the duty by parties of men.

In the wet season of the winter, when the roads were at their worst, it was found impraticable to obtain a sufficiency by means of the parties that could be sent from the camp to Balaklava. The daily supply was dependent on the quantities brought up each day, and I am credibly informed that it sometimes happened, in November and December, the night-relief of the trenches was delayed in the camp waiting the arrival of their rations, but was never compelled to leave the camp without them.

On account of the extreme difficulty of supplying the camp by the efforts of parties sent from it, 300 fresh men, sent from the "Queen," and "London," in the Bosphorus, to join the Brigade,

who arrived at Balaklava about Christmas, were detached to do this duty on a new plan.

They had their home through several weeks on board ships at Balaklava, from which place they made a daily journey to the camp, conveying the supplies of provisions, &c.

But as soon as the weather improved, and the roads became more passable, this party shifted from the ship to the camp.

By this very excellent arrangement, the worst of the evils arising from deficiency of food were obviated from an early period of the winter, the irregularities and deficiencies of supply being thus limited to November and the early part of December.

It is worthy of notice, that the seamen stationed in the batteries around Balaklava did not leave their ships until after the attack of the 24th of October. They suffered very much less in the winter months than the main body of the Brigade did, which must have been greatly owing to their proximity to the stores at Balaklava.

As the spring advanced, no difficulty was found in gradually storing a reserve of provisions in the camp, so that when the batteries were open, the duty of bringing up supplies from Balaklava was suspended.

Early in April, the Land Transport Corps relieved the Brigade entirely of this duty.

Formation of Messes among the Seamen.—The original arrangement was, that the men dwelling in each tent should form a distinct mess. There were, at first, as many as eighteen in each tent, but they became gradually less crowded, by obtaining a larger number of tents.

The office of cook of the mess was taken by each man in turn. The cook's duty was to draw the rations of his mess from the steward, to provide fuel, and to cook the food for his messmates. He was excused from every other duty, and had to rise an hour earlier, so as to prepare breakfast for the party going to the trenches.

Another arrangement was afterwards carried into effect among the men of the "Queen," "London," and "Rodney," who, being provided with large extemporised camp-kettles, that would contain fifty rations in each, a cook and two mates from each ship's company were allotted permanently to this duty; by which arrangement, uniformity of diet was established; and as the men of each tent had no longer to provide for their own cooking, there was a great economy of the working hands.

Those ships' companies unprovided with these camp-kettles, adhered to the plan first instituted.

Means and Modes of Cooking.—It may be said that with seamen the normal mode of cooking their rations is by boiling them; the limited resources of ships' galleys will admit only of the sailor's enjoying a roast or baked meal as a luxury not frequently within his reach. This being the range of his ordinary habits, it follows that, when in possession of a stew-pot and fuel, he has all the appliances to enable him to meet the ordinary demands of his appetite.

Some ships' companies, on leaving their ships in October, were allowed to take with them the portable furnace and boilers supplied for the service of the boats; but these being small, were found very

inadequate to cooking for so many, and were soon worn out by constant use.

During the first week of October, the encampment of the Brigade lay outside the town of Balaklava, and the seamen then took care to provide themselves as well as they could, by purchase or otherwise, as many pots and kettles as they could procure from the townspeople. The utensils thus obtained being comparatively small, they only partially supplied a great deficiency.

In December, there were sent from some ships, for the use of their own men, large camp-kettles, or boilers, made from iron, tar or paint barrels, by cutting them in halves, and fixing on them iron-looped handles and wooden covers. This was a simple contrivance, but it proved a most efficient adaptation of means abundantly at disposal.

Possessing these contrivances for cooking, and having such good arrangements for messing authorised by their officers, it is improbable that the seamen suffered from any irregularity of meals, or from the use of uncooked food; or that men leaving the camp on duty, or returning to it, were unsupplied with some warm refreshment; and it would appear that what was so well arranged, was equally well carried out in practice.

The men going to the batteries took with them their rations for the time they were to be absent from the camp; and having hearths and cooking-places constructed in convenient corners, they cooked their food in the batteries; and from the *savoir faire* of the sailor's character, it may be assumed that he rarely went without a warm meal of some sort during his turn of duty, whether that fell by day or night.

The Supply of Fuel throughout the winter was entirely dependent on the exertions of the men in digging roots, which were very difficult to be procured when snow covered the ground.

In February, there commenced an issue of coal from the stores at Balaklava, but the difficulty of conveying so weighty an article on the shoulders of men, sufficed to limit the advantage of this supply, up to the time when the Land Transport Corps was sufficiently organized to undertake the carrying duties of the camp.

This concludes all I have to offer concerning the victualling of the Brigade; and, in the next place, I shall state all that is known to me with reference to the clothing of the seamen belonging to it.

The Quantities of Clothing and Slops, with reference to the original equipment and subsequent supplies, as affording protection from the wet and cold, and sudden changes of temperature, so very frequent in the Crimea, must have formed an essential item in the safeguard of health during the winter season The anticipated shortness of the absence from their ships, and the continued fine weather through the month of October, did not seem to demand any provision of clothing beyond that for their actual wants at the time, and therefore no increase was made to the quantity to which they were restricted on leaving their ships—viz., to the suit on their persons, with one pilot-coat and a blanket.

Early in November this quantity was found insufficient for their protection and comfort, and the men began then to procure, as they

best could, more clothing from their ships. These being at anchor off the Katscha river, there were no means of proceeding on board them, even if the urgent affairs of the camp had then permitted; and as obtaining the wished-for supplies was left to each man's intelligence and personal exertions, to get the articles he wanted sent to him by steamers proceeding from the fleet to Balaklava, it is very probable that a partial and insufficient provision was thus made to meet the growing necessity.

As it happened that those men of the Brigade belonging to the "Albion" and "Arethusa," ships that had left the shores of the Crimea, after the attacks on the sea forts on the 17th of October, were more sickly than others in November, it may be inferred that they suffered from the want of even this limited advantage.

New Clothing and Slops.—The small quantities of these in charge of the paymaster of the "Diamond" did not go far to supply the Brigade; and it was not until late in November, or early in December, that larger quantities were sent from the ships of the fleet, for issue to those portions of their crews serving ashore. Previously to the arrival of these, it became necessary to procure ankle-boots for the seamen from the stores of the Quartermaster-General, as the shoes they had brought with them from their ships were found useless in wet weather.

After the general issue of clothing and slops that took place early in December, the men were warmly clad; and, indeed, they were so well supplied, that most of them, being possessed of two new pilot-coats, found easily a profitable market for their superfluity among the army officers.

From these circumstances, it would seem, that although the seamen were not generally well clad in the wet period of November, and part of December, yet they were all exceedingly well supplied before Christmas, previous to the setting in of the severely-cold season.

In January, there arrived a most abundant supply of "gratuitous" clothing, consisting of sheep-skin coats, fur-caps, wooden-soled shoes or ankle-boots, and woven or knitted under-clothing, as vests, drawers, stockings, and gloves, in quantities far exceeding the immediate, or even the probable requirements of the Brigade.

It remains now to inquire into *the Duties performed by the Naval Brigade*, so as to arrive at definite conclusions concerning the amount of labour and of exposure undergone by them, especially in the season of cold and wet, when the exciting causes of disease were in most active operation.

The first duty performed was the landing of the ships' guns, at which they were to serve in the batteries, the mounting these guns on their carriages, and dragging them by manual labour, with their shot, shell, and ammunition, to the front, a distance of five miles, over a road unsuited to such weighty loads. The difficulties of this task, and the amount of labour expended in its execution, can only be rightly appreciated in considering the kind of wheels on which the heavy guns were transported—these being simply the trucks intended for use on a ship's decks.

The siege-guns of the Royal Artillery were being conveyed to the front at this time, mounted on the lofty-wheeled carriages termed devil-carriages, and transported by horse-power.

When this was accomplished, about the 11th of October, the encampment of the brigade was shifted from Balaklava to the plateau above Sebastopol, close to the Woronzoff road; and the seamen were then employed assisting in the construction of the first parallel, digging trenches, raising parapets, constructing platforms and magazines, mounting and fitting siege-guns, and storing ammunition for the bombardment.

Their share of this labour was performed in the daytime, up to the opening of the batteries on the 17th of October; after which date, the amount of labour performed was almost entirely regulated by the fluctuating requirements of the batteries.

Whenever the batteries were open, the whole brigade formed two reliefs, going alternately to the trenches after sunset, to remain there twenty-four hours. Through the night the men were employed repairing the damages of the day, and in replenishing the magazines.

In the daytime, they were divided into two watches, that relieved each other at the guns every two hours. Under ordinary circumstances, the batteries opened their fire at daylight and ceased with a grand round, or salvo, at sunset. During the intervals of the great bombardments, the battery duties were much more easy, as only one-half as many men were required; and these, not through quickly alternating periods of fatiguing labour and of rest, but merely to be in readiness for all emergencies, and to reply to the slackened fire of the besieged.

There being now less danger in going to, and returning from the trenches, as the firing was rare, the reliefs were more frequently sent, being repeated every night and morning; by which the stay of the men in the batteries was reduced from twenty-four to twelve hours.

The brigade was divided into four reliefs through the winter season of wet and cold; each relief taking its turn at the trenches twice in four days, one turn being by day and the other by night, of twelve hours each, with an interval of not less than twenty-four hours intervening.

The night duties of the batteries were light when a bombardment was not in actual progress. Sentries being stationed on the platforms, &c., the remainder of the relief in battery were at liberty to take exercise by walking between the traverses, or to warm themselves or cook at their fires, or to shelter themselves in empty magazines.

These duties in the trenches occupied twenty-four hours out of four days, and on the other three days the seamen were called on to perform the duties of the camp, or to go to Balaklava to fetch supplies, which last, it must be remembered, was done in the worst part of the winter by a party stationed at Balaklava.

There were camp duties on two days, such as constructing cook-houses, latrines, roads, watercourses, and bridges, going sentry, &c.

On the days of journey to Balaklava, in the wet season, the fatigue-party was often absent from the camp from 7 A.M. to 4 or 5 P.M.

The Routine of Duty through the Winter Months, the batteries not being then in active operation, may be briefly defined as follows, for every term of four days:—

1st Day.—To the batteries at daylight, returning to camp in the evening. All night in bed.

2nd Day.—Camp duties through the day. To the batteries after sunset, to pass the night there.

3rd Day.—Returning to camp at daylight to perform light duties through the day, and perhaps to do a two hours' turn as sentry at night.

4th Day.—The journey to Balaklava, when that duty devolved on the brigade in camp, and, at other times, the ordinary camp duties. All night in bed.

5th Day.—Recommences a term as on 1st day.

Thus it appears, that in the most trying season of the winter campaign, the sailor of the Royal Naval Brigade, passed two, and perhaps three, unbroken nights out of four in his tent; and that out of a term of ninety-six hours, he was called on to pass from twenty-four to twenty-eight hours, in two distinct periods, on duty in the trenches.

His post of duty being in the first and deepest parallel, he was enabled to obtain shelter, to construct contrivances for cooking, to take exercise, and was never compelled to remain in constrained positions. By the good regulations in force in his camp, he had warm food prepared for him on leaving it and on returning to it. When in the camp, he could find some leisure, which he might employ in repairing his clothes; and he was not, under any circumstances, called on to make the journey to Balaklava oftener than once in four days, being relieved altogether from this duty in January.

On the point of duty, it must be admitted that these were great advantages in favour of the Brigade.

Having now completed the survey of the *material* and *occupational* circumstances under which the seamen of the Royal Naval Brigade were placed, that, in my opinion, may have influenced its sanitary condition, the evidence adduced may be, I think, condensed into these propositions.

That comparative immunity from the diseases prevalent in the camp in the winter of 1854–55, was enjoyed by the Royal Naval Brigade; and that this favourable condition extended to the mortality from camp diseases, which was small relatively to the number of cases under treatment.

That circumstances conducive to this result are to be found in the predisponents to a healthy condition, in operation among the seamen up to the moment of their landing, which took place sixteen days later than that of the army; and the manner in which the Brigade was enabled to recruit its numbers by fresh bodies of men who had not been debilitated by the influences of a camp-life.

That cholera, dysentery, scurvy, and typhus, which were peculiarly the diseases of the camp, always increasing in frequency in the main body of the army from the middle of November to the end of January, decreased in numbers, collectively, in the Brigade after the end of November.

That this earlier check of disease and amelioration of sanitary condition, were cotemporaneous with, if not dependent on, a fuller supply of fresh meat and vegetables, and a very adequate provision of warm winter clothing early in December.

That the subsequent maintenance of this comparatively good

sanitary condition was attributable to two causes, a large infusion of new men about the middle period of the winter, and the much greater proportion of men, relatively to the amount of trench duty to be performed; that duty being, also, through the winter months, lighter in its nature than that of the Infantry stationed in the trenches; and the relative proportion of men being so great as to relieve those who were on trench duty from the very fatiguing marches to Balaklava during six weeks in the depth of the winter, and to admit, also, of permanent camp regulations as to the victualling and the cooking of food.

These are to my mind, unquestionably the most efficient causes of the great superiority of sanitary condition, in which we have grounds to congratulate ourselves as a service, thankfully, and not boastfully.

But there are *minor circumstances* not deserving, perhaps, of being classed with these, that have exercised no mean influence on the well-being of the seamen in camp,—fortifying them against the advent of disease, and tending to render its hold on the system less intimate. I shall now endeavour to describe the most prominent of these.

The true sailor possesses in his general character, inculcated in the primary education that fits him for his occupation, an adaptability to any new circumstances, and a capability of suiting to his wants and convenience the new objects adventitiously brought within his possession; and he is so frequently thrown on his own resources, that he is compelled to become, in some measure, inventive.

Thus, by education, every man-of-war's man is cook and tailor to the full extent of his class-wants; having food, he knows how render it palatable and digestible; and being supplied with materials, he is sufficiently skilled to adapt them to his comfort and protection; and it may be added with safety, that he is by no means unwilling, or unready to appropriate to the service of his necessities, whatever useful objects good fortune may throw in his way.

The vigilant care exercised by naval officers over the welfare of their men throughout this campaign has been proverbial.

Perhaps beyond the pale of family supervision there is no position of life in which greater regard is devoted by superiors to the well-being of their inferiors than on board a well-disciplined ship-of-war; and it is but fair to conclude, that in changing the scene of duty from the ship to the shore, they carried with them the same relations to each other as had regulated their previous intercourse.

Thus the wants of the seamen, arising from the newness of their position, were often anticipated by those accustomed to foresee and to provide for them; and when, from the force of circumstances, things could not have been anticipated or provided against, every effort feasible through the personal exertions of officers, was made to remedy the unavoidable deficiency.

Lastly, the seamen were in the possession of another advantage over the troops, instrumental of good to them when disabled by sickness. There was close at hand, in the Crimea, an hospital ship for their reception, in which the diseased seamen were afforded such means of cure, as they had a right to expect under the most favourable circumstances of their position in life; and ample proofs were afforded of the importance attached to this by themselves.

On being sent away from the camp, they were at once received into an hospital of their own service, in which they were surrounded by objects familiar to them, and essential to their ideas of comfort. On their arrival at Balaklava, labouring under maladies of the severest nature, it often became the duty of the medical officer to supply the means of reanimating the flagging vital powers, by applying general and local warmth, and by the administration of hot diluents, stimulants, or other means that seemed to be most urgently demanded. It was often most satisfactory to him to observe the gradual restoration of energy, during which cases of most aggravated and complicated aspect, almost hopeless on first inspection, assumed milder symptoms, and, at length, came to present the more simple characteristics of definable diseases.

Although this circumstance could have had no influence on "the causation of disease," yet it served more than any other perhaps, to diminish "the ratio of mortality from it."

How very different was the course of events in the case of the disease-stricken soldier, who, through the winter, could not obtain hospital accommodation before he reached Scutari.

In conclusion, I would state, from all that has ever appeared to me, it would be most unjust, and certainly not a likely means of arriving at truth, to fix the sanitary condition of the Royal Naval Brigade as the standard by which that of the army in general is to be estimated and judged.

The facts which I have endeavoured to arrange and to embody in this paper, are to my idea, conclusive, as to the superiority of position, and circumstances, and of sanitary condition as dependent on these, throughout this winter campaign, of the seamen of the Royal Naval Brigade over the Infantry at the front, who were always undergoing a severer degree of exposure, and performing more harassing duties with disproportionate numbers; being, at the same time, as much dependent, as any part of the army, on their own exertions for their supplies.

On the other hand, the Highland Brigade, and the Royal Marine Battalion, stationed around Balaklava, the Cavalry and the Field Artillery, were, in every respect (regarding duties and supplies), in a still more advantageous position than the Naval Brigade; and thus, for opposite reasons, it cannot be brought into legitimate comparison with any of these portions of the army,

In adducing the Royal Marines as an example on the side of superiority of position, and of comparative exemption from disease, exception must be made of that portion of the corps, detached under Major Hopkins, and stationed with the Light Infantry Division on the heights above Sebastopol, from the 4th of November to the 6th of March. It fought in the battle of Inkermann, and took part in the trench duties of the Division to which it was attached, and suffered equally with it by disease and death.

The only body of troops which has been throughout the siege on anything like equal terms with the Royal Naval Brigade, is the Royal Artillery of the Siege Train, of which the duties have been precisely similar in their nature, and in their alternations of intensity and relaxation, the men composing it being well clothed equally early in the season with the seamen of the Brigade. It had, however, always an advantage in the large amount of horse-power at its disposal for the maintenance of a sufficient supply in the camp; but, on the other hand, the Brigade has had the benefit peculiar to itself, of receiving relays of men from the fleet, this being impossible with any military body deriving its reinforcements from England.

Thus by reason of the various positions and duties of the different corps composing the army, it is manifest that any comparison of the sanitary condition of the Royal Naval Brigade with the combined forces with which it fought, to be correct, or of any utility in the estimation of the causes of disease, should be instituted between its returns and those of the Siege Train of the Royal Artillery alone.

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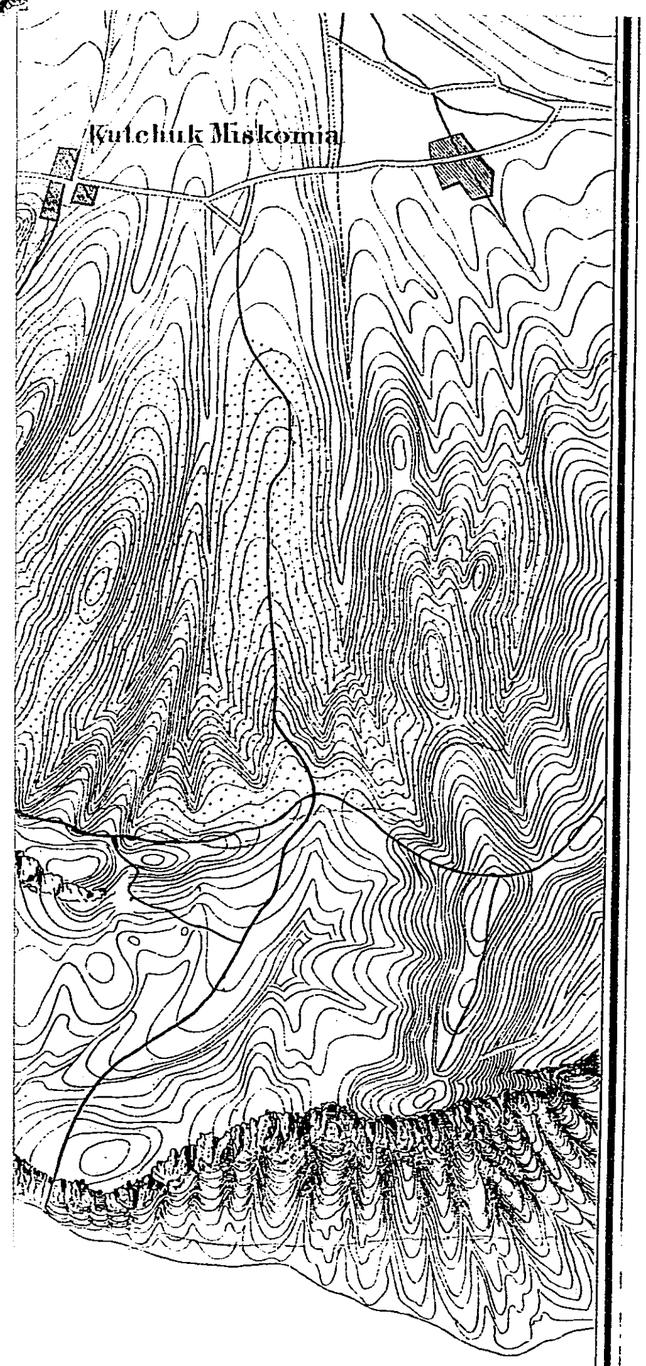


TOPOGRAPHICAL & GEOLOGICAL MAP

of the Allied Occupation in the

CRIMEA

Based on the Reconnaissances of French Staff Officers made in 1854-1855.

Scale of British Miles 1/40 000.

0 1 2 3 1 2 3 Miles

RUSSIAN CAMP

North Fort

Redoubt

Telegraph Battery

Fort Michael

Fort Constantine

Inkerman Light House

Inkerman Lighthouse

Inkerman Ruins

SEBASTOPOL HARBOUR

Fort Nicholas

Fort Paul

Fort Alexander

Quarantine Fort

KARABELNAIA

Little Redan

Malakhov Tower

Mamelon

Right Light House Battery

Left Light House Battery

Battle Field of Inkerman

Intrenchment

SEBASTOPOL

Genoese Fort

Quarantine Bastion

Ruins of Kherson

Redan

Central Bastion

Flagstaff Bastion

Victoria Redoubt

FRENCH CAMP

BRITISH CAMP

Cathcarts Hill

Old Redoubt

British Observatory

Quarries

Telegraph Redoubt

Telegraph

Observatory

Ambulance

House of the Zouaves

House of the Commandant of the Siege

French Head Quarters

British Head Quarters

Redoubt of the 39th

Maison des Carrières

Fountain

Battery

Sommelier Battery

Lazaretto Battery

Landing Place

French Road

KAMIESCH

KAMIESCH BAY

STRELETZKA BAY

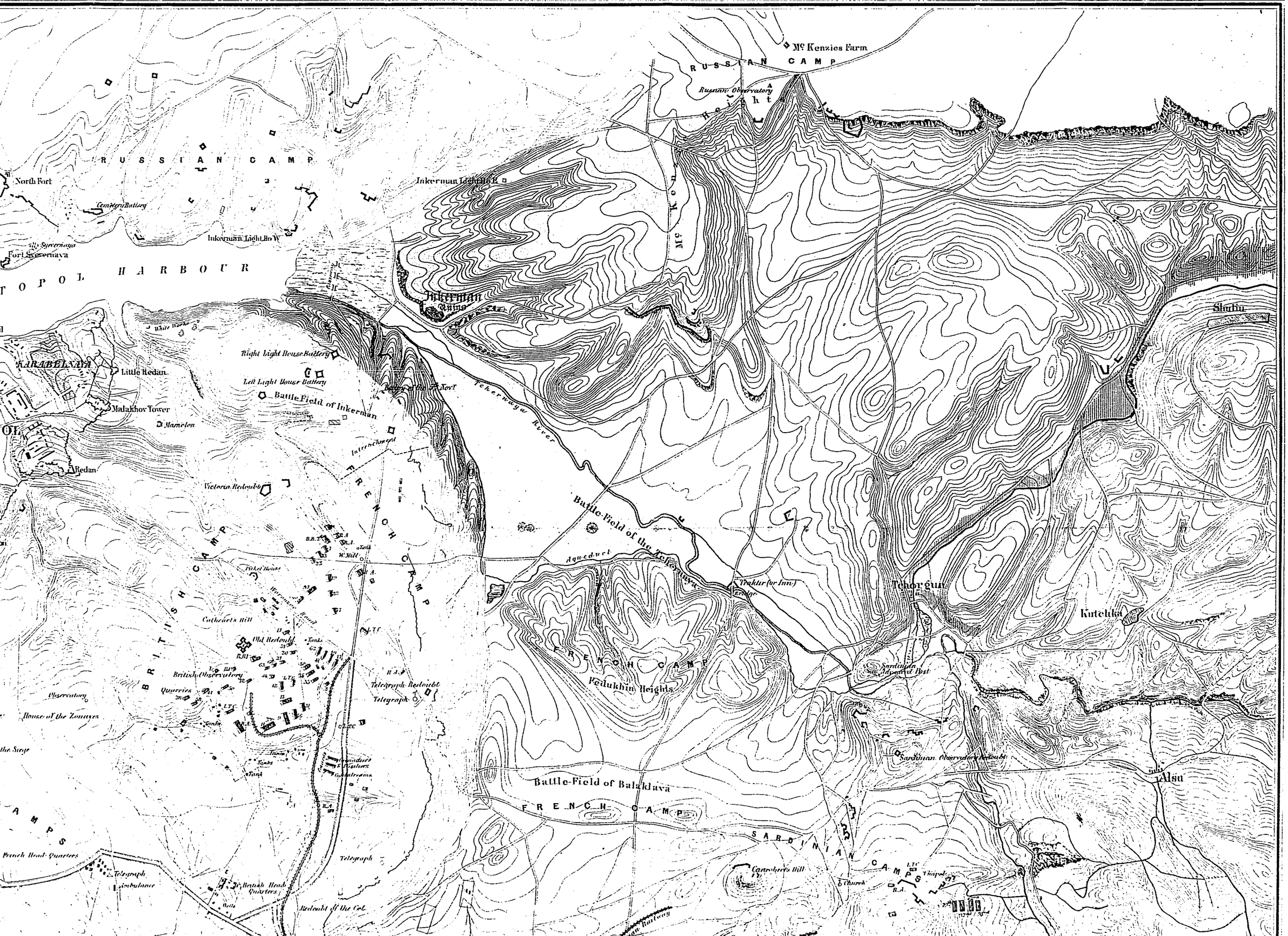
PANAGIA BAY

Panagia Peninsula

Cape Khersonesus or Cape Tarkan

Light H.

Megalon Kastro


Mc Kenzies Farm
RUSSIAN CAMP
Russian Observatory
Inkerman Light House
RUSSIAN CAMP
North Fort
Cemetery Battery
Inkerman Light House
Fort Sveaniava
TOPOL HARBOUR
Inkerman Ruins
Mc Kenzie Hts
Sluchi
White Works
Right Light House Battery
KARABELNAIA
Little Redan
Left Light House Battery
Battle Field of Inkerman
Malakhov Tower
Mamelon
Redan
Victoria Redoubt
Tchernaya River
Battle-Field of the Tchernaya
Aqueduct
Traktir (or Inn.)
Bridge
Tchorgun
Kutchka
FRENCH CAMP
BRITISH CAMP
Picket House
Cathcart's Hill
Old Redoubt
British Observatory
Quarries
Telegraph Redoubt
Telegraph
Observatory
House of the Zouaves
Fedukhin Heights
Sardinian Advanced Post
Sardinian Observatory Redoubt
Ialsu
Battle-Field of Balaklava
FRENCH CAMPS
SARDINIAN CAMPS
French Head Quarters
Telegraph
Ambulance
British Head Quarters
Redoubt of the Col.
Campbell's Hill
Church
Chapel

Cape Khersonesus or Cape Fanari

Light House

Fanari Peninsula

Kamiesch

French Road

French Head Quarters

Telegraph

Ambulance

Wells

Telegraph

British Head Quarters

Redoubt of the Col

Col

British Railway

Telegraph

Engine

BRITISH CAMPS

Kadikoi

Kamara

Mastic Farm

Bischalin Farm

Monastery Farm

Monastery of St George

Cape St George

Explanations.

BRITISH ARMY.

Cavalry Camps | *The Camps near Balaklava are given as they were*

Infantry Do | *occupied during the Summer & Autumn of 1855.*

British Burial Grounds

The Camps on the Plateau and at Kamara were those occupied during the Winter of 1855 and Spring of 1856.

GEOLOGICAL FORMATIONS.

Upper Tertiary or Steppe Limestone

Volcanic Sand and Ashes

Lower Tertiary

Nummulitic Limestone

Chalk and Green Sand

Neocomian

Jurassic Limestone

Conglomerate

Schists

Volcanic

Lithographed & Printed at the Topographical & Statistical Depôt War Depart.t March 1857 Lieut.t Col.t T.B Jervis Director

French Head Quarters
Telegraph
Ambulance
3d British Head Quarters
Redoubt of the Col
Telegraph
Col
Sebastopol Railway
Highlanders
Kadikoi
Spring
Telegraph
Engine
Plan
Canrobert's Hill
Church
H.d.
Chapel
Royals
BRITISH CAMPS
Risakin Farm
Home Farm
Karani
Monastery Farm
Balaklava
Hospital
Marine Heights
Balaklava Castle
Naval Hospital
Monastery of St George
Kutchuk Miskomia
Cape St George
Cape Aya