

**Report on the formation and general management of Renkioi Hospital, on the Dardanelles, Turkey / addressed to the Right Honourable the Secretary of State for War, by E.A. Parkes.**

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**Publication/Creation**

[London] : [Printed at the War Department], [1857]

**Persistent URL**

<https://wellcomecollection.org/works/j3ga465u>

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*By [Signature]*

# REPORT

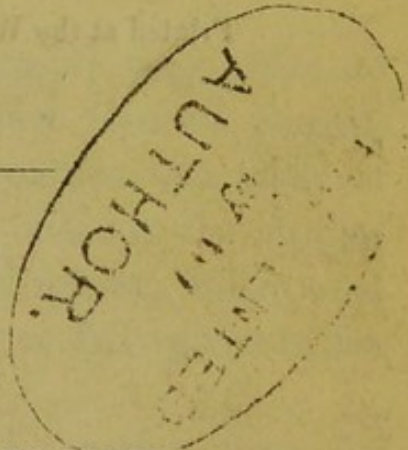
ON THE

FORMATION AND GENERAL MANAGEMENT

OF

## RENKIOI HOSPITAL,

ON THE DARDANELLES, TURKEY.



ADDRESSED TO

THE RIGHT HONOURABLE

THE SECRETARY OF STATE FOR WAR,

BY

E. A. PARKES, M.D.,

LATE SUPERINTENDENT OF THE HOSPITAL.

*1856*

REPORT

OF THE

FORMATION AND GENERAL MANAGEMENT

OF

RENKIOT HOSPITAL

ON THE DARDANIELS BURNET

Printed at the War Department. April 1857.

APPROVED TO

THE RIGHT HONORABLE

THE SECRETARY OF STATE FOR WAR

BY

E. A. PARKES, M.D.

LATE SUPERINTENDENT OF THE HOSPITAL



## REPORT, &c.

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*London, December 1, 1856.*

MY LORD,

ON the 16th November I had the honour to transmit to your Lordship the last Monthly Report of the Civil Hospital at Renkioi, in Turkey, giving an account of the breaking up of the Hospital, and of the disposal of the stores.

It occurs to me that your Lordship may desire to have now presented to you a succinct General Report, containing an outline of the formation and mode of working of Renkioi Hospital, but without the various minute details of expenditure of money, stores, and medicine, which have been already so fully given in the Monthly Reports.

In March 1855, I received intimation from Sir James Clark that Her Majesty's Government were desirous of immediately increasing the hospital accommodation for the Eastern Army, as not only had the hospitals already provided been unequal to meet the pressure which the sickness caused by the Crimean campaign had made upon them, but apprehensions were felt that if active movements were undertaken in the ensuing spring and summer, the amount of disease might be still greater. To meet this contingency, a hospital at Smyrna had been organized in the only



building which remained at the disposal of the Turkish Government; and when this had been immediately filled to overflowing, it was determined to send out from England wooden houses, which might be erected in some convenient spot, as an additional hospital, capable of holding 1,000 sick.

It had been determined by the Government to officer this hospital with civil medical practitioners, instead of calling upon the already overburthened Army Medical Officers to undertake its duties.

I was informed that the Government were desirous that I should undertake the superintendence of this new hospital, the arrangement of the medical details of which were to be made by Sir James Clark; and I was directed to put myself in communication with Mr. Brunel, by whom the hospital was to be constructed.

I found that the formation of the hospital buildings, their size, shape, system of ventilation, water supply, and drainage had been already considered and fixed by Mr. Brunel, and that every arrangement was distinguished by that perfection of detail and excellence of method which stamp all the works of that distinguished engineer. I was convinced that nothing could exceed the excellence of the mechanical arrangements, and the most pressing duty seemed to be the choice of a fit locality for the hospital.

The same view was taken by your Lordship, who informed me that orders had been sent out already to Scutari to survey all eligible sites, but that, as I was to assume the responsibility of the medical direction, it was considered advisable I should have the power of ultimately choosing the best spot; and that, as the



ships were already loading with the wooden houses, it was necessary I should start at once. Orders had been sent out to Mr. Brunton, the engineer to whom Mr. Brunel had determined to entrust the erection of the buildings, to leave Smyrna, where he then was stationed, and to join me at Constantinople, in order that he might judge of the eligibility of any proposed site for drainage and water supply.

Accordingly, having arranged with Sir James Clark respecting the medical organization of the hospital, and having made the proper requisitions for all medical and purveyors' stores suitable for an hospital of 1,000 men, I left London on the 5th, and arrived at Constantinople on the 18th of April.

In addition to choosing a site for this hospital of 1,000 beds, I was informed that two other hospitals of the same size would probably be also sent out, and that I was to keep in view the probability of other sites being wanted. I was also instructed that the nearer together these three hospitals could be placed, the more easily would ulterior arrangements, for the transport of stores and sick, be made.

#### *Choice of Site.*

On arriving at Constantinople, I was informed by Lord William Paulet, the Commandant at Scutari, that no eligible site had been found on the Bosphorus except, perhaps, at Scutari itself; but that it was desirable I should again pass over the ground and satisfy myself on the point.

Accordingly, I made a minute inspection of the Bosphorus, first alone, and afterwards in company with



Mr. Brunton, the engineer, and with Mr. Jenner, purveyor to the Forces, who had also been ordered to join me. We also visited the largest of the Princes Islands, but could find nowhere any place which combined all the conditions required. The spot at Scutari referred to by Lord William Paulet, was found to have insufficient water supply, and to be too near to the marshes of old Chalcedon.

I should mention here, that according to the plan drawn out by Mr. Brunel, the hospital was to be formed of 22 separate wooden houses, or wards, each 100 feet long, 40 feet wide, and 25 feet high in the centre, and connected together by an open corridor. To each ward was attached a lavatory, water-closets and bath-room; there was to be a constant water supply to these places, and the sewage was to be carried away in wooden drains.

It was possible to arrange the houses in various ways—in a straight line, in a crescent, in a square, in two or more lines, &c.; but in whatever way they were arranged we required at least four acres of level ground for the wooden houses alone, without taking into account certain iron houses intended for kitchens and laundries, and which were to be placed at one end or in rear of the wooden buildings.

It was necessary, also, that this ground should not only be level enough to enable us to dispense with terracing or earthworks, but that it should have a fall sufficient to carry off the drainage, and a good outlet into running water for this sewage.

It was necessary, also, to provide for a large water supply, at least 25,000 gallons per diem, as no cesspools were to be allowed, but the closets and sewers were to



be cleaned by flushing; and I need scarcely say, it was important to have the water reservoir at sufficient height to supply the houses and to flush the sewers, in order to avoid, if possible, the necessity of horse-power to pump up the water.

Besides these points, it was absolutely essential to have a site close to the sea, and not at a distance or on a height which would have made the conveyance of materials, stores, and patients, difficult, if not impossible; and it was equally essential to have a good landing-place accessible in all weather.

I need scarcely add, that the chosen spot required to be perfectly free from all causes of endemic disease, and to have, as far as possible, a dry soil, and a due but not excessive exposure to healthy winds.

I need not repeat here the detailed report which I sent to your Lordship on the various places on the Bosphorus, all of which we visited and examined. I need only say, that not only did we spare no trouble in searching personally for a suitable spot, but we placed ourselves in communication with every person who, we thought, could give any information: and I took the advice, not only of his Excellency the Ambassador, of the Commandant, and of the medical officers at Scutari, but also of various English and foreign physicians and residents at Constantinople, and of several interpreters and dragomen who were supposed to be best acquainted with Turkey.

It was a matter of deep regret when we were compelled to give up any idea of the Bosphorus, for Constantinople was evidently the true military base from which the army would have to draw all its supplies, and to which it would return its non-effective men. Its



situation on the high road to England, midway between the Danube and the Georgian provinces of Turkey, where, after the Crimea, the great blows of war were likely to be struck, rendered it much better adapted for a grand central depôt of stores and hospitals than any point on the Black Sea.

After the Bosphorus, some point on the Black Sea seemed most eligible; but on inquiry, I could not learn that any place was possessed of the necessary conditions except perhaps Sinope. I suggested, then, to Lord William Paulet, that we should visit Sinope, which had the advantage of being near the Crimea and the Circasian coast, though at a very considerable distance from the Danubian Principalities and Bessarabia. I was aware that Sinope, in many respects, was disadvantageous—that it lay out of the road of commercial steamers, one steamer only visiting it every week on the way to Trebizond, and that its distance from Constantinople and from the regular mail service was a great objection; still, its proximity to the seat of war was so strong an argument in its favour, as to overbalance, in my mind, the various objections.

Circumstances, however, rendered it impossible for us to go to Sinope, for the Admiral was unable to place a steamer at our disposal to go either to Sinope, or to Varna or Sisapolis, both of which places I should have visited had I had time, although I received unfavourable reports of both of them. But as a Government steamer was out of the question, we found we should have had to wait a week in Constantinople for the next commercial steamer to Sinope, and then should have been detained at the latter place till the return of the steamer, some ten days afterwards, unless some transport had



happened to be crossing from Sinope to the Crimea with cattle. Under the most fortunate circumstances we found that we could not return to Constantinople for at least three weeks, and as we were aware that steamers loaded with the wooden houses had already left England; and as I had received the strictest orders to allow no unnecessary delay or demurrage of these vessels, I felt that the site must be fixed long before the three weeks, which we should have spent in visiting Sinope, had passed. In fact, the first steamer did actually arrive on the 7th May, and as there were only five days to unload her, we should, had we gone to Sinope, have incurred a demurrage of probably more than 1,000*l.* on that single vessel.

It is true that this sum would not merit being put in comparison with the importance of choosing a good site for the hospital; but I felt that after all we were quite uncertain whether Sinope would do, and we might have to look for a site elsewhere. It seemed to me, then, that the wisest plan was to keep Sinope in view for one of the other two wooden hospitals which were to be sent out, and to look for the site of this first hospital at some more accessible point than the shores of the Black Sea.

I did not receive favourable accounts of the shores of the Sea of Marmora, nor of the Gulf of Ismid. Almost all the known places are more or less malarious, and we had no time for a minute survey of all the possible unknown sites on the Sea of Marmora, nor had we the means of visiting them.

I was informed, however, that probably in the Dardanelles some spot would be found; and accordingly on the 1st of May we proceeded to the principal town



on the Dardanelles, usually called by the same name, where Mr. Calvert, the English Consul, resides.

Mr. Calvert accompanied us to various places, and gave us every assistance; and finally, on the 3rd of May, we found a spot which appeared to us to possess every requisite, viz., a healthy soil, abundant and good water, a level yet sloping surface, proximity to the sea, good anchorage, and tolerably sheltered landing-places.

The objection to the spot was its distance from the seat of war, for it was fourteen hours steaming (half power) from Constantinople; still, under the circumstances, it seemed the best choice that could be made. Subsequent experience convinced me that this objection of distance was a trifling one, for with the splendid steamers which were employed in conveying the sick, the additional 100 miles beyond the Bosphorus was a matter of no moment, while in many cases the sick themselves were absolutely benefitted by the short additional sea voyage.

In all other respects, the spot we chose, and which we called Renkioi, from the name of the nearest village, was infinitely superior to Sinope. The advantage of being on the direct line to England, with transport steamers, mails, and storeships constantly passing, could not be overrated; while in addition, instead of being, as at Sinope, 350 miles (sea passage) from Constantinople, the source of supply, we were stationed between the two great cities of Constantinople and Smyrna (about 100 miles from each of them) on the direct steamer route from Marseilles, and were enabled therefore, with the greatest readiness, to draw stores from any of these places as well as from England. We



had the advantage of a mild and delicious climate, free from the severe cold and fogs which prevail at Sinope during the winter months. Moreover, Renkioi would have been actually nearer than Sinope to the seat of war had the campaign shifted, as was expected, from the Crimea to the Delta of the Danube.

I am convinced, moreover, that had the hospital been seated at Sinope, there would have been great delay in its erection. Situated as we were near the mouth of the Dardanelles, the sailing vessels, with stores and houses, were able to reach us easily; but many ships bound to the Crimea were, during the summer Etesian winds, detained many weeks in the Straits of the Dardanelles, and again in the Bosphorus, so that the length of voyage from England was very greatly augmented. In some cases as much time was spent by sailing vessels in getting from the Dardanelles to the Black Sea coast, as from England to the Dardanelles.

I have been thus particular in narrating to your Lordship the reasons why a place in the Dardanelles was finally chosen as the site, because it might at first sight seem extraordinary that the Bosphorus and the Black Sea were disregarded.

As soon as I had fixed upon Renkioi as the site of the first hospital, and had received the approbation of Lord William Paulet and of your Lordship for the choice, I turned my thoughts to the subject of the site of the second wooden hospital which was to be sent out, and as I was at that time unaware of the disadvantages of Sinope, I was anxious that the second hospital should be placed there.

Accordingly, as I was myself unable to leave



Renkioi, where we at once commenced works, I took advantage of the arrival of Dr. Cowan, of Glasgow, a physician of high promise who had been appointed one of the medical officers of the hospital, and sent him to Sinope, with instructions to pass to the Crimea after surveying Sinope, and to confer with Sir John Hall in respect of sites for the second and third hospitals, and to visit any spots that were suggested by him.

Dr. Cowan accordingly proceeded to Sinope, and sent me a report, which I forwarded to your Lordship. He found at Sinope a suitable spot, with a good landing place, but he was unable to satisfy himself about the water supply, and he believed it would be hazardous to put a large hospital there without some preliminary works to ascertain the probability of their being no failure in the supply of water during the summer months.

On arriving in the Crimea, Dr. Cowan found that Sir John Hall was unable to suggest any other sites, or to give him any instructions for his guidance, nor was Dr. Cowan able to learn from any one that any eligible place existed on the accessible coast of the Black Sea.

On transmitting these various reports to your Lordship, I received for answer an inquiry whether, under the circumstances, it would not be possible to put the second hospital for 1,000 sick also at Renkioi, and I was directed to report whether the supply of water and food would warrant such an addition.

On my reply in the affirmative, I was informed that the Government, being satisfied with the choice of Renkioi, had determined to increase the hospital accommodation to 2,000, or perhaps to 2,500 beds, while wooden houses for 500 sick were ordered to be



sent to Smyrna. Subsequently it was found that there was difficulty in obtaining the requisite space at Smyrna, and these houses were ordered to be sent on also to Renkioi. Five of these were at a later period sent on to Scutari.

#### *Nature of the Site.*

Such is the history of the foundation of this large hospital at Renkioi, and I have now to notice the nature of the site selected, and the means which were used in the formation of the hospital.

The piece of land on which the hospital was placed was a shelving bank of a light porous sandy soil resting on marl ; it contained about 270 acres, stretched tongue-like into the waters of the Dardanelles, and was bounded inland by a low range of sandstone hills, which were themselves backed by rather lofty ranges of oolitic limestone, intersected by deep ravines. The tongue of land formed two bays, north and south, in both of which was good anchorage for ships, and as the wind blew almost always up or down the Dardanelles, *i. e.* from the north-east or south-west, one or other of these bays was comparatively calm in all winds except those which came infrequently from the west.

The position of the spot was on the Asiatic coast, nine miles from the mouth of the Dardanelles, in lat.  $40^{\circ} 2'$ , long.  $26^{\circ} 21'$ . It was the site of the port of an old Greek city, the ancient Ophrynum. (See accompanying chart (B) prepared by Mr. Brunton.)

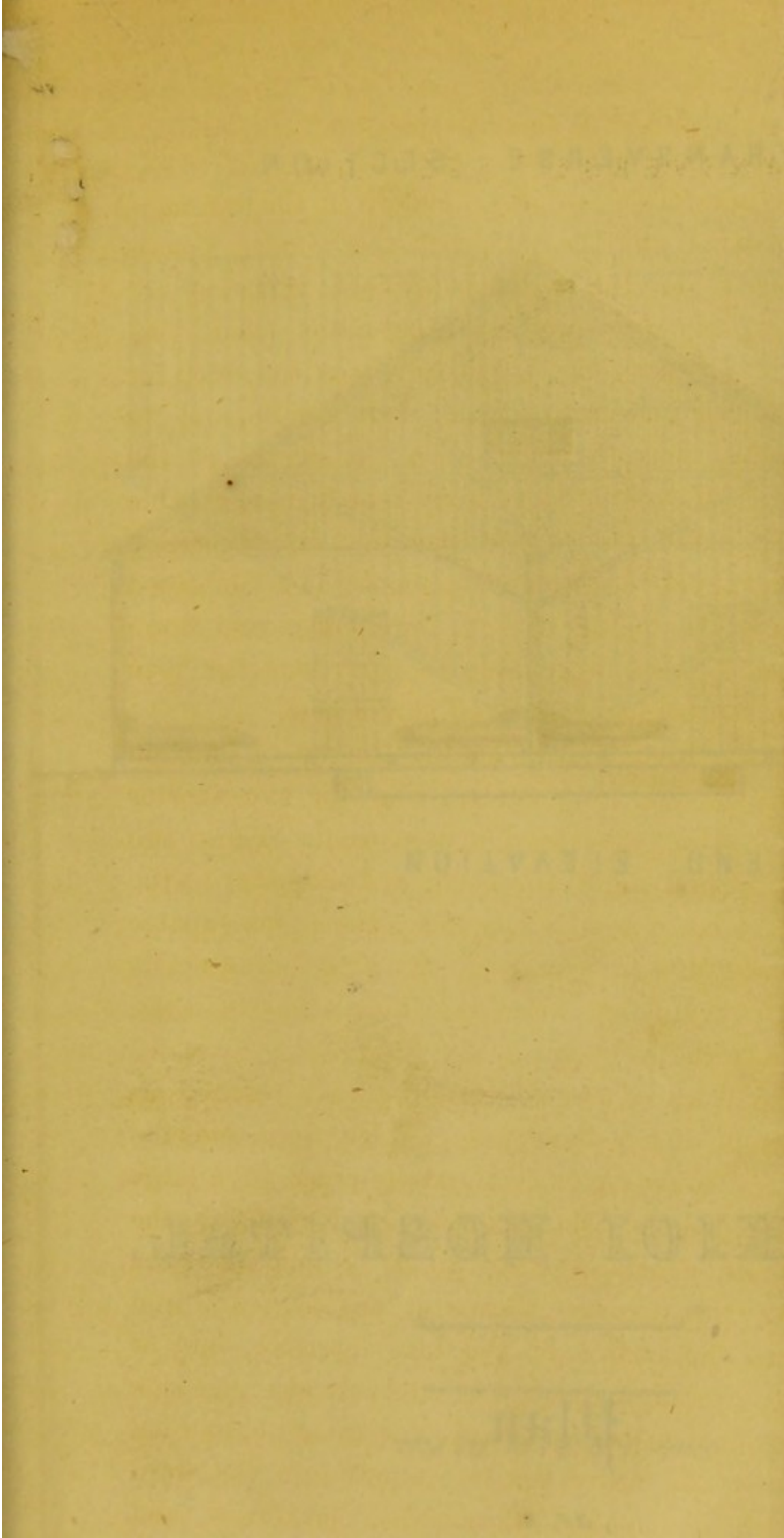
The extreme point of this tongue of land was about ten feet above the sea, but from this point it rose regularly and gradually to about 100 feet above the



sea. An admirable fall was thus given for drainage, and so gradual was the rise, that the wooden houses were placed on the ground without terracing or excavation, whereby very great expense was saved. The extreme length from the point to a spot too steep for the erection of houses was about half a mile, and we were enabled thus to place down the centre of the tongue of land no less than thirty-four houses, capable of holding 1,500 sick, in one long line on either side of the central corridor, an arrangement which facilitated very greatly the laying of both water-pipes and drain tubes. In fact we were able to carry out the plan which Mr. Brunel had suggested as the best.

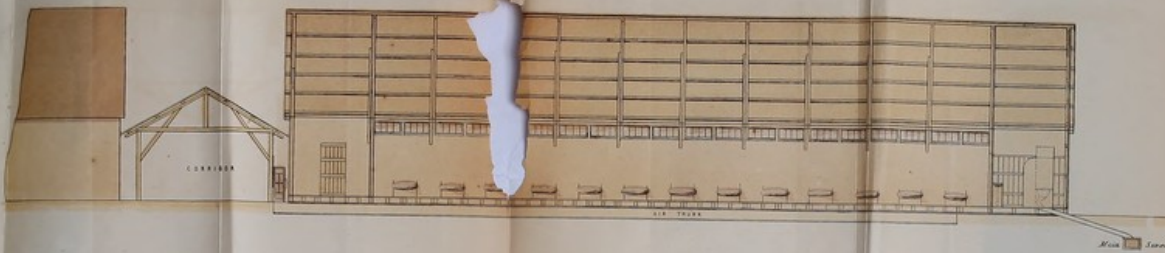
There was enough space on the tongue of land on either side of this long central line for two shorter parallel lines of seventeen houses each. These two lines were placed one to the north and the other to the south of the large central hospital. Each was capable of containing 750 men, and one of them to the north, was nearly completed when the declaration of peace put a stop to the works.

On the sides of the hills in rear were numerous small springs of excellent water, which were collected together and conveyed in earthenware pipes to a large reservoir placed by Mr. Brunton 70 feet above the highest house, which was itself about 60 feet above the sea. From this reservoir the water was carried in iron pipes down the centre of the long corridor, and at every ward (which was placed at intervals at either side of the corridor) a leaden service-pipe came off, and led an abundant and never ceasing supply into the ward cisterns, which supplied the baths, lavatories, and closets. By this arrangement, all necessity for pumping

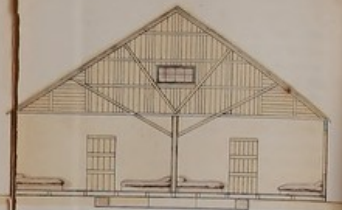




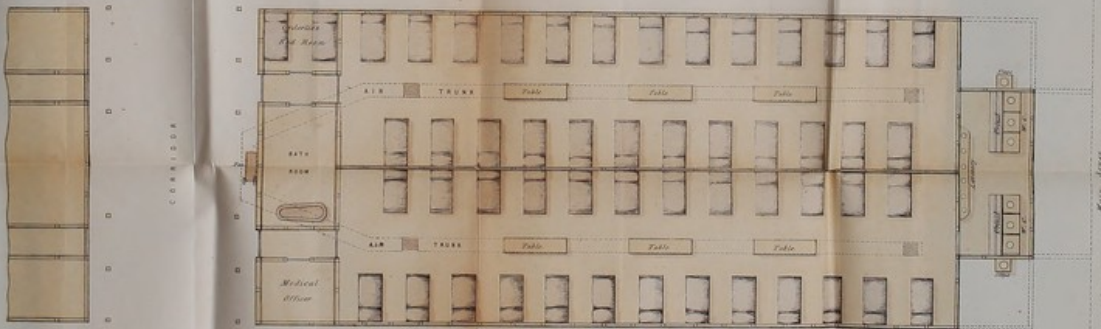
LONGITUDINAL SECTION.



TRANSVERSE SECTION.



PLAN.



RENKIOI HOSPITAL.

Plan

of a

WARD BUILDING.

Scale 1 Inch to 10 Feet.

SIDE ELEVATION.

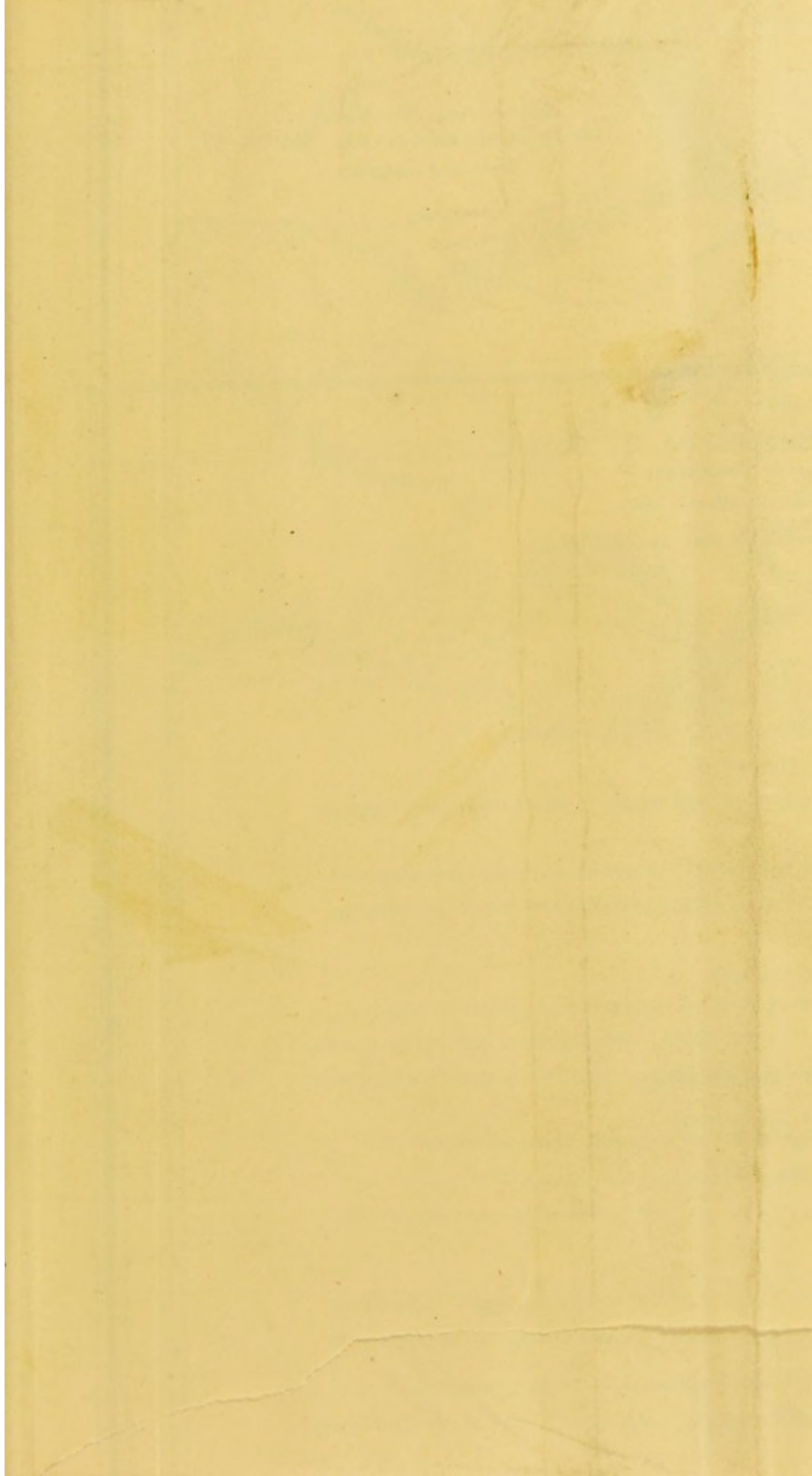


END ELEVATION



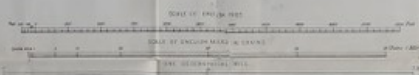
Engraved & Printed at the Topographical & Statistical Dept. War Dept., March 1857. Land Off. J. B. Davis, Designer.







# CHART OF RENKIOI BRITISH HOSPITAL, AND PART OF COUNTRY ADJACENT.



JAMES BUCHANAN, C.E.  
W. EASSE, R.N. Surveyors

THE HORIZONTAL COORDINATES ARE CALCULATED FROM  
HEIGHTS IN FEET ABOVE SEA LEVEL.  
BEARINGS MAGNETIC.



THE DARDANELLES OR ANCIENT HELLESPONT



### DESCRIPTION OF DRAWING

The letters on the plan of the Hospital represent the same classification of buildings as that adopted on the French Plans, Nos. 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

### DESCRIPTION OF THE COUNTRY

The topographical description of the country is given in order of which the symbols are missing. The symbols follow the style of the plan of the Bay and those of the same description as England in every case. Symbols and a full survey plan are found in the following are found in the city of the Main-land.



GENERAL GROUND PLAN  
OF  
**RENKIOI HOSPITAL,**  
DARDANELLES,  
BY  
JOHN BRUNTON, ESQ.

Under the Direction of I. K. Brunel Esq. C.E.

Scale of 200 Feet to 1 Inch



**SECTION AT WELL X**  
Vertical Scale 50 Feet

	Concrete work
	Brickwork
	Stone masonry
	Plaster
	Earth
	Water level

SECTION FROM SEA TO RAVINE NEAR LAUNDRIES





water was avoided, and the sewers were able to be flushed very perfectly.

The lavatories and closets were placed at the ends of the wards most remote from the corridor, and immediately outside them ran the two main sewers, which at their sea terminations were carried some distance into the Dardanelles.

The plan of the hospital may be at once understood by imagining a covered way, open at the sides, and 22 feet wide, running nearly east and west, and reaching for a length of more than a third of a mile, on either side of which stood, at intervals of 27 feet on the south side, and in most cases 94 feet on the north, the thirty-four houses, each of which, as already said, was 100 feet long, 40 feet wide, 12 feet high at the eaves, and 25 in the centre, and was capable of containing 50 patients, with an allowance of nearly 1,300 cubic feet of air for each man (Chart A). Some portion of this space was occupied by the closets and some small rooms used as orderlies' and bath rooms. Thirty of these houses were used as wards; four were used as dispensaries and purveyor's stores. A drawing (C) by Mr. Brunton, showing the arrangements of one of the wards, is attached.

To the south of each division of ten houses was placed an iron kitchen, which afforded the necessary accommodation for preparing 500 diets.

At the inland extremity of the corridor were placed two iron laundries, the water from which (some 4,000 gallons daily) was passed into the sewers. Beyond the laundries were placed on either side the wooden houses of the medical and other officers, who were thus able to see down either side of this long line, and to preserve to a certain extent surveillance over the patients.



The two smaller hospitals were constructed on a similar plan, each range having, however, only one iron laundry inland, and one iron kitchen in the centre of the range.

About half-a-mile from the hospital, close to the sea in the south bay, three storehouses were erected, and a railway led from an adjacent jetty or pier by the side of these storehouses to the centre of the main hospital; had the war continued, it would have been carried to the north pier and bay, and would also have had a branch running along the corridor of each hospital, so as to deposit the sick at the very doors of the wards into which they were to go.

Nothing could exceed the simplicity of the whole arrangement; it was a repetition of similar parts throughout, and experience enables me to say, that nothing could be better adapted for a hospital than this system of isolated buildings, between every one of which was a large body of moving air, rendering ventilation easy, and communication of disease from ward to ward impossible.

The introduction of the covered way connecting the various houses was a happy idea. In the summer, this corridor was left quite open at the sides, and formed a cool walk for the convalescents; while in winter we boarded up its north side, so that in the coldest blasts of the northern wind, the men were protected, and were able to leave their wards and to take exercise. I need only further observe, that in order to secure perfect ventilation, not only were openings left under the eaves and in the gables of the buildings (which could be closed in cold weather) but air-shafts were placed under the floors through which 1,000 cubic feet of air per



minute could be forced into the wards by fans placed in the corridor and worked by hand (see drawing C). As the amount of wind at Renkioi was always considerable, we never had occasion to use these machines, but had the hospital been placed in a less airy situation, they would have been of the greatest use. I append a memorandum by Mr. Brunel which will give additional information respecting the construction and cost of these houses.

For the construction of this hospital, every necessary part was sent out by Mr. Brunel. The houses were erected with great care by Mr. Brunton, assisted by Mr. Eassie, junior, and by eighteen English workmen (thirteen carpenters, one pipelayer, three plumbers, and one smith) sent out for this purpose. On account of the size and height of the houses (which were many times the size of the largest Crimean huts) the framework was obliged to be put together very carefully, and Mr. Brunton felt it necessary to employ none but the English workmen on this duty; consequently, the erection of the houses took much longer time than we originally anticipated; but during the winter we had reason to be satisfied that Mr. Brunton had done wisely, for in spite of the heavy winds we often had, no finished house was ever damaged, except in one or two instances to a very slight amount.

The erection of the houses was commenced on the 21st of May, 1855. On the 12th of July, I reported the hospital ready for 300 sick; on the 11th August it was ready for 500, and on the 4th December, for 1,000 sick. By January 1856, viz., seven months after its commencement, it was ready for 1,500 sick; and when the works were discontinued at the end of March 1856,



we could, with a little pressure, have admitted 2,200 patients. In about three months more, this immense establishment for 3,000 sick could have been finished and in full activity.

\*

*Unloading Vessels.*

As all the materials for the hospital (with the exception of some extra storehouses, and ladies' and nurses wards) were sent out from England, and as the purveyors' and apothecaries' stores required for a hospital of 1,000 sick were of considerable amount, no small labour was thrown upon the heads of the engineering, purveying, and apothecaries' departments, in unloading the various ships arriving from England, and in arranging and preparing their stores.

From the 7th May, 1855, when the "Gertrude" steamer came in, to the 5th December, 1855, no less than twenty-three steamers and sailing vessels were unloaded. Altogether, on a rough estimate, about 11,500 tons by measurement, were thus landed, and the materials carried up to the spot where the houses were to be erected, or were placed in the proper storehouses. We employed in this work some Greeks from the adjacent villages, and as the pay was regularly issued to them, a greater amount of prosperity was introduced into the country than had ever been known there since the inroads of the Turks. I may mention, also, that we employed Greek carpenters to assist our English workmen, and we had the satisfaction of observing, that the style of work and the various appliances used by the English artizans, had the effect of improving very much the mode of work of the Greeks, so that we may reasonably hope that this useful educa-



tion has left more lasting traces of our presence than the transient prosperity produced by the pay they earned by their labour.

*Medical Organization.*

The medical appointments of the hospital were very simple. It appeared, both to Sir James Clark and to myself that the division into wards of fifty patients each, should be taken as the groundwork of our arrangement, and that there should be one medical officer to each ward. The Ward Medical Officer, who was either an assistant-physician or assistant-surgeon, according to the division in which he served, was responsible, not only for the treatment of the patients, but for the cleanliness, hygienic condition, and discipline of his ward.

In the central hospital, each ten wards (containing 500 patients) were made into a division, over which was placed either a physician or surgeon, whose duty it was both to superintend daily the treatment of the sick, and the general hygienic condition of the division. Each division had, or would have had, its own Kitchen, Dispensary, Purveyor's Provision Issue Store, Utensil Store, Pack Store, and Matron's Linen Store, so that it would have been in all respects an hospital by itself, and except in respect of position, might be considered altogether apart from the adjacent divisions, which had another staff, another source of supply, and another kitchen.

The two side hospitals would have had, not 500, but 750 men each.

By adopting thus the system of separate small hospitals, each with its own organization, I hoped to be able to carry on the service of the immense establishment for 3,000 sick (when it should be in full operation) with as



little difficulty as if it were composed of five separate hospitals at a distance from each other.

To each division of 500—to each hospital in fact—I appointed one wardmaster in charge of forty orderlies and ten nurses, four of the former and one of the latter being placed in each ward, or in the army proportion of one attendant to ten sick.

To each division also, one lady-sister was attached, whose duties were especially to superintend the nurses and to see to the nursing of the worst cases of sickness.

A system of daily reports was organized, by which each divisional officer received from the ward officers a statement as to the efficiency of the service of the ward, and as to its hygienic condition; and the divisional officer having satisfied himself, by personal inquiry, of the accuracy of the report, and having attended to any points mooted in it, forwarded it to the Superintendent. The duties of the Superintendent were not supposed to include, as a general rule, the immediate treatment of the sick, though, as the medical charge was entirely vested in him, he would have been consulted in any special emergency demanding careful action, or would have been authorized to interfere in any way had he deemed it necessary. His special duties, however, were those of daily superintendence, adjustment, and arrangement, and even with the hospital in its incomplete state, these were found to be sufficient to occupy his time.

Had the hospital reached its full dimensions, and had 3,000 patients been within its walls, two or three assistant-superintendents would have been necessary, not for the treatment of the sick, but to share the administrative duties of the Superintendent.



The Purveyor's Department was organized, or rather would have been finally organized, on a similar plan. A purveyor in charge of the whole hospital, with a central office, would have had in each division of 500 beds, an issue store for provisions, and one for utensils, regulated by a purveyor's clerk, and stewards or storekeepers, and supplied, on requisition, from the general store which we had erected at a distance from the hospital, at the landing-place, and which was in charge of a separate clerk, kept solely to the duty of regulating the issues from the general store to the smaller issue stores in the hospital itself.

To each division, also, there would have been a separate linen store, and in addition to this divisional linen store, we had, in each ward, a small cupboard containing linen in excess of the actual service of the wards, and which could be used on emergencies.

The apothecary's department would have been organized like the purveyor's; one general store feeding the divisional dispensaries with the required amount of medicines, and instruments, and surgical appliances.

As the hospital was never completed, and as the greatest number of patients at any one time was only 640, this system of subdivision was not thoroughly brought out or tested; but I am convinced, from the result of its partial working, that the administration would have been as smooth and regular with 3,000 as it actually was with 500 patients.

With respect to the Laundry, a Superintendent from one of the London baths and wash-houses was sent out who speedily organized a corps of Greek washerwomen. The linen from the wards was collected daily, and was taken to a dirty linen store, whence it passed into the



laundry. Our plan for the circulation of the linen was very simple. Every morning when the dirty things were taken from the wards, the nurse received from the collector, a receipt for what was taken. She took this receipt to the division linen store and received at once an equivalent number of articles. The receipt was then filed in the linen store, and the laundryman was responsible for the articles named in it to the division store. In this way, the stock in the wards was always at the same amount.

One part of the laundry was found to be of immense service; in fact, without it, the washing could not have been well done. I allude to the drying-closet, which we used also as a baking-closet for killing vermin. We were able to raise the heat to 400° Fah., and to thus cleanse the linen in a way no liquid agents can do. The blankets, coats, and shirts of the men were often swarming with vermin, especially in the cases of the Land Transport and Army Works Corps.

I take this opportunity of mentioning to your Lordship, that Mr. Hooper, the laundry superintendent, has invented a van-laundry, containing boiler, washing-machine, and drying-closet, and capable of being drawn by one horse. It would wash for a hospital of 500 men, and could be used at a moment's notice, even on the march. The value of such a plan to an army in the field is incalculable. Three of these van-laundries would wash for a general hospital of 1,500 sick.

The names of the officers who were appointed by Sir James Clark to carry out these duties, are given below, arranged in the order of their appointment, and I have only to remark concerning them, that as already fully stated in my monthly reports, I am convinced no



men could have done their duties with greater zeal and efficiency than they did. I have not included the names of Drs. Cowan and Buchanan, of Glasgow, who both were first appointed to Renkioi, but who subsequently served some time in the Crimea, and then were called home by private professional duties, which prevented their further service in the East.

Mr. Jenner was Purveyor till August 16, 1855, and Mr. Pigott after this date; both these gentlemen were thorough men of business, and conducted their department with complete efficiency.

Mr. Humphry acted as Apothecary, and arranged the dispensary; and owing to his methodical habits of business, and to the attention paid by the three dispensers, this important part of this hospital was very satisfactorily carried on.

I cannot conclude this sketch of the medical organization without expressing the obligations I am under to Sir James Clark for the kind and judicious counsel and advice I received from him on all occasions. I kept him minutely informed of the transactions of every week, and had the advantage and satisfaction of being able to consult him on all difficult points. It would be impossible to over-estimate the value of the assistance I thus received from him.

*List of the Staff of Renkioi Hospital.*

NAMES.	APPOINTMENTS.
Parkes, E. A.    ..    ..    ..	Superintendent.
Robertson, Wm. ..    ..    ..	Divisional Physician.
Goodeve, Henry ..    ..    ..	do.            do.
Wells, Spencer ..    ..    ..	Divisional Surgeon.
Coote, Holmes ..    ..    ..	do.            do.
Holland, T. S.  ..    ..    ..	Assistant Physician.



NAMES.	APPOINTMENTS.
Scott, G. . . . .	Assistant Physician.
Beddoe, J. . . . .	do. do.
Kirk, J. . . . .	do. do.
Christison, David . . . . .	do. do.
McLaren, J. D. . . . .	do. do.
Reid, Wm. . . . .	do. do.
Dixon, T. . . . .	do. do.
Hale, R. . . . .	do. do.
Bader, C. . . . .	do. do.
Playne, A. . . . .	do. do.
Armitage T. R. . . . .	do. do.
Humphry, J. . . . .	Do. and Apothecary.
Maunder, C. . . . .	Assistant Surgeon.
Fox, J. . . . .	do. do.
Dix, J. . . . .	do. do.
Faucus, J. . . . .	do. do.
*Roberts, Bransby . . . . .	do. do.
Stretton, S. . . . .	do. do.
Veale T. . . . .	do. do.
Pagan, John . . . . .	Clinical Clerk.
†Jenner, K. . . . .	Purveyor.
Pigott, A. W. . . . .	do.
Macfarlane, A. . . . .	Purveyor's Clerk.
Rattray, D. R. . . . .	do. do.
Barton, H. J. . . . .	do. do.
Rains, S. W. . . . .	do. do.
Malcouronne, H. . . . .	do. do.
Grinling, H. . . . .	Superintendent's Clerk.
Webster, G. . . . .	Store Accountant.
Hall, Basil . . . . .	Assistant Accountant.
‡Baker, R. . . . .	Dispenser.
Sheppard, W. . . . .	do.
Roope, W. . . . .	do.
Clarke, W. . . . .	do.
Hooper, W. . . . .	Superintendent of Laundry.

\* Sent home on sick leave, January 30th, 1856.

† Transferred to the Crimea, August 1855.

‡ Resigned, November 13, 1855.



*The Working of the System.*

Although the hospital was ready for 300 patients on the 12th July, 1855, we were not called on to receive sick till the 2nd October. From that time till the 11th February, eleven ships arrived from Balaklava and Smyrna; the patients of the latter hospital were transferred to Renkioi when the Swiss Legion was sent to Smyrna.

The vessels with sick crossed the Black Sea and the Sea of Marmora at half speed, and called at Scutari for orders.

The average length of passage from Balaklava to Renkioi was—

With stoppages at Scutari	..	86 $\frac{3}{4}$ hours
Without stoppages at Scutari	..	72 $\frac{1}{2}$ „

In addition, some of these ships were detained on other services, such as towing vessels through the Black Sea or the Sea of Marmora, so that the actual average length of passage under half-steam from Balaklava to Renkioi was considerably under the time (three days) given above.

The quickest passage that was made was fifty-two hours with stoppages, or forty-six hours without. The longest passage was 124 hours, with stoppages; in this case the vessel anchored for some hours on account of a snow-storm, and was also detained nineteen hours at Scutari.

Eventually, if the service had been properly organized, so that there should have been no detention at Scutari, the passage from Balaklava to Renkioi should have been accomplished regularly in from forty-eight to sixty hours, *i. e.* from two to two and a-half days.



In the eleven ships with sick, a total number of four deaths occurred on the voyage; only one man died in the first twenty-four hours after landing. These facts testify strongly to the good working and admirable order of these transit hospital ships, and I can truly say that it was impossible to conceive any service being better carried on than this was.

After the 11th February, 1856, we received no more sick.

The total number of military patients who were received from these ships was 1,244, and, in addition, eighty-seven soldiers were admitted either from the guard at Renkioi or Abydos, from transport ships which touched at Renkioi, or from the English soldiers attached to the Osmanli Horse stationed at the town of Dardanelles during the summer and autumn.

The total number of—

Admissions was	..	..	..	1,331
Cured	..	.	..	961
Invalided	..	..	..	320
Deaths	..	..	..	50

The per centage is as follows:—

Cured	..	..	72·201	per cent.
Invalided to England.	..	..	24·043	„
Died	..	..	3·756	„
			<hr/>	
			100·000	

The causes of death were:—

Fevers (Typhus and Typhoid)	..	..	22
Phthisis Pulmonalis	..	..	8
Pneumonia	..	..	1
Epilepsy	..	..	1
Dysentery (chronic)	..	..	14



Scorbutus .. .. .	1
Peritonitis .. .. .	1
Frost-bite .. .. .	1
Pyæmia, following wound in action ..	1
	<hr/>
	50

Besides the military patients, we admitted seventy-seven civilians, either servants of the hospital, or, in by far the larger proportion, English sailors from transport vessels, or Turks and Greeks. The Turks and Greeks came from the surrounding country, both mainland and islands, in great numbers, and in some cases they travelled more than 100 miles to get advice. We were obliged in some cases, on the ground of common humanity, to receive them into hospital, the regular Government allowance for extra patients being always paid in.

The skill of the English physicians and surgeons, especially in disease of the eyes, was very highly appreciated, and a great number of operations were performed by Mr. Wells and the other surgeons.

Of the seventy-seven extra patients, six died chiefly from the result of accidents, such as falls from the yards of ships, &c.

The total number of patients actually treated was 1,408; the largest number at any one time, 642.

The medical history of the hospital is sufficiently obvious from these facts. The chief amount of work was performed in the months of January and February, when the whole strength of the hospital was in full, though not in pressing work.

The worst cases received were those of frost-bite, which in many cases affected both feet, and in some instances the hands also. These distressing cases were



of course much less numerous than they had been in the winter of 1854, but they were very severe and tedious, and as they were frequently complicated with diarrhœa and lung affections, they required an extraordinary amount of attendance and care.

The fever cases during the winter were very numerous, especially among the men of the Land Transport Corps, and there was a decided propagation, to a certain extent, on board the transport steamers. The fever was chiefly the well known spotted typhus, with a marked eruption. The type was extremely severe, but our mortality was not great, though when we received the early cases, I was led to anticipate a great loss, so intense was the fever, and so general, during the winter, was the existence of slight scurvy in the Crimean troops, especially in the men of the Land Transport Corps. The total number of cases of continued fever was 221,\* and as the deaths were twenty-two, the mortality was 10 per cent. The total number of cases returned as "fever" was of course greater than this, as we had cases of febricula, and of remittent, intermittent, and relapsing Crimean fever.

The typhus fever was extremely contagious, and we were obliged to isolate the patients, as, in spite of our free ventilation, it spread in two or three wards to a slight extent. The isolation was quite effective, and checked at once the spread of the disease. One medical officer, one nurse, and one orderly caught the disease, and the orderly died in four days from the first symptoms.

Of the whole number of 1,331 military patients, no

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\* It is impossible to be certain of the exact number of cases of true typhus as distinguished from typhoid and other continued fevers.



less than 331 were furnished by the small corps of the Land Transport, or at the rate of 25 per cent. These men were admitted in a state which strongly reminded those who had been present at the time, of the condition of the sick during the previous winter at Scutari. They were thoroughly prostrated, generally scorbutic, and presented the severest types of disease. They offered in all respects, both as to general appearance and cleanliness, and as to severity of disease, a singular contrast with the soldiers of the Line. The men of the Land Transport Corps, hastily enlisted, and numbering many boys, and men considerably past their prime, and quite unfitted to cope with the hardships of the Crimean winter, had had necessarily thrown upon them all the hard work and the exposure which had been so fatal to all classes in the previous year.

The small number of 331 men of the Land Transport Corps furnished no less than twenty-seven of our fifty deaths, while among 1,000 men belonging to the Line there were only twenty-three deaths.

In other words, the mortality among the Land Transport Corps was 8·12 per cent.; among the Line soldiers, 2·30 per cent. Of the twenty-two deaths from fever, thirteen were among men of the Land Transport Corps, or, in other words, 331 men of one corps gave a percentage of deaths from fever of 3·92 per cent.; 1,000 men of another gave a percentage of deaths from fever of 0·90 per cent. It was singular enough also that the fever cases came at one particular time in two vessels, and from their number and severity we anticipated that the army was about to endure an epidemic of typhus; in fact shortly afterwards the French and Sardinian armies did actually greatly suffer from this disease;



but instead of this being the case with the English army, the next vessels brought few cases of typhus, and the threatened epidemic died away. This must have been from the precautions adopted in the Crimea, and from the affected men being speedily removed to the hospitals in the rear, so as to prevent the spread of the disease among the army in the field.

The proportion of surgical to medical cases was about 25 to 30 per cent., which was nearly the amount we had calculated upon. We had, of course, no cases of recent wounds, but a considerable number of men with old wounds received at the assaults in June and September were sent to us in October 1855.

The anticipations we had formed of the health of the spot and of its adaptability for a hospital were quite confirmed by the experience of more than a year. The winter was mild, and the climate seemed especially adapted for pulmonary complaints, of which we had a large number. The changes of temperature, it is true, were very sudden and great, but as the men had warm wards, these changes were not felt, and there were few days in which the most delicate consumptive patient could not get out into the sheltered corridor, for a short time during the day. The construction of the hospital, was admirably adapted for men recovering from illness. As all the wards were on the ground, as soon as a man could crawl he could get into the air, either in the cool and sheltered corridor, or in the spaces round the hospital. The pure breezes from the Dardanelles or the Egean Sea soon brought strength to his enfeebled frame, and the period of convalescence was very short.

The sea-bathing also was very good, and if the war had gone on we should have developed this mode of



treatment to a great extent, as we should have been able to construct douche, and other baths of both fresh and salt water.

The supplies of food were good, with the exception of the milk, which during the winter was very poor. Had we remained another winter, however, this would have been amended. During the summer and autumn the supply of milk, chiefly from goats, was excellent.

#### *The Nursing and Attendance.*

As much attention has been directed to the subject of female nursing, it may be well to state our system and its results. We had a corps of twenty paid nurses, and five ladies, four of whom were paid, while one, Miss Parkes, was a volunteer and unpaid. While our number of sick was small, I placed two nurses in each ward, but subsequently one was attached to each ward of fifty men, and I believe this was the right proportion. The duties of the nurses were confined to nursing; all cleaning and out-door work was performed by the orderlies, and the nurses were therefore able to concentrate their attention on the severest cases. They had also charge of the linen and kept the key of the small wardstores, in which the extra supply was kept.

Of the five ladies, the lady superintendent and matron, Mrs. Newman, had general control over the nurses and the linen store; the sub-matron, Miss Raynes, and the store-keeper, Miss Griesdale, were occupied entirely in assisting Mrs. Newman, and (Miss Griesdale especially) in keeping the accounts of the division linen store. The other two ladies, Miss Parkes and Miss Frodsham, were engaged in superintending the nurses



in the wards. These two ladies spent the whole day in the wards, passing from one to the other ; they carried out to the letter the directions of the medical officers, and were a continual check on the nurses and orderlies. The administering of wine and medical comforts ordered by the officers was left entirely to them, and the extraordinary care with which the food and medicines were given by these ladies and by the nurses was the means of saving many lives. I am quite certain that many soldiers received as much anxious attention as the richest man in this metropolis could have purchased, and owed their lives entirely to the devotedness and untiring sympathy of their female attendants.

Organized as the female nursing system was, that is to say, with a small number of ladies overlooking regular paid nurses, and scrupulously carrying out and not superseding the orders of the medical attendants, I can conceive no objection to it which can be considered at all commensurate with the undoubted excellence of its results. No doubt, for such a duty, the paid nurses must be carefully selected: gathered as our nurses were on the pressure of the moment, there were a few who were not favourable types of their class. But as the inefficient and disorderly nurses had been gradually got rid of, and their places supplied by proper persons, the nursing of the soldiers would have been better than in any of the hospitals I am acquainted with in this country, while the only objections that have any weight against the system of female nursing, would have lost all force and application.

The orderlies of the hospital were of three classes, viz., civilians, soldiers sent from Chatham, and unavailable for other than hospital service, and soldiers



belonging to the regiments in the Crimea, who had been sent down as patients, and had afterwards temporarily volunteered for the service of the hospital. From this heterogeneous assemblage, a very good staff of orderlies was formed. The civil orderlies had been well chosen, were mostly respectable and trustworthy men, and gave me very great satisfaction. Among the soldiers also were some very good men, and I had no difficulty in making them work with, and under, civilians. In three or four instances men were found, who had a remarkable aptitude for nursing, and took a pleasure in it; they possessed all the feminine sympathy, kindness, and consideration, and were as much liked by the sick men as the nurses. But generally the orderlies, however attentive and kind they might be to the sick, were better adapted for the rough work of the wards.

From among the civil orderlies I selected a certain number to act as wardmasters, assistant stewards, &c., and, by your Lordship's sanction, these men received a small increase of pay. They were regarded in the light of non-commissioned officers, and I possessed the power of reducing them to the rank of orderlies if they did not behave well. A very useful body of men was thus formed, and the duties of their several offices were well performed.

#### *The Discipline among the Soldiers.*

Some doubt was expressed in England as to the power of civil officers to maintain order and discipline among the soldiers; but I was sure that this fear was chimerical, for I knew that no men are so manageable as English soldiers when properly treated, and when spirits are kept from them, and that the civil officers



would be possessed of quite as much authority as the army medical officers, who, as the army is now constituted, are, in fact, civilians, and possess no real power over the soldiers in hospital, nor over the orderlies.

The result was as I anticipated; there was no difficulty in maintaining perfect order, and the occasions were few on which I had to report, on their discharge from hospital, men who had committed offences in hospital, to the military officers in whom was vested the power to preserve discipline.

From the opening of the hospital in October till the middle of December, the military duties of the hospital station were most ably performed by Lieutenant Bennett, of the 7th Fusiliers. Subsequently, on the hospital at Smyrna being given up, Major Chads, of the 64th Regiment, the Commandant at that place, was transferred to the Dardanelles, and took command at Renkioi and Abydos.

Abydos, which had been used as a hospital, was given up for the purposes of a barrack in October 1855, and we used it from that time till the end of the war as a convenient place to which the men discharged from hospital could be sent, till they were conveyed to the large depot at Scutari.

A Staff-Paymaster, Captain Corcoran, and in succession to him, Captain Thomas, had charge of the payments of the depôts; and two Staff-Captains, Captains La Touche and Bazalgette, were stationed respectively at Abydos and Renkioi in charge of troops.

The clerical duties were performed by one clergyman, the Rev. D'Arcy Preston, who was most attentive and kind to the soldiers. The Rev. J. Mahe was the Roman Catholic Chaplain.



*Occupations of the Sick Men.*

Thanks to the liberality of the Government, and to various persons interested in the soldiers, the sick men received weekly a good supply of newspapers. An excellent selection of books had been made in England by Dr. Goodeve, and these and other books sent by private individuals were circulated in the wards. Draughts, chess, backgammon and cribbage-boards were sent out by Government, and a most acceptable present of games of the like kind, of which we received our share, was sent to Scutari by Her Majesty. Quoits and football formed the chief out-door amusements when the men were recovering.

*Breaking up of the Hospital.*

In April and May 1856, the greater number of the patients had been either discharged or invalided home, and in accordance with orders from your Lordship, the medical and nursing staff was reduced more than one half; a certain number of medical officers and attendants being kept for fear any disease should break out among the masses of troops who were being moved from the Crimea and Constantinople. At length, in the middle of July, any danger of this sort was at an end, and the remaining staff of the hospital was sent home.

All the Purveyors', Apothecaries', and Engineers' stores which were likely to be used, or to sell well in England, were sent home, and everything else was sold on the ground. Major Chads, with twenty soldiers, and Mr. Brunton, remained behind to superintend the sale of the buildings, which took place on the 20th September.



Placed as we were at Renkioi, on the borders of the Plain of Troy, and in the vicinity of the ruins of so many cities which were great and flourishing before or in the days of the Lower Empire, it was the intention of several of the officers of the hospital to devote some time to a systematic investigation of the remains of antiquity which were so profusely scattered about. But the speedy termination of the war prevented these intentions being carried out, and the only investigations of consequence were made by Mr. Brunton after the hospital works had been stopped. A few objects found in the cemeteries of ancient Dardanus, and in the cemetery of unknown age, supposed to be near the site of old Troy, and among the more modern ruins of Novum Ilium, have been brought home by Mr. Brunton, and presented to the British Museum.

The investigation of the natural history of the district was also not pushed to any extent; but a catalogue of plants collected by Drs. Armitage, Kirk, and Playne, in the neighbourhood of Renkioi and on the heights of Ida and Olympus, has been drawn out by these gentlemen.

The geology of the coasts of Asia Minor is so well known, that it would be useless to introduce it here.

The meteorology of Renkioi for some months after the instruments were unpacked, and till the time of their being re-packed, is given in the subjoined table. The returns were kept by Drs. Robertson and Kirk. Unfortunately, the rain-guage was not ready in time, and the amount of rain is not known. I regret this the less, however, as it was an exceptional year, and the rainfall was much below the average.

The amount of ozone was examined for some time



by the method of Schonbein, till this method was found to be so imperfect as to lead only to erroneous results, and the inquiry was then abandoned.

I subjoin, in an Appendix, the mean meteorological observations from October 1855 to April 1856, and also a memorandum of the ethnology of the district by Dr. Beddoe, a gentleman whose name is already very favourably known in this department of science, and who, had we remained, would have been able to extend his observations over a wide district of Anatolia.

I have the honour to be,

My Lord,

Your Lordship's most obedient humble Servant,

E. A. PARKES, M.D.,

*Late Superintendent of Renkioi Hospital.*



by the method of ... till this method was found  
 to be an important one to lead only to erroneous results  
 and the results were then abandoned. ...  
 I believe in an ... the most methodological  
 observations from ... that in April 1897 and also  
 a ... of the ... of the ...  
 the ... a gentleman whose name is ...  
 probably known in this department to ...  
 who had no ... and had been able to ...  
 his observations over a wide ... of ...

I have the honor to be,

Very truly,  
 J. ...

Yours faithfully,  
 J. ...

J. ...

State Department of Health, ...



# APPENDIX.

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No. 1.

MEMORANDUM BY MR. BRUNEL.

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HOSPITAL BUILDINGS FOR THE EAST.

18 *Duke Street, Westminster,*  
*March, 1855.*

THE conditions that it was considered necessary to lay down in designing these buildings, were,—

First—That they should be capable of adapting themselves to any plot of ground that might be selected, whatever its form, level or inclination, within reasonable limits.

Secondly—That each set of buildings should be capable of being easily extended from one holding 500 patients, to one for 1,000, or 1,500, or whatever might be the limit which sanitary or other conditions might prescribe.

Thirdly—That when erected, they might be sure to contain every comfort which it would be possible under the circumstances to afford. And,

Fourthly—That they should be very portable, and of the cheapest construction.

The mode in which it has been sought to comply with these conditions is as follows :—

The whole hospital will consist of a number of separate buildings, each sufficiently large to admit of the most economical construction, but otherwise small and compact enough to be easily placed on ground with a considerable slope, without the necessity of placing the floor of any part below the level of the ground, or of having any considerable height of foundation to carry up under any other part.



These separate buildings have been made all of the same size and shape; so that with an indefinite length of open corridor to connect the various parts, they may be arranged in any form, to suit the levels and shape of the ground.

Each building, except those designed for stores and general purposes, is made to contain in itself all that is absolutely essential for an independent hospital ward-room; so that by the lengthening of the corridors, and the addition of any number of these buildings, the hospital may be extended to any degree.

To ensure the necessary comforts, and particularly to provide against the contingency of any cargo of materials not arriving on the spot in time, each building contains within itself two ward-rooms, one nurse's-room, a small store-room, bath-room, and surgery, water-closets, lavatories, and ventilating apparatus.

The ward-room is made wide enough and high enough to ensure a good space of air to each bed, even if these should be unduly crowded. Each building contains two ward-rooms, intended for twenty-six beds each, which is found in practice to be a size of room admitting of proper control and supervision.

With respect to closets and lavatories, after examining and considering everything that has been done, both in hospitals of the best description and poor-houses of the cheapest construction, it was found that the requisite security for cleanliness, and the greatest amount of economy of labour, and of consumption of water, could be obtained by a cheap description of water-closet designed for the purpose; and with the same object of diminishing the amount of labour and the waste of water, and securing cleanliness without depending upon the constant attention of assistants, fixed basins for lavatories, and mechanical appliances for supplying and drawing off water were adopted.

As a protection against heat, experience in hot climates, and experiments made expressly for the purpose, satisfactorily proved that a covering of extremely thin and highly polished tin, which reflects all direct rays of heat, was the cheapest, lightest, and most effective protection; and every piece of wood-work not covered with tin is to be whitewashed externally. Internally the lime-wash has a slight tint of colour to take off the glare.

To secure ventilation in a hot climate, with low buildings extending over a large area, and therefore incapable of being connected with any general system of ventilation, it was considered



that *forcing in* fresh air by a small mechanical apparatus attached to each building, would be the only effective means. Each ward-room is therefore furnished with a small fan, or rotatory air-pump, which, easily worked by one man, is found capable of supplying 1,000 to 1,500 cubic feet of air per minute, or 20 to 30 feet for each patient. This air is conveyed along the centre of the floors of each ward-room, and rising up under foot boards placed under the tables, is found to flow over the floor to every part of the room.

Besides this mechanical supply of air, opening windows are provided along the whole length of the eaves and spaces left immediately beneath the roof at the two gables, amply sufficient together to ventilate the rooms thoroughly if any breezes are stirring, without the help of the fan.

The light is admitted by a long range of narrow windows, immediately under the eaves, which protect them from the direct rays of the sun. These windows open, and are provided with shutters inside, which exclude the light, but admit the air.

By forcing the air into the room, instead of drawing it out, the entrance of bad air from the closets, drains, or any surrounding nuisances is prevented. The fan is placed at the opposite end to the closets and drains, and all the fans being in the open corridor, the workmen can be seen by a single sentry, and kept to their work.

The buildings, as now constructed, are adapted to protect the interior from external heat. Should winter come while they are still in use, the framework is adapted to receive an internal lining of boarding, and the interstices can be filled with a non-conductor.

Two buildings of the same form and dimensions are fitted up with every convenience as store-rooms and apothecaries' dispensaries.

An iron kitchen, slightly detached from the wooden buildings, fitted up with every contrivance capable of cooking for from 500 to 1,000 patients, is attached.

A similar building of iron is fitted up with all the machinery lately introduced in the baths and wash-houses of London, for washing and drying in the minimum space, and with the least amount of labour.

If an aggregate of buildings should be placed in one spot for



more than 1,000 patients, a second kitchen would be added, but the single wash-house would be sufficient.

With each set of buildings is sent a pumping apparatus, a small general reservoir, and a sufficient length of main, with all its branches, to supply water to every detached building, and all the pipes and branches are of such construction as to admit of being put together without any soldering or cement. A system of drains is provided, formed of wooden trunks properly prepared, and of sufficient extent to form a complete and perfect system of drainage from every building to a safe distance from the general hospital.

A number of small buildings intended to be detached from the main body are provided for residences for the officers and servants of the establishment, and for a small detachment of soldiers. A slaughter-house, and store-yard, and some other appurtenances are also provided, the extent of which depends on the circumstances of such case.

The construction of each building has been studied with very great care, so as to secure the minimum amount of material, the least possible amount of work in construction or erection, and the means of arranging all the parts in separate packages, capable each of being carried by two men; and the result is that each building is the cheapest and lightest that has yet been constructed in proportion to the area covered.

For the transport of the materials to the spot selected, two sailing-vessels and three steam-boats, capable of carrying one hospital for 1,000 men, which is the first about to be sent out, have been secured. In each vessel is sent a certain number of complete buildings, with every detail, including their proportion of water-pipes and drains, closets, lavatories, baths, &c., and a small amount of surplus material, and tools; and in each of two separate vessels are sent a set of pumps and mains, and a kitchen and wash-house. So that by no accident, mistake, or confusion, short of the loss of several of the ships, can there fail to be a certain amount of hospital accommodation provided with every comfort and essential.

The peculiar circumstances under which these establishments are likely to be placed have required not only peculiarities of construction, but these, in turn, have required numerous provisions and details specially designed for the case.



As all the buildings, except the kitchen and washhouse, are entirely constructed of wood, it is considered essential that no stove or fire-place of any description should be allowed in any part, except in the iron buildings; in these there is provision for an ample supply of hot water, but each ward-building is provided with a small boiler, heated by candles, which by experiment have been found amply sufficient for all that can be required. Candles are to be used exclusively for lighting, and lamps and lanterns have been constructed for the purpose.

A proper supply of fire-engines is provided, and other precautionary measures are adopted against fire.

The condition of portability requiring that the walls and roofs should be of the thinnest and slightest possible construction, protection against heat has been provided for in the manner before referred to, and good ventilation secured by mechanical means; but, in addition to this, there is a very simple provision made for passing the air over a considerable extent of water surface; which would not only cool it, but diminish the effect of excessive dryness, which is said to be occasionally in this climate more oppressive than even the temperature.

As the space in the wards is very liable to be encroached upon, and the beds crowded, portable baths have been designed, into which the more helpless patients can be lifted, and lowered, on a frame or sack, without requiring space for assistants to stand around, or with the bath placed only at the foot of the bed.

The kitchen and laundry have each required many special contrivances.

The instructions given to Mr. Brunton, the engineer who has been sent out for the purpose of erecting these buildings, are to commence by determining on his plan of arrangement to suit the peculiarities of the ground, and then to construct the complete system of drainage, and to lay on the water supply before the buildings are rendered capable of receiving patients; and all the arrangements of the details are designed with the view of obtaining, as the first conditions, a perfect system of drainage, a good supply of water, free ventilation, and the most perfect cleanliness, quite independent of labour, and of the continued attention of assistants; these conditions being assumed as essentials, preceding even the mere covering in of space, and providing shelter for patients.

The cost of these buildings, delivered ready for shipment, will



be from £18 to £22 per bed, allowing 1,000 cubic feet of space in each ward-room to each bed. If pressing emergency should lead to the beds being placed closer, and fifty per cent. more patients should be introduced, it is believed that the perfect system of ventilation which is secured, would render these hospitals very superior to any now in use for the army.

Of the cost above named, about £12 per bed is that due to the ward-rooms themselves, with all their conveniences attached, and the rest arises from the cost of the store-rooms, kitchen, machinery, residences, and appurtenances.

The cargo space required for their conveyance is about a ton and a-half to a ton and three-quarters measurement per bed.

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No. II.

ETHNOLOGICAL NOTES made in the neighbourhood of Renkioi, on the Dardanelles. By JOHN BEDDOE, M.D.

THOUGH the British inhabitants of Renkioi had not, perhaps, such extensive opportunities for ethnological investigation as fell to the lot of those who served with the Turkish Contingent, and had not daily in their presence like those who were quartered near Constantinople, specimens of every nation between the Atlantic and the Ganges, they were favourably situated for the observation of the physical and moral characteristics of the Anatolian peasantry, Greek as well as Turkish. Moreover, there was always in the neighbourhood a considerable number of Arabs and Arnauts, and indeed of people of several other races, all in the British service, either in the Osmanli Irregulars, or in the Land Transport Corps.

The district of the Troad, including the country between the Ægean, the Hellespont, and the Gulf of Adramyttium, and bounded on the East by Mount Ida, and the lower hills connected with the Ala Dagh and Schab Dagh, is assigned by Berghaus the geographer and ethnographer to the race and language of the Greeks.

I believe it will be easy to show that he has been misled in the



matter, and it may be worth while to correct the error, inasmuch as it is highly inexpedient in the present social and political position of Turkey to allow false ideas as to the relative numbers and importance of the divers races and religions to gain currency.

The district in question contains one considerable town, Chanak Kalesi, commonly known as the Dardanelles, and two smaller ones, Bairamitch and Eneh, besides a considerable number of villages, some of which contain from 1,000 to nearly 3,000 inhabitants.

Each of the towns has its separate "millet" or nationalities. In Chanak Kalesi are counted about 700 Turkish houses, 450 Greek, 120 Armenian, and 150 Jewish houses. In the other towns the preponderance of the Osmanli is much greater. The Greeks occupy on or near the coast the populous village of Renkioi, with nearly 3,000 inhabitants; those of Yenishehr (Sigeum), and Yenikeni or Neochori (on Besika Bay); that of Kalafasli (in the plain of Troy), and the lower village of Behrahm (Assos). But I am acquainted with upwards of thirty villages in the district where either the population is exclusively Turk, or where only two or three Greek families, or even individuals are to be found.

It is certain that, even under the Seljukian dynasty, a century or two before the rise of the Ottoman Turks, the hilly country about Mount Ida was occupied by Turkman tribes who warred with the Greek inhabitants of the town of Adramyttium. It is no wonder then that the Musselmans afterwards, as the Christian power declined, drove the Greeks out of the whole of this beautiful tract of country, except in a few localities upon the coast.

That the two races, though dwelling almost in each others presence for centuries, have not become assimilated in blood by intermarriage, would appear pretty clearly to any one who would study their respective principal characters and note the still considerable differences.

The Turkish peasant has not the elongated, regular, and delicate features which in the west are often said to belong to his race. That type is found very commonly in Constantinople, and in some other great towns, but I have little doubt that the continual admixture, during several centuries, of alien blood, Georgian, Persian, Circassian, Armenian, Greek, Arab, and



European, is quite sufficient to account for the phenomenon. One great channel through which the Greek blood was poured into the veins of the urban population was the numerous body of Janissaries, which was for two centuries, recruited I believe exclusively from the Rayas and other Christian populations. The children of a Janissary, while this regulation was in force, did not become Janissaries, but settled down into the general mass of the citizens of Constantinople, and some other great towns.

But these peasants retain many of the traits of their Tartar ancestors. They have powerful frames, seldom tall, but broad and strongly knit, and when stripped for their favourite sport of wrestling, display a great development of bone and muscle. Accordingly they are somewhat slow in action, but capable of severe and long continued exertion.

The form of their heads is also Tartar (Turanian). It is broad, short from the occiput to the forehead, but rising very high about the crown. The facial angle is rather small, although when seen from before, many of them appear to have fine foreheads. The face is usually broad with large cheekbones. The nose varies a good deal; it is strongly aquiline in some who are apparently pure-blooded, but these cases are exceptional; in the greater number it is rather short than long, and nearly straight. The eyes are not unfrequently set obliquely, or rather, the inner angle of the upper eyelid is drawn down as in the Chinese, Calmucks, Lapps, &c. The beard is usually in good quantity, but its appearance is rather late. Altogether the features have the character of power and manliness.

The complexion is darker than that of the Greeks, generally speaking, but lighter than in the Armenians. Exposure to the sun is apt to change it to a coppery brown instead of the olive tint of the southern Europeans. The eyes are generally dark brown, but not unfrequently grey; the hair is more often dark brown than black, and even fair hair is by no means uncommon.

The Greeks of Renkioi and the other villages differ a good deal in appearance from those of Smyrna. I am disposed to attribute this partly to the probable admixture of Slavonian blood, in the former case, and of Italian, in the latter. In the Turkish village of Magnesia where there is a large Greek community, and in the town of Nymfi (Nymphie), the old Hellenic



type seemed to me to be more frequently seen than in either of the two localities above-mentioned.

The Greeks of Renkioi are much lighter in build than their Turkish neighbours; they are more active and less powerful. Instances of longevity are not common among them, and they appear to be much more subject than their neighbours to a variety of diseases. This may be accounted for by several reasons. Their customary diet is bad; black barley bread is the staple of it, seasoned with olives or salt fish, and qualified with raki. During their long and frequent fasts they abstain from all animal food. The Turks on the other hand, make no such distinctions, except with respect to swine's flesh, and appear at all times to make more use of milk and cheese. What is probably of yet greater importance is that the Moslem peasantry generally obey the precepts of their religion, and avoid strong drink; whereas the Greeks on feast days, and holy days, drink to excess of wine and raki. Lastly, it may be that their greater activity of mind and body, in a climate like that of Asia Minor, which disposes all men to apathetic indolence, tends to wear out their bodies and minds more rapidly. I am not disposed to admit this last supposition, for though they retain most of the mental acuteness and restlessness of their illustrious ancestors, they certainly cannot be called industrious or energetic when compared with more northern and more civilized peoples.

There are two other tribes in the Troad of less importance and little spoken of, yet sufficiently interesting. These are the Turkomans and the Yuruks.

The former are nomads who occupy themselves chiefly in felling trees, and sawing wood. The latter are exclusively pastoral, but nomadic only to a small extent.

I regret that owing to the sudden and unexpected termination of our period of service, I was unable to procure the information I desired with respect to these tribes, and which could only be relied on if obtained from themselves, for which end a better knowledge of the Turkish language, and very friendly relations with themselves were indispensable.

I believe the Yuruks to be a part of the same people who under the name of Turkmans, roam as pastoral nomads over Caramania, as well as vast regions further to the East, but they do not themselves acknowledge the name in question, nor



do they intermarry with the acknowledged Turkmen of the forests. Between the Osmanli and the Yuruks, marriages are rare, but between the Turkmen and the other two, they are, I believe, quite unheard of. The Yuruks are considered by the Osmanli peasantry to be tolerably good Musselmans, but the Turkmen are not allowed by them to be Musselmans at all. Indeed they affirm that the foresters had more connexion with the Jewish Rabbis than with the Imam, and even that they kept the Jewish Sabbath. I did not believe this last statement, but as I never visited a Turkmen camp on a Saturday, nor became sufficiently intimate with them to cross-examine them on the subject, I cannot speak positively. Nomadic Jewish tribes do exist in Kurdistan, and Mr. Layard encountered one in the course of his travels. But the people we are now considering have no resemblance whatever to the Jews in person; on the contrary they present, so do also the Yuruks, the Turanian or Tartar cast of head and features. They are generally fine robust men with complexions of a warm brown, sometimes approaching copper-colour; the women have cheeks of a ruddy brown. The eyes are generally set somewhat obliquely. The hair is dark-brown or black; so is the beard, which, though its appearance seems to be rather long delayed, generally attains very fine proportions, a thing unusual among Turanians.

The costume of the women is peculiar, and they have it in common with the Yuruks. Its most remarkable part is the double apron, made of a kind of coarse red cloth, which is worn behind as well as before. They wear also red girdles ornamented with cowries, and use the same necklaces and forehead bands of gold and silver coin, as are in vogue among the Greeks,

As might be expected from their free and active life, the Turkmen appear to be a very healthy race. Indeed I cannot call to mind that I ever had occasion to prescribe medicine for any of them, although we were in pretty frequent communication.

They not only make their own cloth, but weave carpet of patterns similar to those produced at Koola. The weaving is done in the open air in a very simple and clumsy loom.

I could not observe, nor did I hear of any difference of dialect between the Osmanli, Turkmen, and Yuruks. All use the vernacular Turkish, which not being like the literary language of the country, largely mixed as to both grammar and vocables with



Arabic and Persian, is of very simple and regular construction, and may be acquired with comparative ease.

The Turkish peasantry continue to deserve the same commendation with respect to their moral character that their kindred have almost always received from those who knew them best. And their qualities fit them equally for war and conquest, and for a tranquil, pastoral, or agricultural life. The exercise without the abuse of power over subject races is hardly to be expected from any people, but the Turks from their indolence, and their naturally mild and tolerant temper are not so prone to exercise downright cruelty and oppression as certain more civilized and intellectually gifted races. At the same time it is undeniable that some of the nationalities at present subject to them, though morally and physically inferior, are in intellect and activity far superior, and are gifted with powers of self development and progression which the dominant people does not possess.

No. III.

METEOROLOGICAL TABLE.—October—April, 1855-56.

Barometrical Observations by Dr. ROBERTSON. They are uncorrected.

Thermometrical Observations by Dr. ROBERTSON and Dr. KIRK.

MONTHLY AVERAGE—WINDS.

Months.	Northerly. No. of Days.	Southerly. No. of days.
October* .. ..	3	8
November .. ..	20	6
December .. ..	22	9
January .. ..	15	15
February .. ..	14	11
March .. ..	25	4
April .. ..	12	11

\* Not always noted.



METEOROLOGICAL TABLE. OCTOBER—APRIL.

Month.	Mean Barom. at 9 A.M.	THERMOMETER.						
		Mean Max. of 24 hours.	Mean Min. of 24 hours.	Mean of 24 hours.	Mean at 9 A.M.		Mean at 9 P.M.	
					Dry.	Wet.	Dry.	Wet.
October ..	30.062	....	....	....	69.90	63.15	....	....
November ..	30.163	65.00	50.79	57.895	56.60	52.65	55.72	52.72
December ..	30.026	56.38	42.77	49.575	48.87	46.57	46.71	45.8
January ..	30.036	56.03	42.03	49.030	49.00	46.00	47.61	45.22
February ..	30.148	55.34	40.13	47.735	47.57	43.74	46.51	43.59
March ..	30.111	....	....	....	42.65	40.53	....	....
April ..	30.037	....	....	....	58.30	52.20	....	....

Rain fell in October on		1 days.		Snow fell in October on		0 days.	
November	11	November	0	November	0	December	2
December	8	December	7	January	1	January	1
January	7	January	6	February	1	February	1
February	6	February	5	March	2	March	2
March	5	March	1	April	0	April	0
April	1	April	1				

No account of the fall of Rain was kept.



## No. IV.

PLANTS collected by DR. ARMITAGE, DR. KIRK, and DR. PLAYNE in the neighbourhood of RENKIOI, including IDA and OLYMPUS.

	Lat.	Long.	Height.
Ida ..	39° 42'	26° 51'	6,000 feet.
Olympus ..	40° 1'	29° 15'	9,000 „
Renkioi ..	40° 2'	26° 21'	

(Ida was explored in April 1856).

(Olympus was explored June 1855).

NAT. ORDER.	GENUS.	SPECIES.
Ranunculaceæ*	Adonis .. ..	Aestivalis.
	„ .. ..	Autumnalis.
	„ .. ..	Flammea.
	Anemone .. ..	Apennina.
	„ .. ..	Coronaria.
	„ .. ..	Fulgens.
	„ .. ..	Hortensis.
	Ceratocephalus ..	Falcatus.
	Clematis .. ..	Cirrhusa.
	„ .. ..	Vitalba.
	Delphinium .. ..	Aconitum.
	„ .. ..	Hellesponticum.
	„ .. ..	Ajaxis.
	„ .. ..	Pubescens.
	Nigella .. ..	Arvensis.
	„ .. ..	Damascena.
	Pæonia .. ..	Decora.
	Ranunculus .. ..	Arvensis.
	„ .. ..	Ficaria.
	„ .. ..	Lanuginosus.
Thalictrum .. ..	Flavum.	

\* De Candolle.



NAT. ORDER.	GENUS.	SPECIES.
Berberideæ .. ..	Leontice .. ..	Leontopetalon.
Papaveraceæ .. ..	Chelidonium .. ..	Majus.
	Glaucium .. ..	Flavum.
	.. ..	Corniculatum.
	.. ..	Rubrum.
	Hypecoum .. ..	Imberbe.
	.. ..	Procumbens.
	Papaver .. ..	Argemone.
	.. ..	Rhoeas.
Fumariaceæ.. ..	Roemeria .. ..	Hybrida.
	Corydalis .. ..	Tuberosa.
	.. ..	Digitata.
Cruciferae .. ..	Fumaria .. ..	Micrantha.
	Alyssum .. ..	Argenteum.
	.. ..	Campestre.
	.. ..	Montanum.
	.. ..	Saxatile.
	Arabis .. ..	Bellidifolia.
	.. ..	Drabiformis.
	.. ..	Verna.
	Aubrietia .. ..	Deltoidea.
	Bunias .. ..	Erucago.
	Cardamine .. ..	Græca.
	Cakile .. ..	Maritima.
	Dentaria .. ..	Bulbifera.
	Draba .. ..	Muralis.
	.. ..	Olympica.
	.. ..	Aizoides.
	Iberis .. ..	Spathulata.
	.. ..	Nana.
	Lepidium .. ..	Draba.
	.. ..	Latifolium.
Malcolmia .. ..	Lyrata.	
Thlaspi .. ..	Montanum.	
Eunomia .. ..	Chlorifolia.	
Erysimum .. ..	Impestre.	
Capparideæ .. ..	Capparis .. ..	Spinosa.
Cistineæ .. ..	Cistus .. ..	Incanus.
	.. ..	Salvifolius.



NAT. ORDER.	GENUS.	SPECIES.
Cistineæ .. ..	Cistus .. ..	Villosus.
	Helianthemum ..	Arabicum.
	.. ..	Ægyptiacum.
	.. ..	Pilosum.
Violareæ .. ..	Viola .. ..	Canina.
	.. ..	Gracilis.
	.. ..	Odorata.
	.. ..	Sylvatica.
	.. ..	Tricolor.
Resedaceæ .. ..	Reseda .. ..	Luteola.
Polygaleæ .. ..	Polygala .. ..	Glumacea.
	.. ..	Vulgaris.
Caryophyllaceæ ..	Cerastium .. ..	Manticum.
	.. ..	Trigynum.
	Dianthus .. ..	Atrorubens.
	.. ..	Caryophyllus.
	.. ..	Capitatus.
	.. ..	Diffusus.
	.. ..	Carthusionorum.
	.. ..	Leptopetalus.
	.. ..	Lensophæus.
	.. ..	Pinifolius.
	.. ..	Prolifer.
	Gypsophilla ..	Vaccaria.
	Silene .. ..	Conica.
	.. ..	Conoidea.
	.. ..	Cretica.
	.. ..	Dichotoma.
	.. ..	Gigantea.
	.. ..	Juncea.
	.. ..	Italica.
	.. ..	Linifolia.
.. ..	Otites	
.. ..	Vespertina.	
Lineæ .. ..	Velezia .. ..	Rigida.
	.. ..	Quadridenta.
	Linum .. ..	Augustifolium.
.. ..	Flavum.	
.. ..	Nodiflorum.	



NAT. ORDER.	GENUS.	SPECIES.
Lineæ .. ..	Linum .. ..	Strictum.
	„ .. ..	Usitatissimum.
Malvaceæ .. ..	Althæa .. ..	Hirsuta.
	„ .. ..	Pallida.
	„ .. ..	Rosea.
	Lavatera .. ..	Biennis.
	„ .. ..	Trivingiaca.
	Malope .. ..	Malacoides.
	Malva .. ..	Erecta.
Hypericineæ ..	Hypericum, .. ..	Crispum.
	„ .. ..	Elegans.
	„ .. ..	Olympicum.
	„ .. ..	Veronense ..
Ampelideæ ..	Vitis .. ..	Vinifera.
Geraniaceæ ..	Geranium .. ..	Striatum.
	„ .. ..	Tuberosum.
Zygophylleæ ..	Tribulus .. ..	Terrestris.
Rutaceæ .. ..	Dictamnus .. ..	Albus.
	Haplophyllum .. ..	Buxibaumii.
	Peganum .. ..	Harmala.
Rhamneæ. . .	Paliurus .. ..	Australis.
	Zizyphus .. ..	Vulgaris.
Terebinthaceæ ..	Pistacia .. ..	Terebinthus.
	Rhus .. ..	Coriaria.
Leguminosæ ..	Anagyris .. ..	Fœtida.
	Anthyllis .. ..	Tetraphylla.
	Astragalus .. ..	Aristatus.
	„ .. ..	Angustifolius.
	„ .. ..	Exscapus.
	„ .. ..	Incamus.
	„ .. ..	Hirsutus.
	Cicer .. ..	Arietinum.
	Cercis .. ..	Siliquastrum.
Colutea .. ..	Arborescens.	
Coronilla .. ..	Emerus.	



NAT. ORDER.	GENUS.	SPECIES.
Leguminosæ ..	Coronilla .. ..	Parviflora
	Doryenium .. ..	Hirsutum.
	.. ..	Herbaceum.
	Genista .. ..	Fovea.
	Glycyrrhiza .. ..	Glabra.
	Hippocrepis .. ..	Ciliata.
	Lathyrus .. ..	Cicera.
	.. ..	Sativa.
	Medicago. . . .	Arvensis.
	.. ..	Maritima.
	.. ..	Orbicularis.
	.. ..	Sphærocarpus.
	.. ..	Scutellata.
	.. ..	Tuberculata.
	Melilotus .. ..	Vulgaris.
	Ononis .. ..	Antiquorum.
	.. ..	Pubescens.
	Onobrychus .. ..	Æquidentata.
	.. ..	Foveolata.
	.. ..	Sativa.
	.. ..	Saxatilis.
	Ornithopus .. ..	Scorpioides.
	Orobus .. ..	Hirsutus.
	.. ..	Sessifolius.
	Phaca .. ..	Astragalina.
	Pisum .. ..	Arvense.
	.. ..	Sp. ?
	Psoralæa .. ..	Bituminosa.
	Scorpiurus. . . .	Sulcatus.
	Spartium .. ..	Junceum.
	.. ..	Villosum.
	Trifolium . . . .	Purpureum.
.. ..	Ochroleucum.	
Trigonella .. ..	Hamosa.	
.. ..	Spicata.	
Vicia .. ..	Cracca.	
.. ..	Cracoides.	
.. ..	Elegans.	
.. ..	Narbonensis.	
.. ..	Peregrina.	
.. ..	Polyphylla.	
Rosaceæ .. ..	Amygdalus. . . .	Communis.
	Cratægus .. ..	Oxyacantha.



NAT. ORDER.	GENUS.	SPECIES.
Rosaceæ .. ..	Geum.. ..	Coccineum.
	" .. ..	Sylvaticum.
	Potentilla .. ..	Canescens.
	" .. ..	Fragariastum.
	" .. ..	Reptans.
	" .. ..	Verna.
	Poterium .. ..	Sanguisorba.
	" .. ..	Spinosum.
	Rosa .. ..	Canina.
Rubus .. ..	Sp. ?	
Granaceæ .. ..	Punica .. ..	Granatum.
Onagrariæ .. ..	Epilobium .. ..	Alpinum.
	Cercæa .. ..	Lutetiana.
Halerageæ .. ..	Halerago .. ..	Sp. ?
Lythriaræ .. ..	Lythrum .. ..	Salicaria.
Tamariscineæ .. ..	Tamarix .. ..	Gallica.
	" .. ..	Tetrandra.
Myrtaceæ .. ..	Myrtus .. ..	Communis.
Cucurbitaceæ .. ..	Bryonia .. ..	Dioica.
	Momordica .. ..	Elaterium.
Crassulaceæ.. ..	Cotyledon .. ..	Umbilicus.
	Sedum .. ..	Saxatile.
Saxifrageæ .. ..	Saxifraga .. ..	Cernua.
	" .. ..	Hederacea.
	" .. ..	Granulata.
	" .. ..	Media.
	" .. ..	Rotundifolia.
	" .. ..	Sp. ?
Umbelliferæ .. ..	Bupleurum .. ..	Nodiflorum.
	" .. ..	Odontites.
	" .. ..	Rotundifolium.
	Caucalis .. ..	Latifolia.
	Ferula .. ..	Nodiflora.
	Tordylium .. ..	Apulum.



NAT. ORDER.	GENUS.	SPECIES.
Umbelliferæ . . . .	Tordylium . . . .	Officinale.
	Smyrnum . . . .	Perfoliatum.
Araliaceæ . . . .	Hedera . . . .	Helix.
Loranthaceæ . . . .	Viscum . . . .	Album.
Caprifoliaceæ . . . .	Lonicera . . . .	Caprifolium.
	„ . . . .	Etrusca.
Rubiaceæ . . . .	Galium . . . .	Aparine.
	„ . . . .	Coronatum.
	„ . . . .	Verum.
	Rubia . . . .	Tinctoria.
Valerianæ . . . .	Valeriana . . . .	Dioica.
	„ . . . .	Officinalis.
Dipsacæ . . . .	Asterocephalus . . . .	Eburneus.
	Dipsacus . . . .	Fullonum.
Compositæ . . . .	Achillæa . . . .	Clypeata.
	Anthemis . . . .	Altissima.
	„ . . . .	Crysocephalus.
	„ . . . .	Sp. ?
	Aster . . . .	Tripolium.
	„ . . . .	Sp. ?
	Bupthalmum . . . .	Spinosum.
	Calendula . . . .	Arvensis.
	Carthamnus . . . .	Lanatus.
	Centaurea . . . .	Syanus.
	„ . . . .	Crupina.
	„ . . . .	Parviflora.
	„ . . . .	Solstitialis.
	„ . . . .	Spinosa.
	Chrysanthemum . . . .	Segetum.
	Conyza . . . .	Limonifolia.
	Crepis . . . .	Rubra.
	Cichorium . . . .	Puberulum.
	Doronicum . . . .	Pardalianches.
Erigeron . . . .	Viscosum.	
Geropogon . . . .	Hirsutum.	
Lapsana . . . .	Vulgaris.	
Santalina . . . .	Anthemoides.	



NAT. ORDER.	GENUS.	SPECIES.
Compositæ .. ..	Santalina .. ..	Maritima.
	Senecio .. ..	Crassifolius.
	.. ..	Vernalis.
	Seriola .. ..	Lævigata.
	Pyrethrum .. ..	Maritimum.
	Inula .. ..	Viscosa.
Vaccineæ .. ..	Vaccinium .. ..	Myrtilus.
Ericaceæ .. ..	Arbutus .. ..	Andrachne.
	.. ..	Unedo.
	Bruckentalia .. ..	Spiculifolia.
	Erica .. ..	Arborea.
Ebenaceæ .. ..	Styrax .. ..	Officinalis.
Jasmineæ .. ..	Ligustrum .. ..	Vulgare.
	Jasminium .. ..	Fructicans,
	Phillyræa .. ..	Media.
	Olæa .. ..	Europæa.
Apocyneæ .. ..	Cionura .. ..	Alba.
	Cynanchum .. ..	Acutum.
	.. ..	Monspeliacum.
	Periploca .. ..	Græca.
Gentianeæ .. ..	Gentiana .. ..	Verna.
Convolvulaceæ ..	Convolvulus .. ..	Arvensis.
	.. ..	Cantabrica.
	.. ..	Althæoides.
	.. ..	Var. Argyreus
	.. ..	Pseudosiculus.
	.. ..	Sabatius.
	.. ..	Tenuissimus.
Boragineæ .. ..	Anchusa .. ..	Undulata.
	Asperugo .. ..	Procumbens.
	Alkanna .. ..	Tinctoria.
	Borago .. ..	Orientalis.
	Cynoglossum .. ..	Pictum.
	Echium .. ..	Violaceum.
	Heliotropium .. ..	Circinatum,
	Lithospermum .. ..	Purpureocœruleum



NAT. ORDER.	GENUS.	SPECIES.
Boragineæ .. ..	Myosotis .. ..	Alpestris.
	" .. ..	Olympica.
	" .. ..	Pusilla.
	Onosma .. ..	Echioides.
	" .. ..	Montana.
Solanaceæ .. ..	Datura .. ..	Stramonium.
	Hyoscyamus .. ..	Albus.
	" .. ..	Niger.
	Lycium .. ..	Europæum.
	Physalis .. ..	Alkekengi.
	Verbascum .. ..	Floccosum.
	" .. ..	Sinuatum.
	" .. ..	Triste.
	" .. ..	Sp. ?
" .. ..	Ramosum.	
Scrophularineæ ..	Digitalis .. ..	Ferruginea.
	Bartsia .. ..	Trixago.
	Scrophularia .. ..	Bicolor.
	" .. ..	Georgica.
	Pedicularis .. ..	Sibthorpii.
	Veronica .. ..	Anagallis.
	" .. ..	Cœspitosa.
	" .. ..	Cymbalaria.
	" .. ..	Gentianoides.
	" .. ..	Jacquinii.
	" .. ..	Thymifolia.
Trixago .. ..	Carnea.	
Orobanchæ .. ..	Orobanche .. ..	Ramosum.
	" .. ..	Sp. ?
Acanthaceæ .. ..	Acanthus .. ..	Spinosus.
Verbenaceæ .. ..	Vitex .. ..	Agnus castus.
Labiatae .. ..	Ajuga .. ..	Chia.
	" .. ..	Genevensis
	Lamium .. ..	Maculatum.
	" .. ..	Longiflorum,
	" .. ..	Rugosum.
	Lavandula .. ..	Stæchas.
Marrubium .. ..	Perigrinum.	



NAT. ORDER.	GENUS.	SPECIES.
Labiatae .. ..	Phlomis .. ..	Pungens.
	Prasium .. ..	Majus.
	Prunella .. ..	Laciniata.
	Salvia .. ..	Arvensis.
	„ .. ..	Æthiopis.
	„ .. ..	Horminium.
	„ .. ..	Pratensis.
	„ .. ..	Viscosa.
	„ .. ..	Sclarea.
	Satureia .. ..	Capitata.
	Sideritis .. ..	Montana.
	„ .. ..	Lanata.
	Stachys .. ..	Dasyantha.
	„ .. ..	Cretica.
	„ .. ..	Orientalis.
	Teucrium .. ..	Polium.
	„ .. ..	Regium.
Thymus .. ..	Acicularis.	
„ .. ..	Vulgaris.	
Primulaceae .. ..	Anagallis .. ..	Cœrulea.
	Androsace .. ..	Olympica.
	Lysimachia .. ..	Atropurpurea.
	Samolus .. ..	Valerandi.
Globulariæ .. ..	Globularia .. ..	Cordifolia.
Plantaginæ .. ..	Plantago .. ..	Lagopus.
	„ .. ..	Psyllium.
Polygoneæ .. ..	Rumex .. ..	Tuberosus.
Thymeleæ .. ..	Chlamydanthos .. ..	Buxifolia.
	„ .. ..	Tartonraira.
Santalaceæ .. ..	Osyris .. ..	Alba.
Elæagneæ .. ..	Elæagnus .. ..	Augustifolius.
Cytineæ .. ..	Cytinus .. ..	Hypocistis.
Aristolochiæ .. ..	Aristolochia .. ..	Clematitis.
	„ .. ..	Hirta.



NAT. ORDER.	GENUS.	SPECIES.
Aristolachiæ .. ..	Aristolochia .. ..	Rotunda.
Euphorbiaceæ .. ..	Euphorbia .. ..	Amygdaloides.
	.. ..	Chamæsyra.
	.. ..	Gerardiana.
	.. ..	Myrsinitis.
	.. ..	Sp. ?
	Crozophera .. ..	Tinctoria.
Urticeæ .. ..	Ficus .. ..	Carica.
	Humulus .. ..	Lupulus.
	Morus .. ..	Alba et nigra.
	Parietaria .. ..	Officinalus.
	Urtica .. ..	Urens.
Juglandaceæ .. ..	Juglans .. ..	Regia.
Amentaceæ .. ..	Castanea .. ..	Sativa.
	Corylus .. ..	Avellana.
	Platanus .. ..	Orientalis.
	Quercus .. ..	Brutia.
	.. ..	Cerris.
	.. ..	Coccifera.
	.. ..	Infectoria.
	.. ..	Ilex.
	.. ..	Ægilops.
	.. ..	Pubescens.
	Salix .. ..	Sp. ?
Coniferæ .. ..	Ephædra .. ..	Distachya.
	Cupressus .. ..	Horizontalis.
	.. ..	Sempervirens.
	Pinus .. ..	Maritima.
	.. ..	Pinaster.
	Juniperus .. ..	Communis.
Orchideæ .. ..	Cephalanthera .. ..	Rubra.
	Habenaria .. ..	Sp. ?
	Limodorum .. ..	Abortivum.
	Ophrys .. ..	Cornuta.
	.. ..	Fusca.
	.. ..	Lutea.
	.. ..	Oxyrynchus.
	.. ..	Speculum.
	.. ..	Sp. ?



NAT. ORDER.	GENUS.	SPECIES.
Orchideæ .. ..	Orchis .. ..	Acuminata.
	” .. ..	Laxiflora.
	” .. ..	Papillionacea.
	” .. ..	Romana.
	” .. ..	Sambucina.
	” .. ..	Simia.
	” .. ..	Sp. ?
	” .. ..	Sp. ?
Irideæ .. ..	Crocus .. ..	Gargaricus.
	” .. ..	Hybernus.
	” .. ..	Mæsiacus.
	” .. ..	Pulchricolor.
	” .. ..	Susianus.
	” .. ..	Vernus.
	Gladiolus .. ..	Segetus.
	Iris .. ..	Biglumis.
	” .. ..	Lutescens.
	” .. ..	Pseudacorus.
Asparageæ .. ..	Trichonema .. ..	Bulbocodium.
	Asparagus .. ..	Acutifolius.
	Ruscus .. ..	Aculeatus.
	” .. ..	Hypoglossus.
	Smilax .. ..	Aspera.
	Tamus .. ..	Communis.
	Liliaceæ .. ..	Allium .. ..
” .. ..		Sp. ?
Asphodelus .. ..		Luteus.
” .. ..		Ramosus.
Fritillaria .. ..		Pontica.
Gagea .. ..		Arvensis.
Muscari .. ..		Comosum.
” .. ..		Racemosum.
” .. ..		Sp. ?
Ornithogalum .. ..		Comosum.
” .. ..		Fimbriatum.
” .. ..		Nanum.
” .. ..		Narbonense.
” .. ..	Nutans.	
” .. ..	Prasandrum.	



NAT. ORDER.	GENUS.	SPECIES.
Liliaceæ .. ..	Ornithogalum ..	Pyrenaicum.
	" ..	Umbellatum.
	Scilla .. ..	Bifolia.
	Tulipa .. ..	Clusiana.
	" .. ..	Turcica.
Melanthaceæ ..	Colchicum .. ..	Montanum.
	Bulbocodium ..	Trigynum.
Zosteraceæ .. ..	Zostera .. ..	Marina.
Aroideæ .. ..	Arum .. ..	Dracunculus.
Typhaceæ .. ..	Typha .. ..	Latifolia.
Gramineæ .. ..	Ægilops .. ..	Ovata.
	Briza .. ..	Major.
	Lolium .. ..	Temulentum.
	Lagurus .. ..	Ovatus.
	Lappago .. ..	Racemosa.
	Phleum .. ..	Alpinum.
	Sclerochlea ..	Rigida.
	Setarea .. ..	Viridis.
Filices .. .	Asplenium ..	Adiantum nigrum.
	" ..	Trichomanes.
	Adiantum ..	Capillus Veneris.
	Ceterach ..	Officinarum.
	Pteris .. ..	Aquilina.
Equisetaceæ. .	Equisatum ..	Telmateia.



*Plants cultivated in the Vicinity of Renkioi.*

Barley,	Vegetable Marrow,
Maize,	Bottle Gourd,
Millet,	Capsicum,
Wheat,	Tomatoe,
Oats,	Bamia (Abelmoschus Escu-
Vine,	lentus),
Almond,	Aubergine (Solanum Ovige-
Mulberry (white and black),	rum),
Fig,	Lettuce,
Cherry,	Garlic,
Pomegranate,	Sesame (Sesamum Orientale),
Pear,	Cotton,
Water Melon,	Tobacco,
Sugar Melon,	Carrot.
Cucumber,	

*Native Vegetable Productions.*

<i>a</i> Timber .. .. .	Pine,
" .. .. .	Walnut,
" .. .. .	Elm,
" .. .. .	Oak,
" .. .. .	Willow,
" .. .. .	Ash,
<i>b</i> Valonea .. .. .	Quercus Ægilops.
" .. .. .	Cerris.
<i>c</i> Oak galls .. .. .	Quercus infectoria.
<i>d</i> Liquorice .. .. .	Glycerrhiza glabra.
<i>e</i> Capers .. .. .	Capparis Spinosa.
<i>f</i> "Gram" .. .. .	Cicer arietinum.