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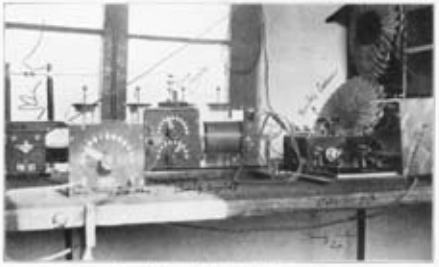


General View of Receiving Instruments.

Aerial (on right of Flagstaff).

Interior of Station.

WIRELESS TELEGRAPHY

WIRELESS TELEGRAPHY.

SOME UP-TO-DATE AMERICAN METHODS OF RECEPTION.

By LIEUT. A. C. FULLER, R.E.

SITUATED as the author is in Bermuda, some opportunities arise of becoming acquainted with the present American ideas on the above subject.

First it may be mentioned that in the U.S.A. wireless stations may be erected and worked by anyone without let or hindrance. The direct result of this is that many of the young electrical students have installations of their own, and are thus early able to get some practical knowledge of the subject. Secondly there are many firms who make all kinds of wireless apparatus for retail sale—thus enabling the student to proceed from purely laboratory experiments up to practical working, and to obtain experience with all patterns of apparatus.

Ships' Aerials.—Vessels fitted by American companies usually carry a heavier aerial than that carried by British or Continental ships. The American aerial would generally consist of a 4 or 6-wire aerial in place of the usual 2. The wires of these aerials are joined in groups at the leading down end, and are all connected across at the other. In the case of a 6-wire aerial the connections for receiving are as shown in *Fig.* 1 of the *Plate*. The aerial is wrongly drawn for clearness but of course the six wires are all in one horizontal plane.

It will be seen that the group marked *a* is connected directly to the tuner—the group *b* is usually connected to the ground, but this earth connection can be broken by the switch S_2. In 4-wire aerials the group *b* is done away with. The group *c* is connected to a switch S_1 which allows the operator to put it to earth or to put it to the tuner in parallel with the *a* group.

The object of this arrangement appears to be to render the aerial elastic *i.e.* to give it a variable oscillation constant—thus allowing the operator to adapt his aerial more or less to the length of wave he wishes to receive—in fact to accomplish the first rough tuning on the aerial itself, thus diminishing the tuning inductance coils required.

Atmospheric effects may also be mitigated to a certain degree by a skilful manipulation of such an aerial.

Tuning.—All detecting seems to be done inductively, hence there are two entirely different circuits to tune, (*a*) the primary which

receives the oscillations and passes them to earth—(*b*) the secondary which contains the detecting apparatus and operates by induction from the primary.

These circuits must of course be tuned to each other, and both to the distant station. The primary circuit is tuned as a rule by the addition of inductance to that of the aerial, this added inductance being wound to form the primary of the transformer tuner. This inductance is varied either by a contact which can slide on a bared portion of each turn, or by dividing the primary into a large number of parts each one being brought out onto a contact stud over which a contact arm revolves as in an ordinary rheostat.

This primary coil is wound on a hollow cylinder of ebonite, or in any case is so arranged that the secondary can be fitted within it. When a hollow cylinder is employed, the secondary is wound on another cylinder of slightly smaller diameter which fits inside the former. By sliding this secondary coil in or out of the primary, close or loose inductive coupling is obtained.

Photo No. 1 shows a method of placing the primary inside a box in and out of which the secondary is geared to slide.

The secondary coil is usually divided only into a few (up to eight) subdivisions. The fine tuning is brought about by arranging a variable condenser across the portion of the secondary in use. *Fig.* 2 (*Plate*) shows the arrangement.

Detectors.—Of the numerous patent detectors in use the crystal type seems to be most often met with. It is the usual practice to have two detectors in circuit with a change-over switch. One of the detectors is not very sensitive, and is used at close range during heavy work where a sensitive detector would be so affected as to render all signals one unintelligible hum. The second is of the most sensitive type available, and is used for distances above 200 or 300 miles or when the received signals become weak.

The crystal detectors that the author has tried have all been very excellent when properly adjusted. The fact, however, that they are comparatively insensitive unless so adjusted, is a slight drawback to the type.

Perhaps the simplest detector in use is the silicon—consisting of a brass point in contact with a piece of silicon. When the correct pressure is obtained this detector, which requires no cell and in fact will not operate with one, is remarkably sensitive. The author, at Bermuda, has read the Cape Cod Station some 800 miles away with this simple form.

Telephones.—The telephones, which are universally used for reception, are all wound to very high resistances up to 2,000, 3,000, or 4,000 ohms. These telephones have smaller diaphragms than those used for telephony and respond to infinitesimal currents.

Through the courtesy of the "Wireless Specialty Apparatus Co."

of New York, the author has been supplied for experimental and testing purposes with a receiving set of the latest pattern. The set is an exact duplicate of those recently supplied for the Japanese Government by the firm, and represents the latest ideas on the subject. The photograph and diagram of connections will explain the arrangements. The set consists of an inductance coil which will tune up to 4,000 metres—a loose coupled tuner, variable condenser and detector set. This detector set contains a fixed condenser—test buzzer, potentiometer, and two detectors one called "Perikon" the other and less sensitive "Pyron."

The detectors themselves are enclosed in a copper box which will swing back to allow of adjustment. The perikon consists of two cups one movable and one fixed. The movable and smaller one contains one small mass of mineral (Chalcopyrites—$Cu_2SFe_2S_3$—) the fixed several such masses (Zincite—ZnO).

Adjustment is made by moving the small cup containing the single fragment, so that it makes contact with different portions of the mineral in the larger cup until the best response to a distant station or the test buzzer is obtained. The potentiometer dial switch is then varied to the position of best response. The pyron detector consists of a brass point which bears lightly on a metallic mass which has the appearance of fuzed silicon. The cup containing this metal is moved under the brass point till a sensitive position is found, the pressure of the brass point is then adjusted by a large ebonite screw provided for the purpose till the best result is obtained.

Some results obtained by the author may prove of interest:—The receiving aerial was made up as follows. From a 4′ wooden rod suspended some 80′ high—a pair of wires (copper No. 14) lead down making an angle of about 40° with the ground. These wires terminated in 1′ ebonite rods some 20′ from the ground. From a point near the top of this pair, two nearly vertical wires were led. These were joined at their base and brought into the station (see photograph).

The earth connection was the lightning conductor of the mast, consisting of a wire rope about 1″ in diameter leading through about ¼ mile of rock to the sea.

The following list of stations able to be read at Bermuda gives some idea of the value of the set under the not very favourable conditions of its trial.

Jamaica (Lepel System).—About 1,100 miles distant nominal range 300 k.m. Signals weak.

Key West, U.S.A. (U.S.A. Naval Station).—Signals very strong.

Manhattan Beach.

S.S. "Bermudian."—Up to 600 miles—power 2 k.w.

Brant Rock.—Signals very strong indeed.

Cape Cod.—Signals variable.

Several other stations on the East Coast of America with various wave lengths were heard.

Vessels, up to a dozen or so, on slightly different wave lengths could frequently be heard simultaneously—pointing to the fact that the receiver was capable of reading 1 to 2-k.w. sets at an average distance of about 500 miles.

On continued experiments it was found that the perikon detector loses its sensitivity after some months. The cups however can be replaced by spares in a few seconds.

The pyron detector appears to remain sensitive and to need no attention for very prolonged periods.

THE AUSTRIAN OPERATIONS IN NORTH ITALY IN 1848.

By CAPT. F. D. IRVINE, R.E.

THE Austrian operations in N. Italy in 1848, appear to be very little known, yet the lessons which may be drawn from a study of them are of rather exceptional interest.

In the first place, while presenting a fine example of the value of the offensive spirit in war, they also show how the mere possession of the initiative is of little value if proper use is not made of it. Then they illustrate the use of fortresses in a theatre of war, and also show how their presence may divert the enemy's attention from his true objective. Lastly, these operations contain a remarkable example of a flank march, and of a great pursuit.

Throughout them, we see the advantages conferred by thorough peace training and intuitive co-operation on the Austrian side, as opposed to the lack of cohesion among the heterogeneous collection of units which composed the Army of Allies. Moreover, the terrain is interesting as being the scene of Napoleon's triumphs in 1796 and 1797, as well as subsequently that of Custozza in 1866; in fact the Archduke Albrecht—famous in the latter campaign—served in these operations and doubtless profited by them.

This short essay is based on two German accounts and cannot pretend to be a full history of the campaign, the accounts of the actual battles of which are very interesting reading.

Before going into the actual operations, it is desirable to say something about the leaders on both sides, as well as the armament of the times. The Austrian Commander-in-Chief in North Italy was Field Marshal Count Von Radetzky, a veteran of over 80. He had fought all through the 1796 and 1797 campaigns, and also at Marengo against Napoleon, and had learnt his lessons from these brilliant operations. He was famous for his energy and activity, and these operations, as well as those of 1849, which are dealt with in Hamley, are pervaded with the offensive spirit. He had taken over command of Lombardy and Venetia in 1831, and during these 18 years had an opportunity, such as falls to the lot of few commanders,

of putting into practice his own theories as to the training of the troops. He was assisted for some time by Count Ritter Von Hess, Chief of the Staff, a very able man, highly esteemed in the service.

A systematic training of the troops was carried out by companies, battalions, regiments, and brigades, and culminated in corps practice camps lasting 10 days. This was quite new at that time although the field service regulations of the Austrians recommended such practice camps. The regulations were, however, more honoured in the breach than in the observance. The Austrian infantry had lately had the new percussion cap issued to them, and great things were expected of it. The effective range was still some 300 paces, however, and all fire was delivered in a standing position.

The Allies consisted of the Kingdom of Sardinia, with the States of Tuscany, Parma, Modena and Naples. The Pope also threw in his influence, mainly with a view of revivifying his moribund power.

Of this numerous collection the paramount partners were Sardinia and the Pope, each was jealous of the other and the Papal troops as a matter of fact did not actually join the Allied Army, but operated separately in Venetia. There were no leaders of renown among the Allies, and the King of Sardinia took the lead by virtue of the superior number of his troops. All decisions were arrived at by Councils of War, the weakness of which has often been demonstrated. Both the armament and the training of the Allies were poor. Their *morale* was fairly good as they were fighting the cause of their blood relations.

The operations divide themselves into three phases.

(*a*). The revolt of N. Italy, and temporary repulse of the Austrians.

(*b*). The rapid strokes by which the Austrian C.-in-C. freed himself.

(*c*). The decisive battle and pursuit.

(*a*). THE REVOLT IN N. ITALY.

In March, 1848, an insurrection broke out in Milan. This was the signal for a general rising against the Austrians throughout Lombardy and Venetia.

The I. and II. Austrian Corps were scattered in garrisons and as frontier guards on the Po and Ticino. The campaign opened disastrously as Venice fell, and 20,000 Austrian troops—of Italian extraction—deserted.

Radetzky was compelled to abandon Milan, and he concentrated

by the end of March the major part of the two corps, 30,000 men, at Verona, with a body of 5,000 at Pastrengo and garrisons in the quadrilateral fortresses, Verona, Peschiera, Mantua and Legnago. Milan to Verona is a distance of 110 miles, and this concentration was no small feat of arms, and impossible without the co-operation of all the subordinate Austrian commanders.

Situated at Verona, Radetzky was at the point where reinforcements could first reach him down the Adige Valley. Moreover he covered his line of retreat northwards, and held out a hand to the remains of his II. Corps—15,000 men—which had been collected on the Isonzo. The Isonzo is at the head of the Adriatic. Owing to the supineness of the Papal General at Vicenza, this corps ultimately evaded him and reached Verona.

The Allies, 70,000 in number, led by the King of Sardinia, followed the Austrians in a very leisurely manner. The first action was at Goito where the passage of the Mincio was forced on April 10th. The Allies then halted for three weeks, being content with investing Peschiera and masking Mantua.

On the 28th to 30th April, the King advanced to Pastrengo and drove the Austrians across the Adige. By this movement, he cut them off from their direct line of retreat, and, had he continued his attack with vigour, a decisive action would have been forced, or the Austrians must have retired towards Vicenza, held by the Papal troops. Venetia might have been cleared, a considerable success would probably have been gained by their enormously superior forces, and internal dissensions might have prevented Austria from ever undertaking the reconquest of N. Italy. The Allies could afford to risk a battle while the Austrians could not afford to take any risks.

However, the opportunity was let slip, and on the 6th May the Allies made a frontal attack on Verona from the W. with 40,000 men in three columns. Owing to mistakes the columns assaulted at different times, two were driven back, and so the whole army retired to the hills on the line Pastrengo-Villafranca.

The King of Sardinia's assault on the south wing had been successful, but he was disappointed that Verona gave no signs of rising in co-operation as he had expected, and in place of pushing his own success he joined in the general retirement.

There is little doubt that this was the crisis of the campaign and that the Allies had in their grasp an opportunity of success which never recurred. Their superior numbers gave them the initiative, but, as they did not know how to use it, it passed from their grasp.

On May 25th, the corps from Isonzo reached Verona, and Radetzky felt himself strong enough to take the offensive. We thus pass to the second phase.

(*b*). RADETZKY'S STROKES.

The position on both sides was now as follows.

The Austrian garrisons still held the quadrilateral fortresses, and there was a field army of 45,000 at Verona. A division at Rivoli covered the passes into the Tyrol.

The Allies still held Venice and Vicenza, the latter with 20,000 Papal troops under General Durando. The Tuscan division 10,000, strong, masked Mantua, while 55,000 Sardinians occupied an extremely strong position in the hills on the line Villafranca-Pastrengo, covering the siege of Peschiera.

Radetzky was far too weak to attack the allied position in front, but as he was anxious to relieve Peschiera and effect a diversion, he determined on a bold stroke. This was to surprise the enemy's detachment near Mantua, and then to wheel northwards and take the allied position in flank. This necessitated a flank march, a hazardous operation, and left Verona exposed.

However, he marched at darkness on May 27th with great secrecy in three parallel columns, the centre *viâ* Isola della Scala, while the right passed within 5 miles of Villafranca, the enemy's right. Meanwhile, to distract the enemy's attention, a feint was made from Rivoli. The operation was a complete success.

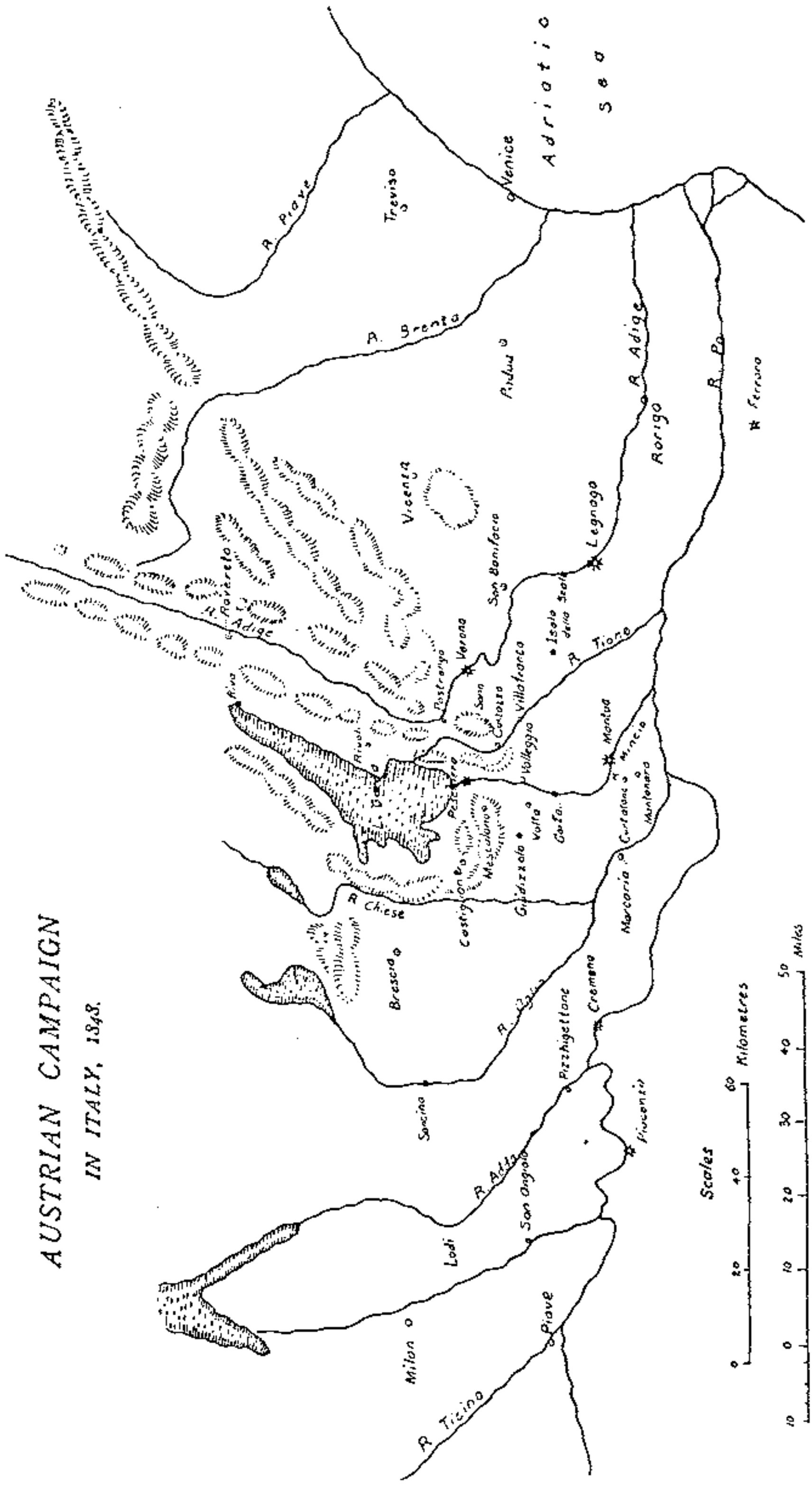
Mantua was reached on the afternoon of the 28th, a distance of 25 miles, and on the next day Radetzky completely routed the Tuscan troops at Curtatone and Montanara and drove them southwards over the Po. On the 30th, he wheeled northwards and continued his advance west of the Mincio to Goito.

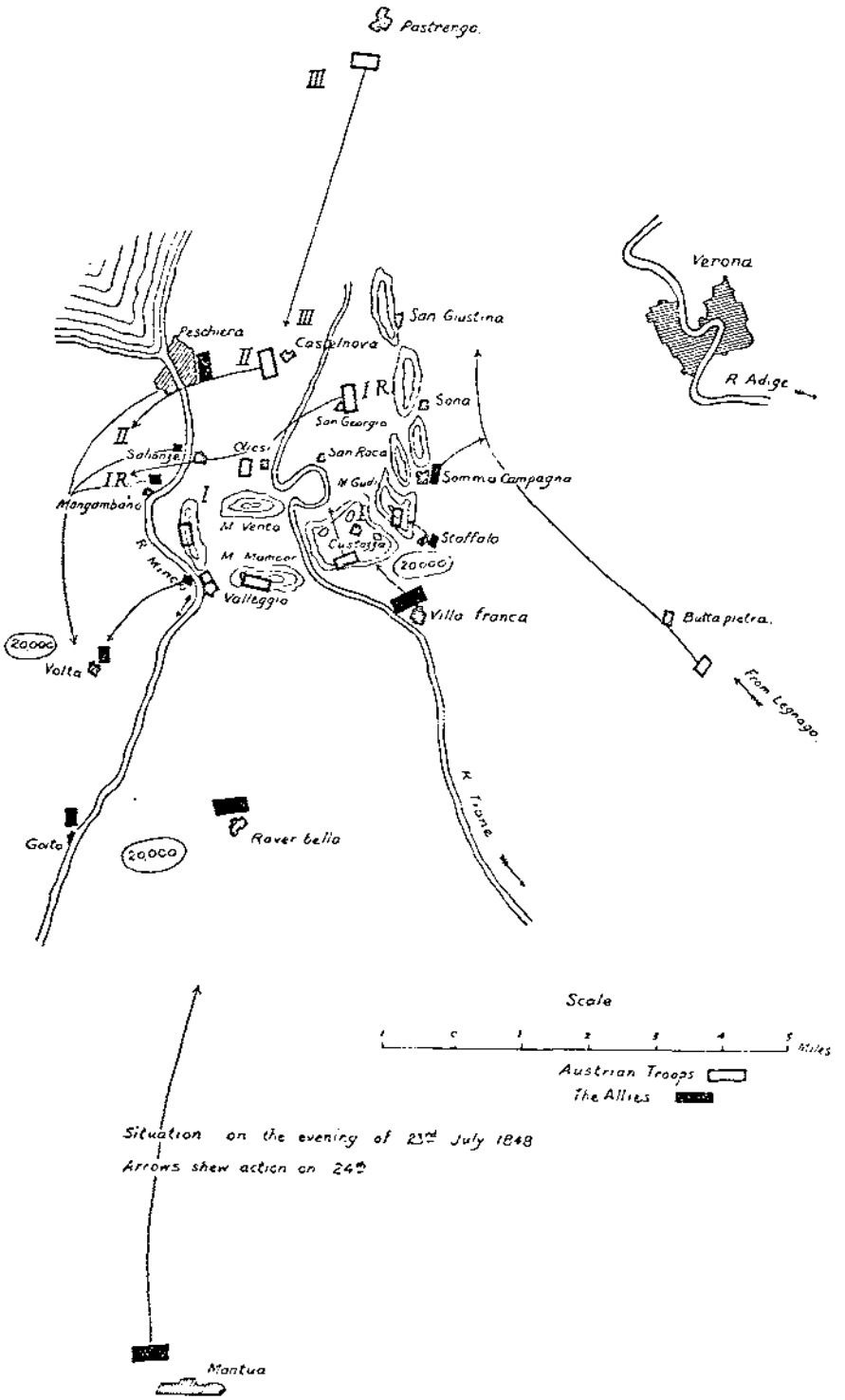
The Allies only heard of this march on its completion. Troops were hurried south, and on the evening of the 30th, 40,000 men were collected at Goito. The Austrian march came to a standstill, and the news that Peschiera had capitulated now arrived. Radetzky therefore withdrew across the Mincio N.E. of Mantua.

Before passing on, it is impossible to help noticing the resemblance between this operation and Napoleon's flank march to Arcola in 1796. Did the latter inspire Radetzky? Both marches were carried out in a similar manner and each had primarily the same effect, *i.e.* that the army was placed on the enemy's flank and rear. This will be referred to later.

To resume, heavy rain now fell for three days and operations were rendered impossible. On June 3rd, the Allies advanced in force to attack the Austrians, but the latter had already left.

Radetzky had planned another bold stroke. Leaving a rear guard with orders to retire on Verona, he marched *viâ* Legnago to Vicenza to deal with the Papal troops there. At the same time he drew a column from Verona in order to keep his force up to the necessary strength.


AUSTRIAN CAMPAIGN
IN ITALY, 1848.
Adriatic
Sea
Venice
Treviso
R. Piave
R. Brenta
R. Adige
R. Po
Rovigo
Vicenza
Legnago
San Bonifacio
R. Tione
Verona
Pastrengo
Villafranca
Mantua
Mincio
Rivoli
Riva
R. Chiese
Brescia
Cremona
Pizzighettone
Soncino
R. Adda
Lodi
Milan
R. Ticino
Scales
Kilometres
Miles


Pastrengo.
III
III
Peschiera
II
Castelnova
San Giustina
Verona
R Adige
I R
Sona
San Georgia
II
Sahonara
Oliosi
San Roca
I R
Mangambano
I
M Vento
N Gudi
Somma Campagna
Custozza
Staffalo
20,000
R Mincio
M Mamcor
Valleggio
Villa franca
Butta pietra.
20,000
Volta
From Legnago
R Frone
Goito
20,000
Raver bella
Scale
Miles
Austrian Troops
The Allies
Situation on the evening of 23rd July 1848
Arrows shew action on 24th
Mantua

The Allies were completely deceived and only learnt the true state of affairs on June 10th, the very day when General Durando was attacked at Vicenza. The latter learnt of Radetzky's approach on June 7th, but he underestimated his opponent's strength and thought that he could hold his own.

The Austrians reached Vicenza on June 9th, having marched 60 miles, and on the 10th, General Durando was forced to capitulate. He was compelled to withdraw his army south of the Po out of the theatre of operations.

Thus Radetzky put into practice the lessons taught by Napoleon in 1796 and 1797. He fell on the enemy's detachments and defeated them in detail.

The Allies meanwhile had taken Rivoli, and, on receipt of the news of Radetzky's march to Vicenza, they intended to advance on Verona. Three days were, however, wasted in a festival to celebrate the incorporation of Lombardy into the Kingdom of Sardinia, so that when they advanced on June 13th, they were met by the Austrian troops fresh from their victory in Venetia, and were once more compelled to retire to their former positions.

Thus while the Allies had done little but countermarch among the hills, Radetzky, by his two bold strokes, had weakened the enemy to the extent of 25,000 men, had freed Venetia, a province fertile in supplies, and had assured to himself both manœuvring room and a safe line of retreat to Austria, should events there render this necessary. To crown all, there remains the moral effect of his successful leadership on the troops of both sides.

(*c*). The Final Stage.

Austrian reinforcements reached Verona in the middle of July, and their total numbers are given in the appendix.

It will be seen that there were three corps, Nos. I., II., and one Reserve at Verona, with a brigade of cavalry and corps artillery. No. IV. Corps was at Legnago. No. III. in S. Tyrol. There was a large garrison in Mantua and garrisons in Venetia. The field force available consisted of 50 battalions, 40 squadrons, and 30 batteries, say 46,000 infantry, 4,000 cavalry, and 180 guns.

The Allies still stood on the line Villafranca-Pastrengo-Rivoli, and the Council of War decided to make another attempt to take Mantua. Strong forces were therefore pushed southwards, extending the allied line to some 30 miles in length, their total numbers being about 60,000 men.

Radetzky decided to pierce this line about Sona, to hold off the enemy's left and roll their centre and right back on to the Po and Mantua.

The advance was ordered for July 22nd, but unfortunately a violent storm delayed the main body at Verona. The III. Corps, which advanced from Roveredo to attack the enemy's left wing at Rivoli, became so heavily engaged that the allied commander was alarmed and withdrew his troops towards Peschiera.

The Austrian main attack took place on 23rd on Sona, San Giustina and Castelnovo, and found the Allies in the following positions :—

General de Sonnaz with 10,000 men retiring from Rivoli and Pastrengo on Peschiera ; the King of Sardinia with 20,000 men at Sona, Villafranca and Valeggio ; while 30,000 men, the bulk of the force, lay near Mantua.

The surprise was complete in spite of the withdrawal of the enemy's left wing, and on the evening of the 23rd, the Austrians held Castelnovo, Oliosi, and the heights of Monte Mamaor, Custozza and Staffalo. No. I. Reserve Corps was at San Georgio and No. III. Corps coming up from Rivoli. A brigade was also on the march from Legnago towards Sommacampagna.

On the 24th, General de Sonnaz, who was left without instructions and was afraid of his isolated position, withdrew across the Mincio southwards to Volta, leaving however a garrison in Peschiera. By this move he abandoned Valeggio and the passages of the Mincio which were at once seized by the Austrians. The situation was not clear to the Austrian commander, who thought that this withdrawal betokened a transfer of the main strength of the Allies to the W. bank of the Mincio. He therefore transferred the bulk of his troops also across the river.

The King, however, had collected 20,000 men at Villafranca and so, being unaware of de Sonnaz's retirement and still hoping for co-operation from him, he made a counter-attack on the heights of Custozza and Staffalo late on the evening of the 24th. The weak Austrian forces were driven from their positions, but night put an end to operations. This counter-attack also struck the brigade on the march from Legnago in flank, and it was driven past Sommacampagna with considerable loss. The evening therefore cleared up the situation. The bulk of the Austrians now lay on the west, while the bulk of the allied troops still lay on the east of the Mincio, and the position won by the King of Sardinia menaced the Austrian left wing and rear.

Radetzky issued his orders on the night of the 24/25th ; these were for No. I. Corps to hold the passages of the Mincio at Salionze and Valeggio, and also the line from Valeggio to the Tione *viâ* Monte Mamaor. No. II. Corps was to attack Monte Godi and Sommacampagna assisted by a brigade from Verona. No. I. Reserve Corps with the Legnago brigade were held in reserve at San Roco. No. III. Corps from Rivoli was to mask Peschiera.

The Allies were divided by the Mincio, the crossing at Goito being the only one of which they had possession ; 20,000 men lay at Volta, 20,000 were on the heights north and west of Villafranca while 20,000 still lay south of that place and at Goito.

The King's plan for the 25th was to make a concentric attack on the Austrians, to retake Valeggio and to unite his wings.

The allied orders however miscarried ; for, while the troops under General Bava between Villafranca and Goito reached Valeggio about 8 a.m., the King's troops were not ready to move from Custozza until 11 a.m., while General de Sonnaz at Volta only received the orders at noon.

In any case Radetsky had anticipated the enemy, for his dispositions were made in the night and the allied troops were attacked before their orders could be put into effect.

General Bava did indeed attack Valeggio and Monte Mamaor, but, being unsupported, was unsuccessful.

The Austrian attack on Sommacampagna was well carried out and quite in accordance with modern ideas. A turning force was despatched in the night to the north, the right flank of the Sardinian position, while the brigade from Verona arrived on the east of Sommacampagna at dawn. The Allies were driven from their position and retired in confusion about 6 p.m. through Villafranca to Goito.

Meanwhile the Commandant of Mantua, on his own initiative, had engaged the enemy S. of Goito and thus participated in the victory.

The Austrians pushed on in parallel columns on July 26th on Castiglione and Guidizzolo. An attack on Volta, which lasted all night until the 27th, broke down the last resistance of the Allies.

The King of Sardinia now proposed an armistice, and during the negotiations succeeded in withdrawing his troops across the Oglio at Marcaria. Marching by Cremona and Pizzhigettone, he reached Milan on the 2nd August. The Austrians marched in parallel columns, and, on the 4th August, drove the remains of the Allied Army back into Milan. Radetzky magnanimously decided not to storm the town, and as the result of a parley the King of Sardinia withdrew his troops over the Ticino.

Thus in five months the Austrians had recovered all their lost ground, and had beaten the Allies at every point.

This concludes the operations; it remains briefly to point the lessons of this short campaign.

In the first place, we see that Radetzky seized the initiative as soon as he possibly could, and by his bold offensive strokes freed his army from its precarious position.

Then, on the arrival of reinforcements, he wasted no time in falling

on the weak spot in the enemy's lines, and in ending the campaign in one decisive battle. Contrasted with the operations of 1796–97, the Allies made the same errors as the Austrians, and though Napoleon would doubtless have been more active and inflicted more severe punishment on his enemy had he been in the position of Radetzky, still the latter shows that he had profited by the lessons of Napoleon's campaigns. In fact, we see the effect of Napoleonic principles all through this campaign of 1848.

We may also note the skilful way in which Radetzky turned his possession of the quadrilateral fortresses to good account, using them as pivots for the operation of his field army. On every possible occasion their garrisons were employed in co-operation with his own movements to distract the enemy's attention, to deceive him, and to supplement his own strength.

On the other hand, the fortresses served as baits to the Allies who were diverted from their true objective, viz. :—the defeat of the Austrian field army.

Napoleon once said that the possession of the plateau between the Mincio and Adige meant the possession of Italy. The Allies were led away by this dictum to attach too much importance to their position without reference to other causes. We have seen a similar faith in positions rudely dispelled in Manchuria.

We have already noted the similarity between Radetzky's flank march to Mantua and that of Napoleon to Arcola. Both were brought to a standstill, and for the same reason, viz. :—that the enemy was not at the same time held in front.

Napoleon's genius and the loyal co-operation of his subordinate generals achieved the greater result, Radetzky on the other hand, having Mantua at his back, took a lesser risk.

Finally we come to the pursuit and, in passing, we note the use of the ruse by which the Sardinians escaped destruction. From the Mincio to Milan is 90 miles, and the enemy were given no respite. Radetzky moving on parallel lines to the enemy prevented any rally. This is comparable to Marlborough's pursuit after Ramillies by which he regained the whole of the Low Countries.

No doubt modern inventions have rendered such operations somewhat obsolete in a way. For instance, in the final battle, touch was completely lost for three days between the main army of the Allies and their left wing. This could hardly happen nowadays ; penetration will be far less frequent, as also flank marches because they entail far greater risks now than formerly. Still the lesson to be learnt is not a blind imitation of the operations so much as the prompt seizure of the opportunity offered.

It is curious to note how very badly served the Allies were as regards intelligence, considering that the inhabitants were friendly. The explanation may perhaps be found in the very difficult nature

of the country south of Villafranca, filled as it is with vineyards and intersected with water channels. We must also remember that the Austrians have always made a speciality of secrecy.

The fog of war is well exemplified on the evening of the 24th July, and is similar to that which existed on the eve of Sadowa.

Throughout the whole operations, we may contrast the advantages of a uniform training in the Austrian Army, with the lack of uniformity in ideas and lack of co-operation on the part of the Allies, who suffered from divided councils.

To sum up, Radetzky's successes were due in the first place to the thorough peace training of his troops, and, in the second, the more important, to his offensive spirit. Although not in superior force, he seized the initiative, and by being stronger than the enemy at the decisive point, ensured victory.

AUSTRIAN STATE, 15TH JULY, 1848.

Verona.

I. Army Corps.—F.M. Count Von Wratislaw.

Division.—Schwarzenburg.

Brigade Strassoldo... ... ... { 4 Battns. 2 Squadrons. 6 Guns. } Each.
,, Clam ... ... { 4 Battns. 2 Squadrons. 6 Guns. } Each.

Division.—Von Rath.

Brigade Von Supplikatz ... ... { 4 Battns. 2 Squadrons. 6 Guns. } Each.
,, Wohlgemath ... ... { 4 Battns. 2 Squadrons. 6 Guns. } Each.

Corps Artillery Reserve ... ... 12 Guns.

Total { 16 Battns.... ... ... / 8 Squadrons ... ... / 36 Guns ... ... } 15,000 Infantry and Sabres.

II. Army Corps.—F.M. Count D'Aspre.

Division.—Wimpffen.

Brigade Lichtenstein ... ... } Strengths as above.
,, Kerpan ... ... } Strengths as above.

Division.—Schaafgottsche.

Brigade Schwarzenburg ... ... } Strengths as above.
,, Gyulay ... ... } Strengths as above.

Corps Artillery Reserve ... ... 18 Guns.

Total strength { 16 Battns. ... / 8 Squadrons ... / 42 Guns ... ... } 15,000 Infantry and Sabres.

I. Reserve Corps.—F.M. Count Von Wocher.

3 Brigades Infantry 11 Battns. and 18 Guns.
1 Brigade Cavalry 20 Squadrons and 18 Guns.
Corps Artillery 40 Guns.

Total Strength { 11 Battns.... ... ... / 20 Squadrons ... ... / 76 Guns ... ... } 12,000 Infantry and Sabres.

Total at Verona ... 42,000 Infantry and Sabres, and 154 Guns.

Austrian State, 15th July, 1848 (continued).

Roveredo.

III. Army Corps.—F.M. Count Von Thurn.

7 Battns.		
3 Squadrons	}	6,000 Infantry and Sabres.
18 Guns		

Legnago.

IV. Army Corps.—Von Culoz.

3 Brigades	10 Battns.	}	10,000 Infantry and Sabres.
	6 Squadrons ...		
	35 Guns		

The above provided the field force after deductions for holding Verona and Legnago.

Venetia.

(Venice, Vicenza, Padua, Treviso, etc.).

II. Reserve Corps.—F.M. Count Von Wehlen.

17 Battns.		
6 Squadrons	}	16,000 Infantry and Sabres.
43 Guns		

Garrison Troops.

Legnago	1 Battn.		
Ferrara	1 ,,		
Mantua	10 Battns.	}	10,000 Infantry and Sabres.
	3 Squadrons		
	6 Guns		

A SPECIAL VITRIOL CHIMNEY AT THE CORDITE FACTORY, ARUVANKAD.

By MAJOR F. A. WILSON, R.E.

THE following is a short account of the history and design of a special vitriol chimney at the Cordite Factory in the Nilgiri Hills, Southern India. When the works were originally constructed, a chimney 90′ high and 5′ internal diameter was built of hard stock bricks, specially moulded to suit the radius of shaft, and set in mortar. The foundations were of blue stone coursed rubble stepped down to a 21′ square lime concrete platform resting on a good gravel foundation. This chimney served the nitric acid house and the vitriol chambers, the flue from the former being led into the shaft at the base, and from the latter by a lead pipe 18″ in diameter through a 20′ hole, 26′ above the base.

Near the end of 1904 the Sub-Divisional Officer reported that, owing to the effects of the condensed acid fumes from the vitriol chambers, the brickwork was being rapidly eaten away at the spot where the fume pipe entered the shaft. To enter the shaft was found impossible owing to falling fragments of acid-impregnated particles of brick, but probing with a knife showed that the acid had turned the masonry for a depth of 2″ or 3″ into a substance resembling wet salt. As the chimney showed signs of bulging, steel bands were ordered for strengthening it, but these did not arrive in time to save it.

It was impossible to stop using the chimney without hanging up the factory, and as matters got worse it was realized that a new chimney would have to be built and in the least possible time, which fact, necessitating the use of the existing foundations coupled with the condition that the internal diameter must be 5′, precluded any material alteration in design.

The reserve stock of sulphuric acid was practically completed when on the 23rd December, 1904, as the cracks had increased to an alarming extent, the chimney was dismantled from the top to below the fume opening, the scaffolding having been erected in anticipation.

As South Indian blue bricks had been found incapable of resisting acids, an objection applicable also to Portland cement plaster lining, the Superintendent, Cordite Factory, had suggested rebuilding in Staffordshire blue bricks, but apart from the prohibitive cost, to have obtained special moulded bricks from England was out of the question where time was so important. Messrs. Burn & Co.'s blue-glazed bricks were then tested and found satisfactory, moulds were sent them

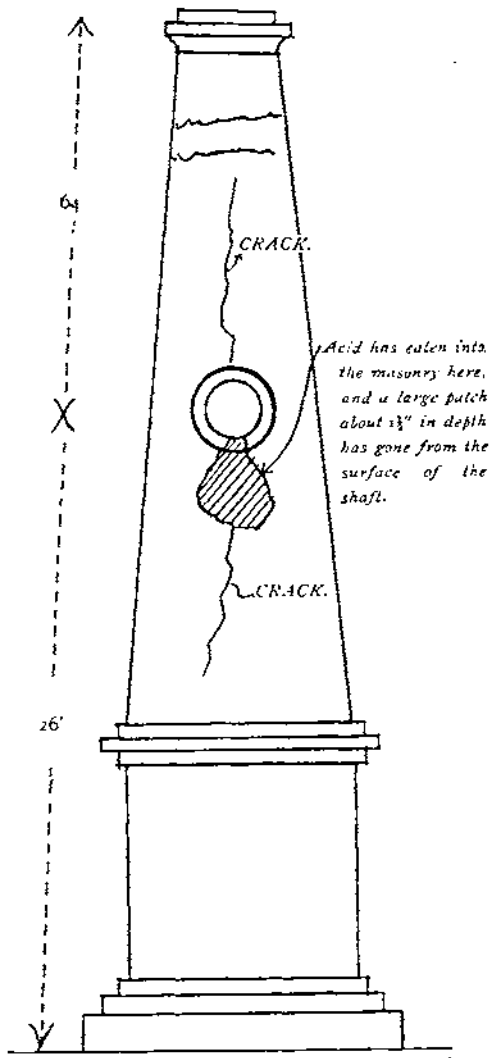


FIG. 1.

and, working night and day, they dispatched them by the truck load from Calcutta as ready. The rebuilding was started on the 22nd of February and completed on the 20th April, 1905, and the chimney immediately taken into use. The new chimney consisted of a 9" lining throughout of the above bricks, set in mortar consisting of 1 P.C. to 1 finely crushed blue brick, local sand being unsuitable, encircled and supported, with the exception of the top 10', with special mould stock bricks set in P.C. mortar; a small oven was also built and connected by a flue to the chimney, its object being firstly, to improve the draught, and secondly, to increase the temperature in the chimney, thereby preventing the condensation of the fumes on the internal surface; at

the same time the Ordnance Department altered the vitriol flue so that it entered at the base of the chimney.

In June, 1905, the Sub-Divisional Officer reported that four vertical cracks had appeared extending upwards from the *bottom* and that they were rapidly opening. The interior of the chimney was found to be heavily coated with acid paste, and the auxiliary furnace, whose use had been neglected, was started. On the 25th July further slight cracks appeared and examination showed that the use of the auxiliary furnace had cleared away the acid paste from the surface of the blue bricks. The blue bricks were apparently unharmed and the joints were quite tight but seemed to be finer than when made, which would appear to indicate that the blue bricks had swollen from acid absorption.

The steel bands previously ordered had been wired for and these (16 in number) were now fixed.

A year later in June, 1906, further cracks appeared and an examination on the 2nd of July after the small furnace had again been put into use showed 6" of acid deposit on the floor and $\frac{1}{2}$" of moist acid paste on the blue brick lining, and, on removal of this latter, the blue bricks were found to be to all appearance unaffected but the P.C. joints were corroded to a depth of $\frac{1}{4}$" to $\frac{1}{2}$"; there were however no signs of bulging.

It was decided to do nothing and this action was justified as the chimney remains to-day as it was then.

The cause of the cracks was evidently the swelling of the lining under the action of the acid, but whether the blue bricks or joints swelled, or both combined, is a moot question; personally I am in favour of the latter hypothesis, as even Stafford blue bricks have been known to act so. Had it not been necessary to take the chimney into use while the brickwork was quite green, the cracks would no doubt have been much less serious and perhaps little noticeable.

As on this chimney depended the working of the factory, it became evident that some standby must be provided in case of its failure, and various ideas were mooted such as a second chimney with an inner shell of glazed brick separated by an air space from the chimney shaft proper. The fact that acids were conveyed about the acid branch in glazed earthenware pipes eventually suggested the solution, which was to build an earthenware column to take the fumes from the vitriol chamber, and to use the existing chimney for the nitric acid house whence no acid fumes emanated.

The design, the details of which are shown in the plate, consists of a trestle column enclosing and supporting another of 20" diameter glazed stoneware piping. The bottom 40′ of the column is of mild steel, but the top 12′ of teak, as wood is a good acid resister, and this portion would be in the vicinity of the acid fumes emanating from the chimney. The mild steel column is provided

at every 10′ with a platform or cross-bracing, at the centre of which is a collar for supporting one of the pipes from under the flange, so that the pipes being 2′ in length every fifth is supported except in the top section. At the suggestion of the Manager an oven was erected, connected with a base of blue Feroke bricks, to increase the draught if necessary, and from this base a lead fume was carried by the Ordnance Department to the vitriol chambers on wooden trestles erected by the Military Works. This base gave considerable trouble as both the bricks and the joints absorbed acid and swelled to such an extent as to push the whole stoneware column up 3″. The oven was however found to be unnecessary, as the draught was ample, and it was demolished, the lead fume being carried up to and round the end of the first pipe and secured to the first platform by clips. The stoneware pipes were joined together by the Ordnance with a plastic cement used in acid work.

The steel work of the column may appear heavy, but the object was to obtain rigidity and so prevent the joints between the stoneware pipes being spoilt by the swaying of the column. This was also the object of the guys which, however, were never used, as a heavy wind occurring before they could be fixed proved the column stiff enough by itself. Had the column with guys been found insufficiently stiff, it was intended to stiffen each section of stoneware piping by lashing to its circumference vertical wooden battens. The draught is regulated by dampers fixed in the lead trunk, and a light wooden ladder is provided for workmen, to move from one platform to another.

The chimney excluding the lead work but including the unfixed guys and all else shown in the plate cost £272 and has, up to date, proved a great success.

GIBRALTAR UNDER MOOR, SPANIARD, AND BRITON.

By Col. E. R. Kenyon, R.E.

Under the Moors.

The most prominent building now standing in Gibraltar is also one of the most ancient, namely the great square tower of the Moorish Castle, commonly called the Tower of Homage, which carries back our thoughts to the earliest historical occupation of the Rock by man. It has been stated that "The Goths built two Churches in the neighbourhood of Calpe, and a chapel or Oratory on the mountain itself: these churches were, one at Julia Traducta* and another at a little village now called St. Roque. The Chapel on the mountain was about the centre of the middle hill."† The geological exploration of the caves on the Rock proves the presence of man upon it in very remote ages; and the astronomer Euctemon (430 B.C.) refers to its being ascended by man; but no other records remain (either historical or archæological) to prove any permanent occupation of it prior to that by the Moors, who took possession in 711 A.D. under Tarik, the able lieutenant of Mousa, the Saracen conqueror of Northern Africa, when the traitor Count Julian (the Spanish governor of Ceuta at that time) invited them to invade Spain and assisted them in overthrowing his sovereign King Roderick, the "Last of the Goths," and thus avenged the wrong done to his daughter. Montero surmises (p. 86) that there must previously have been fishermen's huts on the Rock and that Tarik housed his first detachments in them, but this seems to be pure conjecture.

Various derivations have been given of the name Gibraltar, but there can be no doubt that it is a corruption of Gebel Tarik,—the Hill of Tarik,—thus commemorating the Moorish conquest. Ibn Batutah‡ quotes Ibn Djozay as saying "The mountain took the name of this warrior and was called the mountain of Thârik and also the Mountain of the Conquest." Since 711 A.D. Gibraltar has been subjected to numerous sieges, blockades, or attacks, of which the following is a brief summary compiled from Montero's *Historia de Gibraltar*, from which it will be seen that it was unmolested for 588 years after its seizure by Tarik.

* Now Tarifa.
† Dodd.
‡ Vol. IV., p. 355.

It is usual to speak of it as having undergone 14 sieges, but it will be seen that the 7th, 8th and 11th were really attempts to carry it by a *coup de main* of which two succeeded and one failed. The 2nd "Siege" was only a brief investment; and the 5th and 10th were blockades. The successful raid by Barbarossa's pirates in 1540 was another *coup de main* but is not reckoned among the 14 "Sieges" since it was all over in four hours.

No. of Siege or Attack.	Date. A.D.	Nature of Attack.	Result.
1	1309	Alonso Perez De Guzman occupies the mountain unopposed, besieges the Castle and Moorish Town, attacking from the side of the mountain, and blockades the place by land and sea.	Captured in September after 1 month's siege. The town then consisted of the two wards of Villa Vieja and La Turba which are shown on the map of 1627 in Bell's translation of Ayala's history.
2	1316	Invested by Moors.	Relieved by the Infante Don Pedro.
3	1333	Besieged by Moors who occupy the mountain and arsenal unopposed, and, later, capture the town and press their attack on the Castle.	Capitulates on June 17 after 4½ months' siege. The arsenal was approximately on site of Casemate Barracks.
4	1333	Besieged by King Alfonso XI., who advances by the crest of Sierra Carbonera and also lands troops on the Red Sands who are repulsed. A second party land there and effect a lodgment on the heights above the Castle, batter down the turrets and parapets of the Tower of Homage and attempt to undermine its walls.	Siege raised in September after 2½ months, on peace for 4 years being made between the King of Castile and those of Granada and Morocco.
5	1349	Siege commenced in August by Alfonso XI. but converted into blockade. Camp formed along the line now occupied by the Cemetery and the Gardens. Spanish squadrons cruise in the Straits.	Alfonso dies in camp of plague March, 1350, and the blockade is raised 8 months from commencement of siege.
6	1410	Revolt against King of Granada by inhabitants who invite the King of Morocco who occupies the town and besieges the Governor in the Castle.	The King of Morocco is surrounded in the town by a relieving force from Granada and captured.
7	1436	Attacked by Count of Niebla who lands at low water on the Red Sands, where the Saluting	Attack repulsed. The Count is drowned; and Don Juan with-

No. of Siege or Attack.	Date. A.D.	Nature of Attack.	Result.
		Battery was formerly, but the Moors had fortified this locality since 1333 so that the Spaniards cannot advance and are caught by the tide. The Count's son Don Juan simultaneously attacks the landport from the north, but withdraws to succour his father.	draws August 31st. The Count's body is kept by the Moors in the Tower of Homage (also called the Calahorra, or Granary).
8	1462	Alonso de Arcos, Alcaide of Tarifa, with 80 horse and 200 foot, guided by a renegade Moor (Ali el Curro) secretly occupies posts on the mountain in August, calls on Xerez and the neighbouring nobles to reinforce him, and attacks by land and sea.	Town is captured; Castle surrenders on second day. The place is occupied in the name of the first Duke of Medina Sidonia, (the Don Juan of the 7th Attack) on August 20th. The Duke inters his father's body in a chapel which he made in the "Calahorra."

This was the final capture of the place from the Moors. King Henry IV. of Castile claimed possession; and the Duke handed it over under protest. In December, 1462, the King granted to it all the territory of Algeciras, which town had been destroyed by Mahomed V. in his war against Henry II. of Castile.

9	1466	Besieged by the forces of the Duke of Medina Sidonia to whom the town is abandoned. The Castle holds out for 10 months. Its walls are then carried by assault, but the Royal governor holds out in the Tower of Homage for 5 more months.	Royalists surrender to the Duke's son, Don Henry, in June, 1467.

In 1478 Queen Isabella confirmed the possession of Gibraltar to the Duke of Medina Sidonia and gave him the title of Marquis of Gibraltar but in 1501 she compelled his heir, Don Henry, the second Duke, to transfer it to the Crown. The keys were handed to Garcilaso de la Vega as Royal Governor in January, 1502.

10	1507	The third Duke of Medina Sidonia (not second, as stated by Ayala) forms a land blockade.	Blockade raised after some months.
Not usually numbered among the "Sieges."	1540	Turkish pirates, sent by Barbarossa's deputy land in the bays of Almadrabilla (north-east of Europa Point) and Laudero (now called Little Bay), plunder the town and Franciscan Convent (the present Government House) and the Hermitage of Europa.	Turks re-embark at the Almadrabilla Bay after four hours on shore with plunder and 70 captives who are afterwards ransomed. The Turks lost 70 men, the Spaniards 20.

No. of Siege or Attack.	Date. A.D.	Nature of Attack.	Result.
		The Turkish squadron was subsequently met and destroyed by the Spaniards who liberated 800 Christians from the galleys and captured 400 Turks.	
11	1704	British fleet under Sir G. Rooke and Prince Henry of Hesse-Darmstadt anchors in the bay on August 1st,* and lands a force on the isthmus (not at Punta Mala as stated by Ayala). On August 4th a bombardment is followed by landings on the New and Old Moles and north of the former.	Capitulates on Aug. 6th; and the British take possession.
12	1704	Siege commenced by Spaniards and French September 5th.* An attempt to surprise the place by ascending a shepherd's path from Sandy Bay to the Silleta is made by 500 men under Colonel Figueroa but fails.	Siege raised after about 8 months.
13	1727	Siege commenced by Spaniards in February. A mine is commenced to blow up Queen Anne's battery but is not completed. Trenches are carried to the Inundation.	Hostilities suspended after 5 months on account of negotiations for peace, but blockade not entirely raised until June, 1728.
14	1779	Siege commenced by Spaniards and French in June. Trenches destroyed by sortie on night of November 26th, 1781. Great bombardment on 13th September, 1782, and disastrous repulse of the combined squadrons. A mine was commenced in the neighbourhood of that part of the Rock in which is St. George's Hall.	Hostilities suspended February 3rd, 1783, while peace is being negotiated which is signed at Versailles on 3rd September.

The principal existing buildings which preserve the memory of the Moorish occupation (A.D. 711—1462) are the Castle and the remnants of walls forming parts of the old fortifications; the remains of a bath in Bomb-House Lane; the Chapel of "Our Lady of Europa" opposite the main guardhouse at Europa; and a bath or tank, known as "The Nuns' Well" under the Brewery Barracks at Europa.

* These are the dates as given by Montero, but it must be remembered that Spain adopted the Gregorian calendar, or "new style," when it was promulgated by Pope Gregory XIII. in 1582, whereas England did not adopt it until 1751. Consequently up to 1700 there is a difference of 10 days between Spanish and English dates, and of 11 days from 1700 to 1751. Montero (p. 265) draws attention to the discrepancy but has not perceived its cause.

The Moorish Fortifications.

The Castle is stated by James to have been begun in 711 A.D. (*i.e.*, the year of the seizure of the Rock by Tarik) "but," he adds, "when finished is hard to say." Montero (p. 87) states that "the Castle has an Arabic inscription from which it appears that it was built or extended in the reign of Jezid ben Walid, 17th Caliph of Damascus, which thus fixes 744 A.D. as the date of the foundation of Gibraltar." Carter deduces the date of 740 or 741 A.D. from the same inscription, which was over the South Gate of the Castle (the large Moorish building now used for Army Ordnance Stores), but which no longer exists.

Dodd says that Tarik constructed lines "from east to west, from almost the top of the mountain to the small plain and had built a tower as an advanced post, a look-out, and a citadel."

Abdul-Mumen, who was the first Emir of the Almohades line (1130—1163 A.D.) and who crossed into Spain in 1146 to complete the overthrow of the Almoravids, already conquered in Morocco by himself and his predecessor Mohammed ben Abdullah,* is stated by Montero (p. 103) to have sent Abul Amren to destroy the Almoravids. This leader occupied Algeciras and Gibraltar and ordered the Architect Alhas Yahix of Malaga to extend the fortifications of Gibraltar. This order was put into force by his son Cid Abu Sa'id, Wali of Algeciras (1160), to which Gibraltar was at that time subject. Al Makkarí states (Vol. II., p. 314) that Abdul Mumen (1160 A.D.) "landed at Jebal-Tarik (Gibraltar) which from that day was Jebalu-l-fatah (the mountain of the entrance or victory), and ordered that a strong fortress should be erected on the top of it. He traced out the building with his own hands, and . . . appointed his son Abu Sa'id, then Governor of Granada, to superintend the building and report its progress to him."

We do not know exactly what these buildings of Abu Sa'id's were, but we do know that in the sieges of 1333 there was no wall along the coast to prevent men who had landed on the Red Sands (where the Alameda now is) from pushing inland; and that later records show that subsequent to 1333 such a wall which afterwards came to be called "The Line Wall," was built from the Arsenal—(on the site of the existing Casemate Barracks)—to the south end of the Rock. It is therefore probable that Abu Sa'id's works were confined to additions to the castle itself, and perhaps walls round that part of the city which was growing up in what was afterwards known as the ward of *Villa Vieja*, which is elsewhere described as the Lower and Middle Castles, and which undoubtedly became a walled suburb with its own gates.

The next stage in the development of the Castle seems to have been after the capture of the place by the Spaniards in 1309. The King

* *Encycl. Brit.*, Vol. I., p. 593, and Vol. XXII., p. 316.

(Ferdinand IV. of Castile, called "El Emplezado") came to take possession of it and "ordered the walls destroyed during the siege to be rebuilt and the Atarazana (arsenal) to be constructed for the defence of the galleys and vessels of the port with a very strong tower which might protect it against the attacks of the hostile squadrons."*

In 1350 we obtain a contemporary account of the Castle and other fortifications from Ibn Batoutah who was a native of Tangier and apparently one of the greatest travellers of the world. Between 1325 and 1349 he travelled in Egypt, Arabia, North Africa, Asia (from Asia Minor to China). He then visited Granada and, in 1351, the Soudan. Some copies of the history of his travels were discovered in Algeria after its conquest by the French; and the Arabic text with a French translation was published in 1853. In Vol. IV. (pp. 354—363) he describes his visit to Gibraltar, which was the first town in Spain he saw on his way to Granada. "I there saw the admirable works executed by our late master, Abou'l Hassan." He then gives a long quotation from Ibn Djazay, in the course of which the latter after saying that one can still see the remains of the wall built by Tarik and his companions which are called "the wall of the Arabs" adds that Gibraltar was again conquered by our master, Abou'l Hassan (A.D. 1333) who "built the immense tower in the top of the Castle; at first there was only one turret, which was ruined by the stones thrown by the engines (balistas), and our master caused the great tower which I have just mentioned to be built in its place. He also caused an arsenal or workshops, to be built at Gibraltar, which were lacking before his time. Lastly he raised the great wall which embraces the red hill, and which commences at the arsenal and goes as far as the tile-field (tuilerie). Later our master, Abou Inan, renewed the fortifications of Gibraltar. He constructed a wall as far as the end of the mountain: and that part which he added is the most remarkable and that of which the utility is the greatest."

"The immense tower" was, no doubt, the one which still exists and which is generally described as the "Tower of Homage." Montero, in his narrative of the sieges of 1309, 1333, and 1466, mentions the Tower of Homage or the Calahorra (*i.e.* Granary) as one of the chief parts of the castle, but, when describing the place as it existed in his time (1860), he says, (after speaking of the great tower at the north-east corner of the castle) "There remain in the castle no traces of the ancient and celebrated 'Tower of Homage.'" His whole description of the castle is however clearly an abridgment of that given by James who wrote nearly a century earlier (1771); and as James and also Carter speak of the existing one as the Tower of Homage, it would seem that Montero's statement must be a slip of the pen, and that he intended to say that no traces remained of the

* Montero, p. 118.

Giralda tower which Portillo speaks of as "a redoubt of very great strength and capable of containing sufficient numbers to defend the place, as was seen in the year 1333 when besieged by King Alfonso."* This tower is believed to have stood on the site of the present North Bastion.† Ayala quotes Portillo's description at length, which includes both the "tower called Calahorra" and the "redoubt called Giralda," and makes it quite clear that the former is that which still survives and is ordinarily spoken of as the "Tower of Homage," while the latter, standing at the north-west corner of the arsenal, was no doubt the "very strong tower" built under the orders of King Ferdinand IV.‡

After recapturing Gibraltar in 1333 Abou'l Hassan at once repaired its buildings and increased its fortifications "spending immense sums in building houses and magazines, as well as a principal mosque and erecting new walls, towers, and even a citadel. Before however these improvements were fully completed the Christians invested Gibraltar by sea and land"; but without success. "After this Abou'l Hassan again applied himself further to strengthen Gibraltar, by causing a thick wall to be built at the foot of the Rock, surrounding it on all sides, as the halo surrounds the crescent moon."§

The Arsenal was on the site of the Casemate Barracks; and the "wall which embraces the red hill" was probably the old Line Wall from thence to the "Red Sands" or Alameda. Nowhere else have I found any mention of the tile field, but it would seem probable that this must have been about the neighbourhood of Scud Hill where the great clay "fault" shows itself. If this is so we have apparently the following sequence of events in the construction of the Arab or Moorish works:—Tarik and his comrades built a wall which was known in 1350 as "the Arab wall" and which was probably that which runs parallel to Charles Vth's wall and still bears the name of "Moorish Wall." They or their immediate successors also built a castle, as is proved by the inscription above referred to assigning a date of about 740 to 744 A.D. to its completion. This castle was probably that which James calls "The Upper Castle" and which lies between the Tower of Homage and "Castle Row": *i.e.*, that which is at the present time known as "The Moorish Castle," omitting, however, the Tower of Homage itself. Then about 1160 Abu Sa'id built a strong turret or tower on the site where now stands the Tower of Homage. Next, in 1309 the Spaniards constructed an arsenal (on the site now occupied by the Casemate Barracks) and the Giralda tower on the North Bastion site which, being built in Moorish style

* Quoted by Ayala, p. 50.

† Dewing and the Ordnance Survey.

‡ General Skinner says "The North Bastion was originally a square Moorish tower which was enlarged in 1756." (No. 17).

§ Al Makkári, Vol. II., p. 355.

and before the final conquest by Spain was afterwards spoken of as a Moorish tower. In 1333 and subsequent years Abou'l Hassan enlarged, or strengthened, the arsenal, and built the Tower of Homage, Abu Sa'id's tower on that site having been ruined in the siege by the Moors in 1333. He also constructed the Line Wall from the Giralda to approximately the site of the New Mole, which was not itself constructed until the reign of Philip IV. (1621—1665). Before 1350 this wall was carried on by Abou Iman to the extreme south where its remains still exist above Europa Advance and at Deadman's Hole. The intermediate works between the Arsenal and the Upper Castle (called by James the "Middle Castle") may probably have been also constructed in 1309—1350, although it is possible that they were built by Abu Sa'id or his successors as an independent extension of the Upper Castle.*

James† says: "There is an old strong wall which comes down from the Middle Castle, reaching as far as the entrance into the Old Mole, part of which was taken down some time after the last siege,‡ but the lower part within the rampart is still standing which was part of the lower fort: this wall was given to the Navy to build against." This wall is now part of the Officers' Quarters, and it was here that the Navy had their cooperage, the memory of which is preserved by "Cooperage Lane." The Officers' Quarters are on the site of Navy storehouses; the stables, tank, etc., are where the cooper's house stood—which had vanished before the plan dated 1745 was made—the other cooperage buildings and the shot yards were on other parts of the Casemates site.

James also states (p. 403) that the Moorish galleys used to be launched through a large arch "now closed" north of Waterport. No sign of this arch now remains, the wall in this part having been completely reconstructed.

A note on a plan in Ayala's history describes the Castle as "with four towers, each with six cannons on the north and three on the west." The castle thus referred to is that which James calls the Upper Castle. The Clock, or "Stanley's Tower," at the south-west corner of the castle, is a modern structure on a Moorish foundation. The name of Stanley was given to it in 1845 when the clock was inaugurated, Lord Stanley (afterwards fourteenth Earl of Derby, the "Rupert of Debate,") being then Colonial Secretary in Sir Robert Peel's ministry.

* It is somewhat unfortunate that James coined the names of Upper, Middle, and Lower Castles, for it seems clear that the Castle proper was always that which he calls the "Upper," and that the two others formed the Arsenal, or Atarazana, which gradually grew into the walled quarter of Villa Vieja.

† P. 305, Vol. II.

‡ *i.e.*, The siege of 1727.

The Moorish Tower at Deadman's Hole.

Close to the lighthouse, a few yards west of the Trinity House quarters, stands an ancient turret of Moorish construction surmounting a spiral stair which gives access to the cliffs below. On the site now occupied by the lighthouse keeper's quarters there was formerly a little circular room with a dome-shaped brick roof with stone walls 4′ thick and about 7′ high to the springing of the roof. This room seems to have been completely covered over and buried out of sight when the light-house battery (now obsolete) was built; but in August, 1894,* when the quarters were being built it was brought to light and a leaden coffin was found under its floor, which gave rise to a report that the foundations of the ancient chapel of "Our Lady of Europa" had been found at this spot.† The chapel was in reality not there but opposite the guardhouse, where it is shown on the 1745 plan; the room was another Moorish structure; and the presence of the coffin is explained by the following extract from James (Vol. II., p. 326):—

"The tower at Europa Point has a room arched at the foundation in the Rom style, and winding stairs on outside at the top, easily to be traced; but before the building of Europa Line Wall the most part of the steps were entire. . . . The coved room is made use of for a guard of soldiers and vulgarly called the Deadman's Hole, on account that a gentleman was, at his particular desire, buried there under the floor of the above room. At a few yards' distance from the above tower, is a stone centinel box on the summit of a wave-worn rock, 34 yards and 2′ high from the surface of the sea, and falsely termed the southernmost point in Europe."

In process of time the name "Deadman's Hole" came to be misapplied to the little bay at the north-east side of the lighthouse into which the main sewer discharges, but it has been restored in the Ordnance Survey to its proper locality. The existing tower seems to have been the "coved room" described by James; while the room discovered in 1894 was the "stone centinel box," the gentleman having been buried under the latter instead of under the guard room as believed by James. Both structures were part of the Moorish defences, not Roman, as might be implied by James.

Moorish Bath.

In Bomb-House Lane there is a good specimen of a Moorish bath which was cleared of rubbish and opened up to view, so far as

* *Gibraltar Chronicle*, August 18th, 1894.

† These particulars were obtained in February, 1909, from a workman named Salvador Garcia who was one of those who discovered the building and the coffin.

practicable, in 1908. Unfortunately it cannot be completely detached from the adjoining official quarters without considerable expense, one of its chambers being utilized for an officer's stables, and other parts being in such positions that they cannot be thoroughly explored without serious alterations to the quarters themselves. However the general plan of the building may now be seen, together with the floors of Moorish tapia* and portions of the heating flues and drains; and the polished syenite columns and the carved capitals which carry the roof of the principal reception room have been cleaned of the whitewash which defaced them. Even before these restorations,—or, rather, cleansings, for nothing whatever has been renewed or added—were carried out, that great authority on Moorish subjects, Mr. Budgett Meakin, wrote to the *Gibraltar Chronicle* under date March 16th, 1906:—"Except in the Alhambra there is nothing in Spain to compare with it; and in Morocco such baths may not be entered by Nazarenes or Jews, so that its interest is exceptional." The central room (which was probably the shampooing room with raised divans behind the rows of columns) has a 16-sided vaulted roof carried by horseshoe arches on polished syenite columns. In the roof of this and of other rooms are numerous star-shaped light-holes similar to those in the Alhambra and in the little bath in the Tower of Homage in the Castle, while in the steam chamber there are plain round holes. Probably the original entrance to the suite was in the western room (now used as a stable) and not in the central room as was surmised by Mr. Meakin, who only saw the place before it was opened up and the doors of communication discovered and reopened. The tiles or marble slabs with which the floors, baths, and divans were no doubt originally covered have entirely disappeared. The heating chamber has not been discovered, but the slope of the flues seem to indicate that it was probably under the present stables.†

The Church of "Our Lady of Europa."

Opposite to the Artillery Guard Room on Europa Flats there stands a strange-looking little building which is one of the oldest on the Rock and one which in its history epitomizes the principal vicissitudes of Gibraltar. It is a fragment of an old Moorish building which Colonel James, in his *History of the Herculean Straits* (p. 326) states "was in all probability either a Mosque or a Saint House." Montero (p. 278) says "The building was Moorish and had a good tower which doubtless had served the Moors as a fort." The tower no longer exists; and there does not seem to be any description of

* A kind of concrete used by the Moors.

† Three letters from Mr. Budgett Meakin on the subject of this bath appeared in the *Gibraltar Chronicle* of March, 1906, and one from the author of this book in June, 1908.

the building in Moorish times. Ayala speaks of the tower as perhaps having been the minaret, but as having been restored in modern style. The Spaniards converted the building to Christian uses. Both Ayala and Montero in describing the Turkish piratical raid of 1540 speak of it as a "hermitage," and state that it was sacked by the Turks. At the capture of the place in 1704 by the British it was the Chapel of the Virgin of Europa and is spoken of by Montero as "the most ancient and venerated of all the sanctuaries. . . . Its chapel was adorned with sumptuous and rich gifts of the admirals of squadrons and enjoyed great privileges." Ayala (p. 32) gives a long quotation from Portillo who speaks of it as having been the scene of many miracles of some of which he had himself been a witness, and as having received many gifts from the residents and silver lamps with an endowment of oil from the "generals of the galleys." Portillo enumerates several of them, commencing with a lamp given in 1568 by Juan Andrea Doria, the son of the famous Genoese admiral and himself the commander of one wing of the Christian fleet at the Battle of Lepanto. Ayala adds that the church was enlarged to almost twice its original size. There can be no doubt that the existing structure is but a small fragment of what existed formerly. After the capture of Gibraltar by the English this chapel was converted into a guard room, and it may be that the tower mentioned by Ayala and Montero was then removed, but it seems more probable that it and other parts of the building were removed or destroyed in September, 1779, when all towers in the town were pulled down to avoid affording marks to the enemy's artillery. James speaks of it (Vol. II., p. 310) as a Captain's Guard in his time (1771). Drinkwater, who states that two powder magazines in front of the South Barracks "were the chief, I might say almost the only, buildings remaining on the Rock after the late siege," (p. 35) says "opposite the guard-house may be traced the remains of a building erected by the Moors, but used by the Spaniards as a chapel and called Nuestra Señora de Europa." It seems therefore a legitimate inference that when he wrote (1785) the Guard had been moved across the road to its present position and that besides the existing Moorish building there were ruins which afforded traces of the more extensive structure which have since entirely disappeared.

In the Chapel of the Little Sisters of the Poor is a statue of the Virgin which is said to be the one which was originally in the Chapel of the Virgin of Europa.

Subsequently the building became a store room, but in 1908 it was cleared of its contents, and a partition wall of comparatively modern construction was removed, so that it now consists of only one room instead of two as when described by Colonel Dewing, R.E. It remains simply as an interesting structure, no longer desecrated as a guard room or oil store although not restored to any sacred use.

The "Nuns' Well."

This is an underground tank, probably of Moorish origin, underneath the old Brewery Barracks. It is said to have been used by the nuns of the shrine of "Our Lady of Europa," and thus obtained its name of the "Nuns' Well." It is fully described by James.* Its roof is carried by rows of square brick arches; and the tank is now divided into two portions, one under that wing of the barracks which has been converted into a temporary church, and the other under the open yard of the barracks. The partition wall is shown by plans to have been in existence in 1815, while James' description shows that it did not exist when he wrote. Probably it was built as a foundation for the barrack wall above it, and therefore either in 1802–3 when the brewery was built or in 1804–5 when it was taken into use as a barrack. The entrance which was by steps is spoken of by James as having fallen in but the sketch plan of the "spot" granted to Mr. Douglas for the brewery seems to indicate it as having been in the middle of the north wall.

* Vol. II., p. 326, and Ayala, p. 34.

(*To be continued*).

MAJOR-GENERAL SIR WILLIAM REID, R.E., G.C.M.G., K.C.B., F.R.S.

(*Continued*).

By Col. Robt. H. Vetch, c.b., late R.E.

The correspondence bearing on the placing of Major Reid, R.E., and Capt. Colquhoun, R.A., on temporary half-pay to enable them to proceed to Spain to take up commands in the British Legion in 1835, which has been already referred to, has not been previously published and will, I venture to think, be read with interest.*

From Sir H. Vivian† to Lord Palmerston.‡

The King's disapproval of the arrangement to enable Major Reid and Capt. Colquhoun to serve with the Spanish Auxiliary Force.

"Ordnance Office, 23*rd September*, 1835.

"My Dear Lord Palmerston,

"I regret to say that either the newspapers or some kind friend have so worked upon His Majesty, that in an interview I have just had with Him he stated His strong disapproval of Major Reid having been permitted to retire on temporary half-pay in order to enable him to serve with the Auxiliary Force, and commanded me to inform him that if he continued in that service, He never would consent to his being restored to full pay and resume his place in the Royal Engineers.

"At the same time the King authorized me to say that if he chose at once to return to his Corps, he was at liberty to do so.

"I have always been apprehensive of this.

"Nothing that I could say had any influence or effect on the King's determination.

"I put it to Him as strongly as I could that the same indulgence was granted by the Horse Guards, but the most I could obtain was permission that Reid might, if he chose, be immediately replaced in the rank he held. The King was in perfect good humour but very resolute. He ordered me to make a communication to the effect I have stated to Major Reid, and this I must do unless you will see the King on the subject, and can find means to persuade His Majesty to allow the present arrangement to stand, which I much fear you will find no easy job.

"During the discussion of the matter I foresaw this, and in my letter to Colonel Fox told him how it would be unless the King's consent were

* This correspondence is in the Public Record Office. See p. 93 August *Journal*.

† Lieut.-General Sir Richard Hussey Vivian (1775—1842), Bart., P.C., G.C.H., K.C.B., Colonel of the 12th Royal Lancers and Master-General of the Ordnance; afterwards first Baron Vivian of Glynn and Truro, G.C.B., and Colonel of the 1st Royal Dragoons. See *Dictionary of National Biography*.

‡ Henry John Temple, 3rd Viscount Palmerston (1784—1865), Secretary of State for Foreign Affairs; afterwards Prime Minister and Knight of the Garter.

first obtained. In reply he told me that you had undertaken to speak to His Majesty, and it was under the impression that you had done so that I gave in to the proposed arrangement; indeed, if I mistake not, Colonel Fox in one of his letters distinctly said you had mentioned it to the King; but, be this as it may, we are in a difficulty; as far as Reid is concerned he has the alternative of returning to his Corps; but as far as I am concerned, and indeed as far as the Government is concerned, it is very awkward, unless you can get over it.

"You can speak out to the King more than I could, because of the letters you have in which His Majesty expressly authorized Lord Hill being called upon to select officers to serve in Spain. You can therefore fairly say that you concluded the same authority applied to other branches of the Service, and consequently could not doubt His Majesty's approval of my doing the same. You will however know better how to manage than I can, but manage it you must somehow or other if possible, for if you cannot it will be a very awkward and unpleasant affair for all parties..

"Ever yours,

"H. VIVIAN."

"P.S.—I shall not write to Reid (or Colquhoun, who is in the same box) until I hear from you."

From Lord Palmerston to Sir H. Vivian.

"BROADLANDS, 24*th September*, 1835.

"DEAR VIVIAN,

"I will write to the King about Major Reid, and let you know the result.

"It would have a very bad effect, if he were now to be recalled by special order from the King.

"Fox was not quite correct in saying that I had undertaken to speak to the King about the arrangement for Reid and Colquhoun, as I understood him to say it was a matter of purely internal arrangement in the Corps, which rested entirely with the Master-General. I no doubt told him that I would take on myself any responsibility for having pressed it, which certainly I shall.

"Yours sincerely,

"PALMERSTON."

"There are three chances for Spain, Carlos, Isabella, and a Republic. The King certainly cannot wish for the first or the last, and yet he is unwilling to help the second."

From Lord Palmerston to Sir H. Vivian.

"BROADLANDS, 28*th September*, 1835.

"DEAR VIVIAN,

"I have a thousand apologies to make to you for not having sooner returned you the enclosed, but I have been working as hard here as if I had been in London. I write to the King on the same subject by to-day's post and shall be in town to-morrow.

"Yours sincerely,

"PALMERSTON."

"Fox misunderstood me as to my speaking to the King, because I did not understand from him that the arrangement required any special reference to the King."

From Sir H. Vivian to Lord Palmerston.

"29*th September*, 1835.

"My Dear Lord Palmerston,

"I had hoped to have heard from you on the subject of my proposed letter to Sir H. Taylor.* I conclude the delay arises from your having written yourself, as you said you should, to the King; but pray let me hear from you as soon as possible, as I am all this time postponing to act on His Majesty's commands and communicate His orders to Major Reid and Capt. Colquhoun.

"It will be a terrible stroke on the Auxiliary Force if those officers are recalled; it is, indeed, impossible to say what may be the effect; but I should apprehend the worst possible.

"I do hope, therefore, that you will manage to persuade the King to admit of their continuing to serve.

"Yours,

"H. Vivian."

From Sir H. Vivian to Lord Palmerston.

30*th September*, 1835.

"My Dear Lord Palmerston,

"I have desired Mr. Elliott to call on you and ascertain whether it will be necessary to send my letter to Sir H. Taylor; if His Majesty has attended to your representation and consented to Reid and Colquhoun serving with the Spaniards, that settles it, and perhaps if He has not it will be of no avail my saying anything more.

"In that case, however, both these officers would have to be recalled at once, if they are to be reinstated in the Corps; and this would on every account (I mean their recall) be a most disastrous measure.

"Pray see Mr. Elliott who will deliver this, and settle with him what I am to do.

"Ever yours.

"H. Vivian."

"P.S.—Fox has most unintentionally in some degree got us into this difficulty, in his anxiety to overcome that which existed, as to how we were to manage that these two officers were to serve without being lost to our Service.

"I pointed out to him that the proposed measure must be submitted to the King, in the same manner that I wrote to you respecting our giving any men, and Fox, in reply, either told me that you had undertaken to do it, or had done it. I am not certain which; but I think he merely said you had undertaken to speak to the King about it."

* Lieut.-General Sir Herbert Taylor (1775—1839), G.C.B., K.C.H., Private Secretary successively to George III., Queen Charlotte, and William IV., and First and Principal Aide-de-Camp to Queen Victoria. He was at different times Military Secretary at the Horse Guards, Surveyor-General of the Ordnance, and Adjutant-General of the Forces. See *Dictionary of National Biography*.

From Lord Palmerston to Sir H. Vivian.

"FOREIGN OFFICE, *2nd October*, 1835.

"MY DEAR VIVIAN,

"I wrote to the King and got an unfavourable answer; but I am returning to the charge, and have written Him another letter which I shall send Him this evening. I propose to Him to split the difference and to suspend the communication to Reid and Colquhoun for the present. If He does that the thing will drop; but I found from a few words I had yesterday with Lord Hill, that he (Lord Hill) has got a notion into his head that if the Legion were well found and equipped, it would be too successful and rival the British Army, that Evans would go afterwards to Madrid and be loaded with honours that would make him dangerous.

"I could not have believed if I had not heard it with my own ears that a grown man could have talked so childishly. But this is the sort of stuff which is crammed into the King's ear every day.

"Then Evans's foolish order about promotion from the ranks has been taken hold of, as if quantities of officers in the British Army had not risen from the ranks, among them I have always understood Elley, Whitelock, and David Dundas.

"Yours sincerely,

"PALMERSTON."

"P.S.—I have settled with Elliott that there is no use in his sending Taylor your letter as the matter now stands."

From Sir H. Vivian to Lord Palmerston.

"TEDWORTH, *3rd October*, 1835.

"MY DEAR LORD PALMERSTON,

"I sincerely hope you will have been able to arrange with His Majesty in the manner you have proposed.

"I can well understand the language you mention having been held by the party named, and the stuff which is poured into the King's ear on the subject. But after all what are we to understand from all this? That it is more desirable that a corps of 10,000 British should fail and be disgraced, than that any individual should add to his character that which might occasion his attaining higher estimation in the opinion of the world.

"Evans's order was I admit a most imprudent one, and pointing directly to the British Army, a most offensive and unjust one.

"You are quite right in saying that from our ranks many excellent officers have sprung. I am not clear that Whitelock and Dundas did. I rather think not, for Dundas was originally intended for a surgeon. Elley did and hundreds I may say of others during the late war. At one time when I commanded the 7th Hussars I had given six adjutants from its ranks to different regiments of cavalry. Still, if we were to go to war to-morrow and serve with a French army, we should be obliged to extend the provision still further of promoting non-commissioned officers to commissions, or discontent would arise, and Evans's order is well calculated to create such feelings.

"Therefore seeing the support he has received he is very wrong in issuing it. I am quite satisfied that my letter to Taylor was not sent; it

might have led to further questions; but Fox certainly must have made a mistake about a communication to the King.

"It was true that the reference was with respect to a question not in your department; but as I was out of town, and as the request came from you and I may say, so coming from the Government, as the step to be taken was a new one, I told Fox (as I told you afterwards in regard to the permission of men to enlist) that the King must be made acquainted with it, before Reid and Colquhoun were placed on half-pay in the manner proposed; and his answer was to the effect I have stated, either that you had mentioned, or would mention, it to His Majesty. However, it is no matter. We must now get out of it as we can, and I hope you will be able to tell me, in answer to this, that these officers are to continue to serve.

"Ever yours,
"H. VIVIAN."

From Sir H. Vivian to Lord Palmerston.

"*4th October*, 1835.

"MY DEAR PALMERSTON,

"Mr. Elliott will call with this in order to learn whether you have obtained the King's authority for Reid and Colquhoun to serve in Spain. If not, he must at once send off the letters of recall. I can no longer delay carrying into effect the King's commands.

"Ever yours,
"H. VIVIAN."

Then follows a paper in the King's handwriting.

"The King directs the Master-General of the Ordnance to furnish His Majesty with whatever correspondence may have passed relative to Major Reid of the Royal Engineers and Capt. Colquhoun of the Royal Artillery, relative to *these* officers being placed on half-pay.

"WILLIAM R.

"CASTLE WINDSOR, *4th October*, 1835."

From Lord Palmerston to Sir H. Vivian.

"STANHOPE STREET, *5th October*, 1835.

"MY DEAR VIVIAN,

"I have failed in persuading the King to alter his decision about Reid and Colquhoun, and I send you the correspondence which has passed between Him and me on the subject. Return it to me when you have read it.

"I went down to Windsor on Friday to meet Leopold, and went with Leopold on Saturday as far as Dartford to talk over various matters and did not get back to town till late in the evening; so that I could not sooner send you the result of my endeavours.

"Yours sincerely,
"PALMERSTON."

From Sir Hussey Vivian to the King.

"*5th October*, 1835.

"The Master-General of the Ordnance presents his humble duty to Your Majesty and in conformity to the command contained in Your Majesty's memorandum of the 4th has the honour to submit the only

correspondence which has passed relative to Major Reid of the Royal Engineers and Capt. Colquhoun of the Royal Regiment of Artillery being placed on half-pay. Your Majesty will observe that this correspondence consists solely of Major Reid's first application to be allowed to enter the service of the Queen of Spain, and of the letters directing these two officers to be placed on half-pay.

"The Master-General must explain to Your Majesty in reference to the application of Major Reid, that, before leaving London on a tour of inspection, he had pointed out in verbal communications with that officer the many difficulties in the way of his attaining his wishes, so strongly that he had given up thoughts of entering the Auxiliary Force. Whilst absent from town the Master-General received through Lieut.-Colonel Fox an application from Lord Palmerston, pressing him in the strongest terms to permit Major Reid and Capt. Colquhoun to retire on temporary half-pay. Thus called on by one of Your Majesty's principal Secretaries of State, and having ascertained that by the General-in-Chief no difficulty was made in allowing officers of the Line to retire on half-pay to enable them to enter the Spanish service, the Master-General looking to the great military claim of these officers, to the claims of the corps to which they belonged, and unwilling to withhold from them an indulgence accorded to their brother soldiers, assented to the proposed measure, which was in fact the only one by which their services could eventually be retained for Your Majesty.

"At the same time, however, he expressly stated in a communication to Lieut.-Colonel Fox that Your Majesty's pleasure should be taken on it; and in reply he understood that Lord Palmerston had spoken, or would speak to Your Majesty on the subject.

"It was under such circumstances and with such feelings that the Master-General permitted Major Reid and Capt. Colquhoun to retire on temporary half-pay. The communications in the Master-General's absence were carried on verbally between Lord Palmerston, Major Reid, and Lieut.-Colonel Fox.

"That there was some mistake there can be no doubt, as it appears that no communication has been made to Your Majesty; in saying this the Master-General has no desire to place on others the responsibility properly attaching to himself. In a peculiar case of this sort it was his duty to have fully ascertained that Your Majesty's pleasure had been taken; and if whilst endeavouring to do that which he believed to be in conformity to Your Majesty's views, which he knew to be those of Your Majesty's Government, he has had the misfortune to incur Your Majesty's displeasure, it will ever be to him a subject of the deepest regret, and his only consolation will be in the hope that Your Majesty will do him the justice to believe he erred most unintentionally.

"The Master-General has directed a letter to be written to Major Reid and Capt. Colquhoun of which a copy is transmitted to Your Majesty.

"The Master-General fears the effect of this communication will be to lose to Your Majesty's Service these most valuable officers, and he presumes to express a hope that as under an impression that it met Your Majesty's approbation, they were permitted to retire for one year on temporary half-pay to accept service in the Auxiliary Legion, Your

Majesty will in Your kindness be graciously pleased to reconsider their case and admit of their continuing to serve during that period, rather than call on them to do that which, through a point of honour on their part, they may deem it inconsistent with their character to do, and the consequence of which may be to blight their prospects in Your Majesty's Army.

"The Master-General begs to explain to Your Majesty that he has delayed until now transmitting Your Majesty's commands to Major Reid and Capt. Colquhoun, having understood from Lord Palmerston that his lordship hoped to induce Your Majesty to rescind them."

A letter was accordingly written on the same date to the two officers concerned informing them that the King having expressed Himself in terms decidedly adverse to the arrangement for placing them on temporary half-pay, reserving their places in their respective Corps, it could not be carried out. They were told that if permitted hereafter to return to the Service it would only be allowed on condition of placing them at the bottom of the list of their rank, but if they were returned at once they would be replaced in the regiment or corps respectively in the situation they occupied on being placed on temporary half-pay.

On the 9th October Sir H. Taylor wrote from Windsor Castle to Sir H. Vivian by order of the King accepting his excuses for the misapprehension that had occurred and continues:—

"But His Majesty retains His objections to what has been done contrary to His orders and intentions, though with His *supposed* sanction, and therefore approves of the communication made on the 5th instant to the two officers in question, nor will he recede from it.

"His Majesty is aware that no objection was made to officers on half-pay entering service in the Legion for the Queen of Spain, and that some few of the Line had exchanged to half-pay for that purpose, but it was clearly understood that the latter would thereby place themselves in the situation of all other officers on half-pay, and would retain no claim to be restored to the commissions which they thought fit to quit for another service, and His Majesty does not think proper to authorize with respect to the Corps of Royal Engineers and Royal Artillery an arrangement which would give to the officers of those corps an exclusive advantage which His Majesty denies to others and disapproves in principle.

"It must indeed be observed that if the officers of the Army *in general* were permitted to take service in Spain or elsewhere for a year, more or less, and then to resume their regimental stations, the privilege might be taken advantage of to a very inconvenient and embarrassing extent and introduce a novel system in the Service.

"Ever yours sincerely,
"H. TAYLOR."

From Sir H. Vivian to Sir H. Taylor.

STONEHAM PARK, SOUTHAMPTON, *11th October*, 1835.

"MY DEAR TAYLOR,

"The receipt of your letter of the 9th has afforded me the greatest pleasure and I beg of you to present my humble duty to His Majesty and express my best thanks for His kind consideration.

"I cannot at all understand how it happened that no communication was made to His Majesty at the moment of Major Reid's being placed on half-pay, beyond submitting the papers for the promotion in succession as in ordinary cases, as I find by a private memorandum of Major Reid's that he expressly desired His Majesty's sanction might be obtained.

"That I considered it necessary is proved by the fact that when I had no longer Lieut.-Colonel Fox to correspond with, I, in my communications to Lord Palmerston (in reply to his lordship's application for the discharge of some men) expressly stated that I could not meet with his wish without the express commands of the King, and this was precisely a similar case and consequently I was certain to have acted in the one, in the same manner as I did in the other; however His Majesty is kind enough to attribute the omission to misapprehension, and I refer to it principally to show that Major Reid, by whom the consequences will be most severely felt, must stand entirely acquitted of any want of consideration as to what might be his Sovereign's wishes on the subject.

"There is still a question arising out of this business that I shall be glad to take His Majesty's pleasure on, it is this—Major Reid and Capt. Colquhoun are now *actually on half-pay* and can only be restored to full pay on a vacancy occurring; such vacancies may occur to-day, or may not occur for 12 months. Does His Majesty insist on their returning to this country at once? or will He be pleased to admit of their remaining absent until such a time as an opportunity offers of re-appointing them?

"I cannot do the officers who have been promoted in succession the injustice to put them back into their former ranks, so that the two officers in question, unless allowed to remain where they now are, will lose the advantage of their own service, and that which they promised themselves by their temporary retirement from it. In drawing the comparison between the officers of the Line and those of the Artillery and Engineers, it must always be recollected that in the one case the officers of the Line move from one regiment to another by purchase or otherwise, and that a captain of infantry quitting his corps to serve in Spain might to-morrow be brought back to full pay in some other regiment, and the following day be appointed to a majority. Whilst the officer of artillery if he sacrificed his place in his corps loses the benefit of his long services. The advantage, therefore, is at present all on the side of the Line, and it was to meet this, and at the same time to preserve to His Majesty two such highly meritorious officers as Major Reid and Capt. Colquhoun that I adopted the measure proposed of placing them on temporary half-pay. . . .

"Believe me, etc.,
"HUSSEY VIVIAN."

On the 12th October Sir H. Vivian sent Lord Palmerston a copy of the letter he had received from Sir H. Taylor. He says: "You will see by the accompanying letter that His Majesty is relentless. In an answer to Sir H. Taylor I have pointed out the hardship this is on Major Reid, who I find in a note to Lieut.-Colonel Fox actually himself requested the King's sanction might be obtained." Sir H.

Vivian then gives the purport of his letter to Sir H. Taylor and concludes :—

"I cannot help thinking (entre nous) that unless some kind friend had stirred up the King on the subject we should have heard no more of it, for He not only signed the commissions without a remark, but on the following day (I believe) He signed the permission for Reid and Colquhoun to serve in Spain, also without a remark; however, if my last appeal fails there is nothing more I fear to be done."

From Lord Palmerston to Sir Hussey Vivian.

"Foreign Office, 14*th October*, 1835.

"My Dear Vivian,

"I return you with thanks Taylor's letter. I wish the King may be persuaded by your last appeal to reconsider his decision, but I doubt it. People are apt sometimes to cling to a foolish decision with more pertinacity than to a wise one. It is quite evident that some enemy has been working upon the King's mind, and that the King now wishes that Evans's Legion should meet with defeat and failure. For I can't believe that if He really wished that corps to succeed He would adhere to so small a point of objection as that upon which He places the recall of Reid and Colquhoun.

"The officer of the Line who goes on half-pay to serve in the Legion, goes on temporary half-pay just as much as Reid and Colquhoun do, because that officer of the Line may, if he pleases, exchange back to full pay at the end of a year, or sooner if he likes.

"The distinction therefore which the King sets up is in truth not real or substantial. But even admitting that there were such a distinction, and that a greater degree of indulgence had been shown in these cases to the Artillery and Engineer officers than to those of the Line, what then? Why should that be a reason for recalling them?

"The Ordnance Service, we admit, differs from the Line as to the facility of going on half-pay, we had therefore only to choose between doing a little less, or a little more for the Legion as to Ordnance officers, than was done for that corps as to officers from the Line; and surely there was every motive of national policy for doing a little more rather than a little less.

"Then again, supposing that an irregularity has happened by placing these two officers on half-pay without taking the King's pleasure; who is the King going to punish for that irregularity? those who committed it? No. But the officers themselves who were no parties to it; and the British Legion who knew nothing about it; and the Spanish Government and the Spanish Queen, who could hardly be made to understand what the irregularity consisted in, if we were to try to explain it to them.

"Yours sincerely,

"Palmerston."

From Sir Hussey Vivian to Sir H. Taylor.

Ryde, Isle of Wight, 15*th October*, 1835.

"My Dear Taylor,

"The accompanying letter from Capt. Colquhoun, R.A., has this morning reached me. I am delighted to find that submitting himself to

His Majesty's pleasure, he has determined on returning to his corps. The question which he raises as to his being permitted to serve with the Spanish Auxiliary Force until an opportunity offers of replacing him on full pay, is that I myself raised in my last letter to you. I shall therefore make no further observation on it, but I owe it both to Major Reid and Capt. Colquhoun to state my full conviction that in taking service with the Auxiliary Force, their great object was to improve themselves in their professional knowledge to render themselves more worthy of the service of their own Sovereign; and moreover I must do these officers the justice to say from all I can learn that they cannot in any way be deemed parties to the circumstance of their being desirous so to serve not having in the first instance been mentioned to the King.

"Major Reid, who acted for both, having expressly requested that His Majesty's sanction should be obtained before he was placed on temporary half-pay.

"Ever, my dear Taylor,

"Very faithfully yours,

"HUSSEY VIVIAN."

From Sir Hussey Vivian to Lord Palmerston.

"BRIGHTON, 16*th October*, 1835.

"MY DEAR LORD PALMERSTON,

"I have not heard from Taylor in reply to the letter I mentioned having written, and yesterday, forwarding a letter from Capt. Colquhoun, I again came to the charge and used in both my letters (although I fear not so forcibly and well) the very arguments you have used in yours I this morning received. I have some hopes His Majesty may yet relent, although with you I doubt it.

"The truth is that the plea of not having been consulted is one to serve the purpose; placing officers on temporary half-pay was a new measure and one in which no doubt it would have been proper to consult the King, but unless influenced by other circumstances His Majesty would never have resisted it in the manner He has done, or is doing, to the prejudice of a Corps of which He is very fond, and whose claims He readily admits; or of officers who in truth are at least entirely exempt from any suspicion even of being wanting in respect.

"Perhaps Lord Melbourne may be able to do something with our Sovereign if he would but try. I will call on you on Monday or Tuesday.

"Ever, etc.,

"H. VIVIAN."

From Sir H. Taylor to Sir H. Vivian.

"WINDSOR CASTLE, 17*th October*, 1835.

"MY DEAR VIVIAN,

"I duly submitted to the King your letter of the 11th and the enclosures which I return, and it has proved quite satisfactory to His Majesty. He orders me to say that He entirely acquits Major Reid and Capt. Colquhoun of having anticipated His objection to the step which they took. The latter has been with me to say that in consequence of the intimation which has been made to him, he has abandoned the intention of joining Colonel Evans's Corps, and His Majesty trusts there will be no difficulty

in restoring him to his station in the Artillery. Should Major Reid at once return, he would in the King's view be entitled to the same privilege, but not otherwise.

"The King admits that the officers of Engineers and Artillery who go on half-pay for any object of service or employment which may not be compatible with the duties of His commission, do so at much greater disadvantage than the officers of the Line, but this results from the general character and composition of the Corps and its regulations, and the difference, although it may impose greater restriction on the officers of Engineers or Artillery, does not affect the general principles for which His Majesty contends as indispensible, namely, that no officer who quits His commission for the sake of employment in another service can be allowed to do so temporarily and to resume his effective station in His Majesty's Service when the fancy for the foreign service has subsided.

"Believe me to be ever,

"My dear Vivian,

"Yours very sincerely,

"H. TAYLOR."

"P.S.—Since I closed the letter, I have received yours of the 15th, enclosing one from Capt. Colquhoun which I return.

"I have submitted both to the King."

From Sir H. Taylor to Sir H. Vivian.

"WINDSOR CASTLE, *29th October*, 1835.

"MY DEAR VIVIAN,

"I return the letter from Major Reid of the Royal Engineers which I have submitted to the King, who has expressed himself much satisfied with the very proper manner in which that officer has received the intimation of His Majesty's pleasure, and quite disposed to appreciate the feeling which prompts him to sacrifice his station in the Corps of Royal Engineers rather than quit a corps which he has actually joined in the field.

"Under this circumstance and certain as the King also is that Major Reid would not have proceeded to Spain, and engaged in the service of the Queen of Spain unless he had felt assured that the understanding that he should be placed on temporary half-pay had been sanctioned by Him, His Majesty is pleased to view the case of Major Reid as a *special* case and to consent to his being placed upon temporary half-pay for one year, at the expiration of which he must rejoin his Corps, or be placed on permanent half-pay. But His Majesty disapproves so much of the possible introduction of the practice of allowing officers of going temporarily on half-pay with the privilege of resuming their station in regiments or corps that He positively forbids the proceeding in the instance of Major Reid being admitted as a precedent, as also the holding out to any other officer on full pay of the Royal Engineers and Royal Artillery the expectation that His Majesty would be induced to sanction his retirement on temporary half-pay for the purpose of engaging in *any* foreign service.

"Capt. Colquhoun having, in consequence of the communication you were desired to make to him, abandoned the intention of proceeding to

Spain, may resume his station in the Corps of Royal Artillery as soon as the vacancy shall offer, and, in the meantime, may agreeably to your proposal, which His Majesty has sanctioned, be employed on the particular service which the communication through Lord Palmerston has suggested.

"Believe me, etc.,
"H. TAYLOR."

Memorandum of Sir H. Vivian of 1st November.

"To the (above) letter Sir H. Vivian returned an answer (written at Windsor the same evening, copy of which was not kept) to the effect that his authority as Master-General was so implicated unless His Majesty consented to the arrangement in regard to Capt. Colquhoun being carried into effect, that he did not see how he could continue to hold office, and begging Sir Herbert, therefore, to press on His Majesty's notice the situation in which he was placed, in addition to any other arguments he might think it desirable to use."

From Sir H. Taylor to Sir H. Vivian.

"MY DEAR VIVIAN,

"I hope I shall succeed, but you have given me a very hard job and Fox and Lord P. must not play their tricks again.

"Ever yours,
"*2nd November*, 1835. "H. TAYLOR."

From Sir H. Taylor to Sir H. Vivian.

"MY DEAR VIVIAN,

"I did enquire for you but was told you were with the King and I desired Lord —— to tell you the unfortunate result of my application this morning, and that I was cut quite short *very decidedly*, but I will try again to-morrow morning though I despair.

"I also told Lord F. you would find me here any time in the evening if you could get away. I will write to Lord M. about the memorial, etc.

"Ever yours,
"Midnight." "H. TAYLOR.

From Sir H. Taylor to Sir H. Vivian.

"BRIGHTON, *3rd November*, 1835.

"Appd.

"WILLIAM R.

"MY DEAR VIVIAN,

"I have submitted your letter to the King, and I have received His Majesty's commands to acquaint you that notwithstanding His continued feeling of objection, and His disapprobation of the early proceedings in the cases of Major Reid and Capt. Colquhoun, His Majesty consents to extend to the latter officer the same indulgence which has been granted to the former, namely to be placed on *temporary* half-pay for one year, during which he may serve the Queen of Spain, at the expiration of which, if he should continue in that service he must be placed on *permanent* half-pay.

"But His Majesty desires it may be clearly understood that His Majesty is pleased to waive His objections in these two instances only, and that

He has done so at your earnest request and out of consideration for you, in consequence of your department having been committed during your absence to the introduction of a principle and the adoption of a measure which had not obtained His Majesty's sanction, and of which He is determined on no account, and in no other case to admit the establishment and the recurrence.

"His Majesty desires this may be clearly stated in an order to the Corps of Royal Engineers and Artillery, in order not only to prevent misapprehension and to discourage future expectations, but that, while he considers the feelings of others and upholds the authority of their superiors, who had, as before observed, committed themselves under the erroneous impression that they did so with His sanction, He may not Himself incur the imputation of weakness and inconsistency, or risk the possible interpretation of an act of grace into a concession.

"To the principle, as before said, the King maintains His objection, nor has anything you have said shaken it. That there is considerable difference in the situation of officers of the Ordnance Corps and those of the Line, His Majesty admits, but this does not remove the objection of facilitating to the officers of the British Service the practice of engaging in any other service to an extent which might become extremely inconvenient, and His Majesty believes that however you may attempt to maintain the principle, you would be puzzled to suggest how it should be regulated, or where the line should be drawn, as half the officers of corps would have just as much reason to expect compliance and to consider refusal a grievance as two.

"You have indeed alleged the greater inconvenience of allowing the continued absence of officers on full pay from their corps when employed on the Staff, or in official situations, and His Majesty admits the inconvenience to corps, but He orders me to observe with respect to Sir Stephen Chapman and Sir William Gosset, and any others so employed that they are serving their own Sovereign and not a foreign Crown and that He considers this contrast to be yet more strongly marked in the present instance, the corps in which officers so detached obtain high rank and pay being a corps of mercenaries commanded by an individual who has not established claims to the King's confidence in his loyalty, and who has since he has assumed the command not scrupled to issue and publish a General Order calculated to excite discontent and disaffection in the lower ranks of the King's Army.

"The King did not object to Sir William Gosset holding a civil situation in Ireland and retaining his full pay and station in the Corps of Royal Engineers, inasmuch as the situation in question was of a character which might render his continuance in it of short duration, but Sir William Gosset having lately obtained a civil office of a *permanent* character, His Majesty considers his continuance on the strength of the Corps of Royal Engineers to be incompatible with it.

"Believe me, etc.,

"H. Taylor."

"P.S.—I forgot to say that His Majesty entirely approves of Lieut. Du Plat of the Royal Engineers being sent to Constantinople in charge of the articles for the Sultan."

From Major W. Reid, R.E., to Sir H. Vivian.

"BRIEVESCA, *30th November*, 1835.

"Keep this.

"H.V.

"DEAR SIR,

"I have received to-night Colonel Fox's letter announcing to me officially that His Majesty has been pleased to allow me to remain here, and to resume my place on the expiration of my leave of absence, expressed by command in terms very gratifying to me.

"It was my intention, before I received this letter, to write and thank you for the very handsome expressions you used on my decision to remain, for which I am sincerely obliged to you; and it was also my intention to write to say how well we were going on, considering the difficulty of forming troops with so few officers and hardly any non-commissioned officers.

"We should have been further advanced now had the drill been carried on slower, and based on the squad and company drill from the beginning.

"To make up for the want of subalterns and non-commissioned officers, I am forming schools of mutual instruction on the Chatham principle, and by degrees we are getting our books and accounts into order. For instance, on inspecting the 3rd Regiment yesterday, commanded by Churchill, I found them very nearly perfect and not a single complaint. Disorders of all kinds are promptly repressed, and although I have been anxious to see flogging done away with, if possible, in the English Army, I am firmly of opinion that we could not have brought the levies, brought out here, into their present state without it; and particularly without the provost-marshal system.

"General Evans is very popular with the Spaniards of all ranks. We march to-morrow morning for Vittoria. When there we shall enable the garrison to join the active army; and our position in the centre of operations, even whilst drilling, will no doubt have a considerable influence.

"The cavalry look well, but have much still to do in the way of equipment and exercise.

"For the Artillery Service we are very anxious about the decision regarding Colquhoun.

"I hope I shall not even require all my year's leave to see Spain settled.

"You will I hope allow me the honour and pleasure of occasionally letting you know what we are doing.

"Believe me, dear Sir,

"Yours with respect,

"WILLIAM REID,

"*Major, R.E.*"

MEMOIR.

MAJOR-GENERAL EDWARD RENOUARD JAMES, ROYAL ENGINEERS.

By Col. Robt. H. Vetch, c.b., late R.E.

I first met the late Major-General Edward Renouard James in May, 1872, at Malta. He was then a 1st Captain, but, on the 5th July following, all the 1st captains were made regimental majors; this rank became, for the first time, a Corps rank, 1st captains having previously been promoted to be lieutenant-colonels in the Corps without the intermediate grade. He arrived only a few days after me and remained in Malta until after I left the island in December, 1876. He was in charge of the Valetta Division the whole time. My work lay mostly away from Valetta, but I had a table in his room where I transacted defence work, military telegraphs and other business, and did company accounts and I, therefore, saw a great deal of James, who was a most indefatigable officer in looking after his district, and a pleasant companion with whom to share a room.

James was great at details, and he has recorded his own life for the benefit of his daughter and other relatives with great minuteness in several folio typewritten volumes, profusely illustrated, mainly by his own pen. These volumes have been lent to me by the kindness of Miss James for the purpose of this memoir.

He was one of those men who delight in patient, laborious work, in careful investigations, in elucidating problems, who are never so happy as when they are following a clue which they hope will lead them to the desired result. He had a great capacity for taking pains but his labours were not bestowed upon matters which were likely to bring him into public notice. He was partial to genealogy, and as he had himself a very interesting ancestry, he set himself the task of finding out all about them. His book on the subject of his forbears was privately printed. It shows much diligent historical research. His own interleaved copy is now before me, and many pages are filled with notes in his neat handwriting to further elucidate the text. Side by side with the family history which he wrote, was

the collection that he made of old portraits of his forefathers. Many of his friends will remember some of these interesting old portraits of the Ott family, with which he adorned his dining-room in the flat at Earl's Court, where he lived for many years before his death.

In this memoir I cannot do more than refer very briefly to his ancestors, who are to be found under the surnames of James, Gardner, Fyers, Renouard, Ott, and St. Pierre. Their pedigrees are given in the privately printed book already referred to, and go back respectively to the following dates :—A.D. 1524; 1650; 1620; 1550; 1350; and 1320.

In the direct line General James traced his descent from Benjamin James, a merchant of Austin Friars, London, who was born in 1656 and died in 1740. He believed, and seems to have had good ground for doing so, that this ancestor was the great-grandson of Roger James, van Haëstrecht, of the ducal family of van Haëstrecht of Utrecht, in the Duchy of Cleves, who established himself at Bow as a dyer and brewer, having probably fled to England on account of religious persecutions in the Netherlands. This Roger James was born in 1524 and died in 1591. He was buried at Allhallows, near Barking, in Essex, where his epitaph exists on a brass over his grave. His great-grandson, Benjamin James, the merchant of Austin Friars, married Elizabeth Henshaw, and their great-grandson, John James (born in 1771, died in 1850), married, in 1803, Annabella Renouard, a Huguenot, descended from Etienne Renouard of Sancerre, a small town on the Loire, between Orleans and Bourges in France.

The Renouard family were closely connected with another Huguenot family, the de St. Pierres, and also with the Otts of Zurich in Switzerland; the mother of Annabella Renouard, who married John James, was Mary Ott, daughter of John Henry Ott and of Elizabeth de St. Pierre.

John James and Annabella Renouard had a family of five children. The eldest of this family, also called John James, was born at Guildford, Surrey, in 1807. He married in 1829 Susan Amie Gardner, born in 1810, daughter of General the Hon. William Henry Gardner, Colonel Commandant, Royal Artillery, and of his wife, Elizabeth Lydia Fyers. He was the father of the subject of this memoir, who, it may be noted, was, on his mother's side, a member of the Fyers family, being the great-grandson of Lieut.-General William Fyers.

John James went to Sandhurst and obtained a commission in the 85th Regiment (King's Own Light Infantry), from which he retired in 1837, as a Captain, after 12 years' service. This was in the early days of railway construction in England, and Capt. James left the Army to obtain employment under Isambard Brunel as a railway engineer. His marriage with Miss Gardner had already taken place while he was with his regiment at Malta in 1829. Major-General James refers to his father in his family notes. He says:

"My father was employed in the construction of the Great Western Railway and its branches, of the Box Tunnel, the Bristol and Bridgewater, Taunton and Exeter, and Oxford and Rugby Extensions. My own boyhood was consequently passed in a variety of homes; and in watching my father's work I gained technical knowledge, which doubtless stood me in good stead in after life. After my birth at Manchester in 1833, and before my father left the Army, we were at Jersey. We lived afterwards at Hutton, Weston-super-Mare, and Wellington in Somersetshire, Exmouth in Devonshire and at Banbury in Oxfordshire. My father was one of the most ardent sportsmen I ever knew, and revelled in the enjoyment of country pursuits; so that my early recollections are of shooting, fishing, hunting, and tandem driving in his genial company. . . . He died in 1850 from the effects of a hunting accident at the early age of 42 years. I was at the time a Woolwich cadet. He was buried in the family vault at Lee, Kent, and I well remember that his loss was the first bitter grief of my life. My dear mother survived him more than 40 years and was buried at Bournemouth in 1891."

Major-General James was born at Shalford, Manchester, on the 23rd July, 1833. He was prepared for Woolwich in 1847 and 1848 at Mr. Quarterman's school at Woolwich (afterwards Mr. Hopkirk's and removed to Eltham). He entered the Royal Military Academy on the 10th April, 1848, fifth on the list. He mentions that during the Chartist riots of that year the Woolwich cadets were under arms, and ball cartridge was served out. The head of his room was Cowell, afterwards Sir John Cowell, Controller of Queen Victoria's household, who continued to be James's good friend until Cowell's death in 1895. "At no period," says James, "had bullying at public schools reached such a pitch as at Woolwich in 1848 and 1849. This is recorded in the literature of the time and I could tell some remarkable stories of the cruelties I endured myself."

James got his commission in the Royal Engineers on the 17th December, 1851, and was under instruction at Chatham for two years. He took to boating as a recreation and he mentions the old cutter *Whim* and the oft-told experience of running her on the mud on an ebb tide, and spending the night there until the rising tide freed her again. At Woolwich James had a chum in Charlie Gordon, who joined at Chatham six months after him. They were thrown together later in the Crimea and in boundary work, both in Europe and Asia; afterwards they corresponded from time to time and remained firm friends until Gordon's tragic death at Khartoum in 1885.

From Chatham James was sent to Alderney, where Capt. (afterwards Lieut.-General Sir) William Jervois was Commanding Royal Engineer, and had under him a staff of young officers who made their mark in the Corps. These were Major-General Sir Charles Nugent, Colonel Joshua Smith, Colonel F. E. Cox, Major-General

C. E. Martin and Colonel Pratt. This large number of officers in the little island of Alderney was required in order to design and superintend the construction of the works of defence for the new harbour, then in course of making by the Admiralty. The breakwater to form the harbour cost a very large sum of money, was greatly damaged by storms, and has, for some time, been allowed to fall into ruin.

James gives the following account of his stay at Alderney :—

"Our time at Alderney was usually fully employed in the office or in visiting the works in progress. Sources of amusement were so limited that there was little temptation to neglect our duties. Our chief, Jervois, . . . was very strict and made us work hard, but he was the only married officer among us and was most hospitably inclined, so that after office hours we were sure of a kind reception at his house, both from himself and from his charming wife. Other society in the island was limited to three families :—those of the Town Mayor, or quasi-Governor, Le Mesurier; the Judge; and the Rector. Mr. May, the Admiralty Engineer, who was a great acquisition to our society, was unmarried. Public entertainments of any sort, except the Rector's sermons (and these were decidedly good), were unknown; after dinner we generally played a friendly rubber of whist, and retired to bed at an early hour. The mail from England arrived at uncertain intervals about once a week, being fetched from Guernsey by a little steamer belonging to the contractor. In stormy weather we were occasionally a fortnight without news from the outside world. . . . There was rough shooting along the cliffs at the back of the island, and sea fishing from an open boat in the rather dangerous channels surrounding the coast."

The impending war with Russia caused augmentations to be made in the Army, and the Corps received an increase of two battalions. Owing to this James became a First Lieutenant on the 17th February, 1854.

On the 30th June, 1854, James left Alderney under orders for Malta, the depôt to which troops were forwarded for the war with Russia. Embarking in the P. & O. steamer *Euxine* on 20th July he arrived at Malta on the 1st August. Sir William Reid, a connection of James, was the Governor, and Colonel Ringler Thomson was the Commanding Royal Engineer. James enjoyed his stay at Malta, which lasted for six months, but he was eager to get to the Crimea. It was not until the middle of February, 1855, that he was sent on to the Siege of Sebastopol.

With two senior brother officers, Capts. L. J. Arnit and Whitworth Porter, he embarked in a very small screw steamer *Arabian* on the 14th February for Constantinople. After a short stay in that city he went on by a fine steamer the *Ottawa* to Balaklava. There he joined the 1st Company of Royal Sappers and Miners, employed in building

huts. On the 20th March he was moved to the front with this company, under command of Capt. (now Lieut.-General Sir) James F. M. Browne, and was employed at the Right Attack, soon receiving his baptism of fire in the trenches, where so many of his comrades were either killed or wounded.

James served in the trenches until the 2nd July, when an incident occurred which effectually stopped for a time his service in the field. Among the books and papers lent to me I find a *Lett's Diary* for 1855, in which James entered very briefly, and at intervals, what he had been doing during the day. I think that the following extracts will be read with interest, referring, as they do, to many brother officers who have since passed away :—

"*February 26th*, 1855.—Arrived off Balaklava about daybreak. . . . Armit went on shore to report. Went on shore myself and saw Browne, Carter, Keane, Martin, Drake, and Leahy. 1st Company, Browne and Carter, stationed at Balaklava. Drake on leave; Keane, commanding officer; Leahy quartermaster; Martin wounded.

"*February 28th.*—Received orders early to join 1st Company. Capt. Browne, Carter, and a doctor, Spittall, and Belson living in a wooden hut. Belson ordered to the front. . . . We are to be employed in building huts and other work about Balaklava.

"*March 2nd.*—Work: to parade at 8.30 to tell off working parties. Building huts for Croats and commissariat store at Kadikioi also convalescent camp on hill behind castle. Went to see Martin and found him improving.

"*March 8th.*—Rode up to Headquarters. Met Browne, Leahy, and Elphinstone there. Saw Bourchier and Cowell. Rode down together. Met my brother[o] at Kadikioi walking with Sale. Dined with him at Sale's house.

"*March 10th.*—My brother started after breakfast to walk to Kamiesch where his ship the *Megæra* is lying. Work as usual. Dined with Drake at Colonel Harding's, the Commandant at Balaklava. Party consisted of Harding, Drake, Fortes of the Austrian Service, commanding the Croats, and myself.

"*March 14th.*—Out to Kadikioi to visit the works. Rode to Karani to see the Cavalry Division races, extremely good for the Crimea. . . . Capt. Craigie, R.E., was killed last night by the bursting of a shell in the middle ravine.

"*March 16th.*—Carter and I rode up to the Right Attack and visited the trenches there. Owen on duty in the battery. The men working at first advance from 2nd parallel to communicate with the French. The Russian rifle pits render a part of this new approach very dangerous.

[o] John William James (b. 1831, d. 1877) in the Navy, afterwards a post-captain. He married his cousin Eleanor Gardner, who died in 1892, without issue.

Went over to Left Attack and afterwards to Headquarters and then home.

"*March 18th* (*Sunday*).—Early parade for service, Mr. Hayward, Chaplain. Work as usual. Received orders to go to the front to join the Right Attack with 1st Company under Browne.

"*March 20th.*—Left Balaklava for Right Attack. Pitched tent next to Drake's mess tent. Commenced digging hole for tent on the spot where Craigie's tent was. Dined with Major J. W. Gordon, R.E.

"*March 23rd.*—In the trenches by day. Arrived just as the fighting was over. Bodies lying in the advance mortar battery, both English and Russians. On the French side to our right, hundreds of bodies. Our loss about 30 killed and wounded. Major J. W. Gordon, R.E., wounded. On Left Attack Capt. Montagu, R.E., taken prisoner. At work in advanced trench with party of Sappers and Capt. Stanton, R.E. General Jones came down.

"*March 24th.*—Down to Balaklava. My brother sent me a sheep and some eggs. Back to camp in time for duty. Flag of truce to-day to bury dead. English, French, and Russians met in friendship on the advanced open.

"*March 29th.*—Capt. De Moleyns arrived at Balaklava to command the 1st Company. In the trenches by night. At work at new mortar battery on the right. Very quiet night."

On the last day of March there is entered a list of the R.E. officers and the Assistant Engineers which is as follows:—*Headquarters.*—General Jones; Lieut. Cowell, A.D.C.; Capt. Bourchier, Brigade-Major; Lieut. Stopford, A.D.C.; Lieut. Jamieson, Life Guards, A.D.C. to General Jones. *Right Attack.*—Lieut.-Colonel Tylden; Major J. W. Gordon; Capts. Stanton, Browne, King, Crofton, and Owen; Lieuts. Baynes, Graves, Anderson, Bainbrigge, Pratt, Drake, James, and Lowry; *Assistant Engineers.*—Capt. Green, E.I.C.; Capt. Garnet Wolseley, 90th; Lieut. Sheehy, 64th; Mr. Newsome, C.E. Adjutants, R.E.—Capt. Ewart and Lieut. De Vere. *Left Attack.*—Major Chapman; Major Bent; Capts. Hassard, Armit, Porter and Belson; Lieuts. Murray, Neville, Lennox (Adjutant), C. Gordon, Donnelly, and Graham; *Assistant Engineers.*—Lieut. Chapman, 20th, and Lieut. Penn, R.A.

"*April 2nd.*—In the trenches by day. A great deal of firing. The Mamelon opened on us 15 pieces. Mortar platforms destroyed by a mortar shell.

"*April 4th.*—Lieut. Bainbrigge killed last night by the bursting of a shell in the trenches. One leg not found. He was buried to-day.

"*April 7th.*—In the trenches by day. At work in left advance at not more than 150 yards from a Russian rifle pit. General Jones came down. Found Lieut. Bainbrigge's missing leg.

"*April 9th.*—General firing commenced from the siege trenches at 5.30 a.m. Rain falling in torrents and blowing hard. Five men killed and nine wounded. On duty at night. We kept up a constant fire of shells.

"*April 13th.*—Crofton badly wounded in the trenches yesterday. Leg not to be cut off yet.

"*April 15th.*—In the trenches by day. Firing getting slack, 7th day. Mending embrasures, etc., improving cover in left advance. One sapper killed by round shot. Capt. Greene, Scinde Horse, Assistant Engineer, wounded. Du Cane arrived in charge of telegraphs. Crofton died of wounds.

"*April 17th.*—In trenches by night. Advancing on left. Capt. King and three sappers wounded.

"*April 19th.*—In trenches to-night with Capt. Owen and Lieut. Baynes. Rifle pits taken by 77th, etc., and boyau established to enclose the nearest. Owen and Baynes both wounded. I received a canister shot through my cap. The enemy came on in force towards morning and regained one rifle pit. Colonel Egerton and Lemprière, 77th, killed.

"*April 22nd* (*Sunday*).—Service performed by Mr. Taylor, the chaplain lately appointed to the Royal Engineers. King died to-night at 11.30 p.m. The doctor reported after death that the wound must have been fatal, the bullet having entered the intestines.

"*April 23rd.*—Up at 4 to go to the trenches. At work strengthening advanced boyaux. A great many men hit. Truce for a short time to bury dead. Russians advanced from Quarry to do so. Very fine men.

"*April 24th.*—Poor King was buried near our camp; a large number of officers attended. . . . Owen and Baynes are both going on well."

Baynes rapidly got worse and died. Owen went home some time later having lost a leg above the knee. A considerable gap occurs in the diary which contains few entries beyond "Trenches by day," or "Trenches by night," and "Sorties," which were frequent in May, during the whole month.

"*June 6th.*—The fire from our batteries recommenced vigorously at 3 p.m. I went to trenches at 5 p.m. Two hours' firing had done a great deal towards silencing the enemy's guns. Mamelon only firing one gun on my arrival. Kept up a heavy fire from our batteries the whole night. Somerville with me, first time on duty.

June 7th.—Relieved by Capt. Dawson, R.E., and Major Campbell, 46th, at 4 a.m. Poor Dawson (lately married) killed in less than half an hour by a round shot. Wolseley sent down to do duty. Kept up fire all day. Magazine in No. 9, or Spur Battery, exploded. Obliged to use general's hut as temporary magazine. At 5.30 combined attack made by French and English on Mamelon and the Quarries. French successful after one repulse. English successful, but obliged to resist several attacks with great loss. Browne, Elphinstone, Lowry and Wolseley (90th) and

Anderson (96th) present. Lowry killed and Anderson wounded. Total *hors de combat* 630. Amateur in the batteries. [James was in the batteries looking on, being off duty].

"*June 8th.*—Relieved Elphinstone and Wolseley in trenches at 4 a.m. Quarries at present very dangerous. Could get no working party. Sappers at work in communication alone. Capt. Shearman, Major Dickson and Capt. Forster killed, and Capt. Ingall wounded this morning, all of 62nd. . . . Up to camp at noon and came down again after a few hours' sleep to get a working party from 4 to 8 p.m. Returned to camp very tired.

"*June 9th.*—Flag of truce this afternoon, for the bodies were becoming very offensive. The enemy have a kind of infernal machine by which I narrowly escaped being blown up. [He then describes a box which is buried, but has connection with a surface brass which, when trodden on, breaks a glass tube containing acid and explodes the composition in the box]. One or two exploded on the 7th inst. and one during the flag of truce to-day. We dug up about 20 of them about the Quarries. They cause bad burns, but are not otherwise very destructive.

"*June 17th.*—The Engineers have been extremely hard worked since the 7th, almost without ceasing. For myself I have not been a single day out of the trenches, being occupied in making a survey of the Russian works as best I can. We have been engaged every night in pushing forward from the Quarries and in turning some of the Russian trenches. The fire from our batteries reopened this morning. The French with 22 pieces from the Mamelon. The enemy did not return much fire after 2 or 3 hours. The Malakoff Tower appeared particularly knocked about. Our batteries very little damaged. Corpl. James, R.S. & M., killed this morning. Got back to camp about 6 o'clock. John (his brother) arrived from Kamiesch and Sale (Commissariat) from Balaklava. Both slept in camp in consequence of sudden news of storm early to-morrow morning. Nineteen Engineer officers on duty. I am to head central assaulting column (composed of part of 2nd Division) to destroy abattis and to make a passage for main column on salient of Redan.

"*June 18th* (*Waterloo Day*).—Left camp about 12.30 a.m. My party of 62nd Regt. and 15 Sappers to wait, until ordered to advance, in rear of 2nd parallel. Original orders for 2 or 3 hours' heavy cannonading, but about 3 or 3.30 a.m. heard commencement on French side, and Lord Raglan in 8-gun battery gave signal for our 1st and 3rd columns. The French attack not being successful on Malakoff did not allow 2nd Division to advance. Retired the whole in about 2 hours. Grape very heavy and casualties on our side very great. . . . Engineer officers: General Jones wounded; Capt. Jesse, Lieuts. Murray and Graves killed. Colonel Tylden shot through both legs. Major Bourchier slightly wounded. Naval Brigade carried ladders and suffered very severely. . . . With John down to Kazatch to sleep. . . . Very tired got on French cart and slept all the way to Kazatch. On board *Medina* saw Beresford, late of *Sfy*.

"*June 19th.*—Up very early. Bathed off ship's side. Rode up to camp immediately. Called at Naval Brigade and met Tom Fellowes. Rode over to R.E. camp with him. Armistice this afternoon to bury dead. Took Fellowes down. Went within a few yards of abattis in front of Redan. Talked to several Russian officers. Very friendly. Naval officers much superior to military officers. Found bodies of Jesse and Graves and missing Sappers. Rode with Fellowes to see Hallewell and separated. Buried Jesse and Graves this evening at Right Attack. Browne is installed Director of Right Attack.

"*June 22nd.*—Disagreeable duty this morning—to see 2 sappers receive 50 lashes each. Have always avoided it before though I am sorry to say that it frequently occurs. On duty in trenches to-night.

This is the last entry, except "Trench duty," until the 2nd July, when the following entry occurs :—

July 2nd.—In the trenches to-night. Had some work at the bottom of the Woronzoff Ravine, placing *chevaux-de-frises.* Tried to take a short cut from the bottom of the Ravine to the Quarries, but, getting too far in front, walked into the Russian picquet, and as I had nothing with me but a useless sword, and it was too dark to perceive any chance of escape, I was obliged to give myself up quietly. I was led in by the right face of the Redan, by a covered sally port and after following several most winding, narrow, and sometimes subterraneous passages, arrived at last at the hut, or bombproof cover, where the Admiral in command of these works was sitting."

At first, to his horror, James was regarded as a deserter and asked what information he had to give ; his account of his capture was only partially understood—at that time he could not speak French at all well—and was regarded with some incredulity. As it was midnight, he was sent to Fort Nicholas, some two miles away, where he was given into the custody of the officer commanding the barrack guard ; this officer passed him on to General Keismer, the commandant of the fort, to be once more examined. He was then given in charge of an adjutant, in whose room he slept for the rest of the night. By this time it was 3 a.m. and James was so fatigued and ill—he had been suffering from dysentery which had made him very weak—that he dropped off to sleep, just as he was, in his coat and boots. When he awoke and remembered his sad circumstances, he says, he almost regretted his life had been spared in the trenches. After a visit from General Keismer, with an officer to interpret, he was summoned by a staff officer, Capt. Rumein, to go to Count Osten Sacken, the General Commanding the Corps defending that section of the fortress. Capt. Rumein spoke English well and had a courteous, gentlemanly bearing ; James was able to make him understand that he was not a deserter and was really a British Engineer officer, however little

like one he might look, for it was the custom on night duty in the trenches to wear very rough, old clothes. After his interview with Count Osten Sacken he was well treated, allowed to write a report at once to Sir Harry Jones, and to send for clothes and money. The Count also asked him to dinner. James writes :—

"The dinner with Count Osten Sacken was at 2 o'clock, and considering it was given in a besieged town, was very well served. There were about 20 at table. I sat on the General's right with Capt. Rumein next to me. I had to answer a variety of questions, and seemed to be the first to convey the news of Lord Raglan's death to the Garrison of Sebastopol, and to give the name of his successor in the command of the English Army.

"After dinner Rumein took me to see the famous General Todleben, the Chief Engineer in the splendid defence of Sebastopol, who at the beginning of the war had been a junior captain, but had been rapidly promoted in consequence of the ability he had displayed in designing and constructing the works that had so successfully arrested the advance of the allied armies. He was a handsome man who looked about 35 years old. I found him lying in bed, suffering from a wound in the leg received on the 18th June. He spoke very kindly to me while doing his best to pump me about the English siege works, but I hope he was not successful in extracting any information of any value from me . . . he became too seriously ill to be able to see me a second time . . .

"I was given a large casemate room to myself in the upper storey, with a wide window looking southwards towards the town and in the direction of the defences attacked by the Allies. . . . A sentry was mounted at my door and an old soldier, appointed to wait on me, was within call. . . . Lieut. Ferdinand von Stielau, of the 19th Regiment of Infantry, a young Livonian, who knew a few words of English, informed me that he had been ordered to take general charge of me, and that he would come to see me daily. I cannot forget how kind he was."

But in this notice of General James it is not possible to make many quotations. He was allowed to bathe in the harbour and to take exercise on the boulevards, always of course under surveillance, and except ill-health he had little to complain of in his captivity at Fort Nicholas. On the 23rd July, which was the 25th anniversary of his birthday, he was conducted to the north side of the harbour, landing at St. Catherine's Bay. He had been led to suppose that both more money and more clothes had been sent to him from the English camp, but they did not come. It turned out that the money was sent in English sovereigns and followed him about for the next four months, eventually reaching him after he had been released from captivity. In the meantime his only means to procure food consisted of the payment of 75 kopecks a day by the Russian Government at the current rate of exchange, or about half-a-crown a day.

His friend von Stielau bade him an affectionate farewell and he was handed over to the custody of a rough and rather brutal sergeant of gendarmes, who of course could not speak anything but Russian; they travelled by telega, the ordinary Russian cart on four low wheels, over which a small wooden body is perched without springs. James was in a very weak state of health and had difficulty in getting from his escort anything either to eat or to drink. Fortunately at Simpheropol he passed from the custody of the surly sergeant to that of a young Russian officer, who was to escort him the rest of the way, and he found that his destination was Riazan, a town a little south of Moscow, and nearly 1,000 miles from Sebastopol. He travelled for 16 consecutive days, passing through the following places:—Baktchi-Serai, Simpheropol, Perekop, Karovka, Berislav on the Dnieper, Woronzoffka, Nikopol, Ekaterinoslav, Nova-Moscov, Konstantinograd, Kharkhoff, Belgorod, Karotchi, Stari-Oskol, Nijni-Gevitza, Voronetz on the Don, Ousman, Liapirch, Kazuoff and Riajsk. He reached Riazan on the 7th August, having travelled an average of 61 miles a day. His journey had been rather a trial owing to his ill-health and the jolting in the telega, while his escort had turned out a very unamiable companion.

On his arrival James was sent by the Governor to the Chief of the Police, who directed him to wait at the hotel until he could attend to him. He waited several hours, and during this time some of the English officers, who were also prisoners of war at Riazan, called to see him; they told him that they had been most kindly treated, and were able to get money through the banking firm of Anderson at St. Petersburg. These officers were shortly to be exchanged, and were only waiting for the Emperor's reply to their request to be allowed to travel by way of Moscow. They were asking James to dinner at the moment when the Politz Maister arrived. He was very angry at finding the English officers had entered the hotel and had talked with James without permission. He ordered them out summarily, telling James that it was not desired that he should communicate with them, and he must keep his room until they left Riazan.

About a week later his brother officers, whose names he gives—Lieut.-Colonel Kelly and Lieut. Byron, 34th Foot; Capt. Duff, 23rd; Capt. Frampton and Lieut. Clarke, 50th; Lieut. Clowes, 8th Hussars; Lieut. Chadwick, 17th Lancers; and Messrs. Johnstone, Vicars, and Macarthy of the Commissariat—all started for Moscow, their exchange having been arranged. Although James was sorry to see them go, his own position was at once greatly altered for the better. He was given full liberty, with the only obligation to report personally to the Governor every day. The Governor, M. Novasiltsoff, was most friendly, and James was a constant guest at his and other houses in the town

and neighbourhood. He thus had an opportunity, which pleased him, of seeing Russian family life in various classes of society. He spent altogether a very agreeable time in this place of captivity. He was present at Droshky races held near the town, he was given some plover shooting, and went to the apple festival, a sort of fruit harvest thanksgiving; he also saw an alarming fire, which burnt down some of the finest buildings in the centre of the town. The novelty of the life and the kindness he received from everybody left a lasting impression on him. He was there barely six weeks, but he has much to say about the place and, indeed, about Russia generally, and he was really sorry to leave the friends he had made.

James was ordered to Odessa for exchange and left Riazan on the 15th September. He travelled in a post-telega in charge of a tchinovnik, who was a professor of music, and had orders to escort him as far as Toula. His route was entirely different to that by which he had arrived. He had first to travel some 60 versts along the chaussée to Moscow and then double back on the road to Toula. On arriving at Veneva he and his escort changed into a tarantasse, which is a much more comfortable conveyance than a telega. It is a four-wheeled vehicle in which the front and rear axles are connected by fir saplings (which, if broken, are readily replaced in any forest passed), at a distance apart of 20 feet or more. The long platform thus made gives the only spring which the carriage has, and the carriage body, which is generally hooded, rests in the centre.

At Toula, which after Kharkhoff was the finest town he had as yet seen in Russia, James put up at the best hotel, and after dinner his escort conducted him to the Governor and to the Police Master. They treated him well, told him he would remain in Toula for 24 hours, and placed an orderly at his disposal to show him the town.

He started from Toula on the 18th September, in charge of two Government employés who could speak no language that James understood. The route was the great military chaussée running south, wide and well made, and kept in excellent order; passing through Sergifskia and Tsienks, James arrived at Orel the next day. Here his escort was changed and he was placed in charge of an infantry officer, who is described as "a very agreeable, gentlemanly fellow who spoke French well." They got to Koursk at 3 a.m. on the 21st. There they found the Emperor was travelling south, and there was some hesitation as to whether James should be sent on or not. James was not sorry for a delay of a day as he had travelled 100 miles from Orel to Koursk in a post telega. So he spent the time in seeing Koursk, and in the evening, the Emperor being further back than was thought, he was sent on with a fresh escort "an ugly, fidgetty, little Pole who spoke bad French." He spent the night of the 21st at a post-house, and of the 22nd at

Belgorod. In the morning he found that the Czar had passed while he was asleep, much to his disappointment as he had hoped to have been able to see him. He was not allowed to leave Belgorod until 11 a.m. He had passed through this place on his journey up and now had an opportunity of exploring it before starting south again. Arriving at Kharkhoff, the capital of Little Russia, in the evening, he stayed 2 days and, having been furnished with a letter of introduction to a French resident, from one of his Riazan friends, he was pleasantly entertained.

He resumed his journey on the 26th September with a new escort, who spoke English and French, both badly. From Belgorod to Kharkhoff he had been on the road by which he had travelled up country, but now again diverged, taking the road to Poltava which was reached on the 27th. Here he remained for 10 days and made the acquaintance of an old Russian officer, named Scott, who was Captain of the Cadet Corps. His father was a Scotsman who had become a naturalized Russian, and he himself was a veteran who had seen much service in the Wars with Turkey in 1829–9, with Poland in 1831, and with Hungary in 1849. From this officer he received much kind attention.

On the 7th October he left Poltava for Odessa. His escort owned a very comfortable tarantasse, in which they travelled. This tchinovnik was an educated man and a very agreeable companion. The five days occupied in the journey were among the most pleasant James had enjoyed in his long travel. Odessa was reached on the 12th. The last stage followed the coast and he saw the allied fleets of some 80 sail in the offing. He spent a week at Odessa with some other French and English officers who were prisoners. The Russians were expecting a bombardment of the town and the prisoners were confined to the house where they lived, and at night were locked in and watched by sentries. The Allies had, however, no intention of bombarding Odessa, but hoped by a naval demonstration to draw off the attention of the Russians from Kinbourn, which they at this time successfully attacked, and the defences were destroyed.

On the 20th October with the other English prisoners James was marched down to the harbour, where the parties embarked in small boats which took them to the transport *Columbo*, a fine P. & O. steamer, commanded by Capt. Methuen. James was at last a free man again. Nearly four months of captivity, whatever its hardships, had enabled him to see a great deal of Russia. He had driven some 1,900 miles through the country, and had studied the people and their manners and customs, much to his own enjoyment and edification.

The *Columbo* carried the exchanged prisoners to the fleet which had gone to Kinbourn. James went on board the flagship, and

reported the arrival of the detachment of prisoners to Admiral Lyons. He found his cousin Tom Fellowes was a lieutenant of the ship and he stayed the night with him. The detachment of ex-prisoners was transferred to H.M.S. *Agamemnon*, Capt. Sir T. Pasley, and sailed for Kazatch, arriving there on the 25th. Here James found the *Megæra* lying, and his brother delighted and much surprised to see him, as he had heard nothing of him since his capture.

Next day James reported himself to the Commander-in-Chief, General Sir James Simpson. He found that Colonel Lloyd was in command of the Royal Engineers, and that several officers of the Corps had arrived while he had been away:—Cooke, Schaw, Ranken, Nicholson, Scratchley, Kelsall, Cumberland, Edwards, and Dumaresq.

Sebastopol had fallen, and the Engineers were employed in the demolition of the forts, barracks and docks on the south side of the harbour; in making a careful survey of the positions occupied by the Allied Armies; and in erecting huts, improving roads, etc. As James scarcely possessed any clothing and no equipment, and was still in weak health, he was given five weeks' leave to go to Malta to refit; he left the Crimea on the 31st October in the *Alice Jackson* and arrived at Constantinople on the 2nd November. Finding the transport *Emperor* on the point of sailing for England he obtained a passage in her to Malta without difficulty.

Three of his brother officers were in the ship on passage to England, Major Stanton, and Lieuts. Elphinstone and Sedley. The latter two had been wounded on the 8th September. Elphinstone, then a subaltern, was given the V.C. for his gallantry on that day. James says of him:—

"I remember him as one of the most fascinating men I ever knew, and I have no doubt his agreeable manner and his brilliant linguistic skill, aided by the large store of information he possessed on every subject, pointed him out as a fit man for appointment as Governor to H.R.H. the Duke of Edinburgh."

At Malta James was welcomed with the greatest kindness by his old chief, Colonel Ringler Thomson, the Commanding Royal Engineer, and gladly accepted his invitation to make his house his quarter during his stay in Malta. He had an equally kind invitation to stay at the Palace from his relative the Governor, Sir William Reid, but he had already installed himself with the Thomsons and preferred the less public life he could lead there. He mentions, as a trait of Sir William Reid, the wonderful tact and delicacy with which he did little kindnesses. He says he will never forget, in his own case, how he provided him with a sum of money, of which he was

very much in need, and did it in such a way that his feelings could not be hurt. He goes on to say :

"Nothing could have been more acceptable than his gift, for my pay had been stopped during my captivity in Russia, and while I was under the necessity of providing myself with an entirely new outfit, I had little or nothing at my bankers, and should have had to borrow, if it had not been for the great kindness of Sir William Reid. At the time I was not aware that my friends in England had placed money to my credit, so on the whole I was much better off than I had reason to expect."

After a very enjoyable few weeks in Malta, James returned to the Crimea, where he arrived the day after Christmas, and rejoined the 1st Company of Royal Sappers and Miners, then under command of Capt. De Moleyns. Shortly after his arrival he was detailed for surveying duties under Lieut.-Colonel Cooke, R.E., and during the next few months assisted in making the map of the attacks and positions of the Allies on the heights of Sebastopol. His portion of the work was the ground near Kamiesch and Kazatch, and the defensive lines erected by the French in front of those places. The map was drawn on a scale of 6″ to the mile. James says :

"I cannot remember the names of most of the officers who assisted in the survey, but one of them, Lieut. John Grinlinton of the 4th Regiment, an old Survey Sapper promoted from the ranks, occupied a section of the hut I was in. This officer, with whom I became intimate, soon retired from the Army and went to Ceylon, where, after holding important government appointments, he was knighted and is now living in retirement in England. He was one of the best specimens of the large number of our Sapper non-commissioned officers who were rewarded with commissions after the siege as quartermasters, etc. . . . Grinlinton was a perfect gentleman in his manner and I derived great pleasure from his society as long as I was in intimate daily communication with him.

"By placing two large huts together we established a mess building in the Engineer camp, which was much envied by the rest of the Army on the heights in the winter of 1855-6. We lived well, though our cook may not have been a great artist, but our haggises, made by a Scots sapper, were a great attraction to the hungry officers of the infantry regiments round us. Constant out-of-door work gave us the most ravenous appetites, and the roughness of our food was a matter of indifference. After all it was ten times better than it had been during the long weary time of the siege. Our mess table, made from old teak gun-platforms, is now preserved in the Model Room at Chatham. . . .

"In destroying the naval barracks in the Karabelnaia suburb a sad fatality happened in the death of Major Ranken, R.E., who was buried in the ruins of the building as it fell. At that time military mines were

fired by a train of powder hose, the explosion being made by a piece of Bickford fuze, cut of a length to give time to the man lighting it to get to a safe distance before the charge blew up. Ranken lighted the fuze himself and retired. Such a long time elapsed without an explosion that he thought there had been a failure, and advanced to examine the cause. But the fuze had only smouldered, and when he disturbed it, an immediate explosion took place. His body was so deeply covered with the *débris* that it could not be extricated for 24 hours, but its condition when found proved that death must have been instantaneous. I hardly knew Major Ranken myself, but he was a man very much liked and esteemed, and his death coming alone after the period of the greatest peril was overpast, seemed to affect the whole camp almost more than the constant daily losses had done at the height of the siege." [James commanded the party which extricated the body of poor Ranken].

When peace was within sight, and an armistice had been arranged, James obtained a few days' leave of absence, and in company with Capt. Gronow-Davis, R. Artillery, afterwards V.C., made a very pleasant and interesting trip through the Crimea, of which he gives an account in his MS. book. Having finished his survey work with credit he rejoined his company at Balaklava, but not for long, for peace was declared in May, 1856. He was thinking only of returning to England, when he heard of an opening for employment in the East, which took him away for military duty for a time. Peace came and the troops embarked for England, but James did not accompany them. As the war was over and it will not be necessary to refer to it again, it may be as well to state here that for his services in the Crimea James received the Queen's War Medal, the Turkish War Medal, and the 5th Class of the Turkish Order of the Medjidich.

(To be continued).

TRANSCRIPTS.

THE FORTIFIED POSITION OF NAN SHAN AND THE KUROPATKIN REDOUBT.

By Major Don Augustin Scandella.*

(Translated from the *Memorial de Ingenieros*, January, 1910).

Two episodes of the Russo-Japanese War, in which fortification played a very important part, will serve as the theme of the present memoir. Both took place in the Kuan-tung Peninsula and were responsible for numerous losses in the ranks of the belligerents. Both deserve to be studied closely, for they present such antithetic characters that, if they were considered as isolated examples, they would give rise to opposite and erroneous deductions regarding the application of field fortification.

Without going into details, it is easy to present the Isthmus of Kin-cho as a model of a perfectly fortified zone, provided with powerful artillery, endowed with great defensive strength, and garrisoned by brave Russian soldiers; in spite of which the Japanese after a few short hours of fighting succeeded in planting the banner of the Rising Sun on the crests of the Nan Shan. There may be some who would draw as a consequence of this action the lesson that fortification exercises an insignificant influence on the results of battles. On the other hand we would fall into an equal error if we were to say definitely that a simple fort, such as the celebrated Kuropatkin Redoubt, was sufficient in itself to detain for a month the advance of a besieging army, which, provided with powerful means of offence, required to deliver a step-by-step attack in order to gain possession of it. Both incidents have taken place in the way above described, but it will be well to note other factors which may aid the reader in forming his opinion on these two events of a war, in which the art of the engineer, in all its branches, has had such an extraordinary application.

I. The Fortified Position of Nan Shan.

Geographical Sketch.—The walled city of Kin-cho has given its name to the isthmus which connects Southern Manchuria with the Kuan-tung Peninsula, in which Port Arthur and Dalni are situated. Its eastern shores are bathed by the waters of the wide Bay of Ta-lien, while the western coast, marshy and extensive, forms a part of the Bay of Kin-cho. In the centre of this tongue of land there rise the hills of Nan Shan, where the events took place, which we are about to narrate. The railway which runs from Harbin to Port Arthur sends out a branch, to the south of the Nan Shan, at Ta-fan-chen, which leads to the small port of

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Liu-chu-tun; and as soon as the Nan-kuan Mounts are passed, there is a second branch which connects the beautiful city of Dalni with the main line.

The heights of Ho-chang-to to the south of Liu-chu-tun form a good observing station from whence to enfilade the entrance of Ta-lien Wan. The deepest soundings in this excellent bay are in the Odin Cove, and the shallowest in Hand Bay. The port of Dalni is well protected against the prevailing winds. The San-shan Islands bound the three channels which lead to Ta-lien Bay.

Navigation is not impeded by ice in the waters which surround the Kuan-tung Peninsula.

The hills of the Nan Shan are rocky and without vegetation. A cultivated plain lies between them and the mountains which surround Kin-cho on the north and east.

In this sketch and in *Plate* I., taken from the Japanese chart, everything has been omitted which has no immediate relation with the present study.

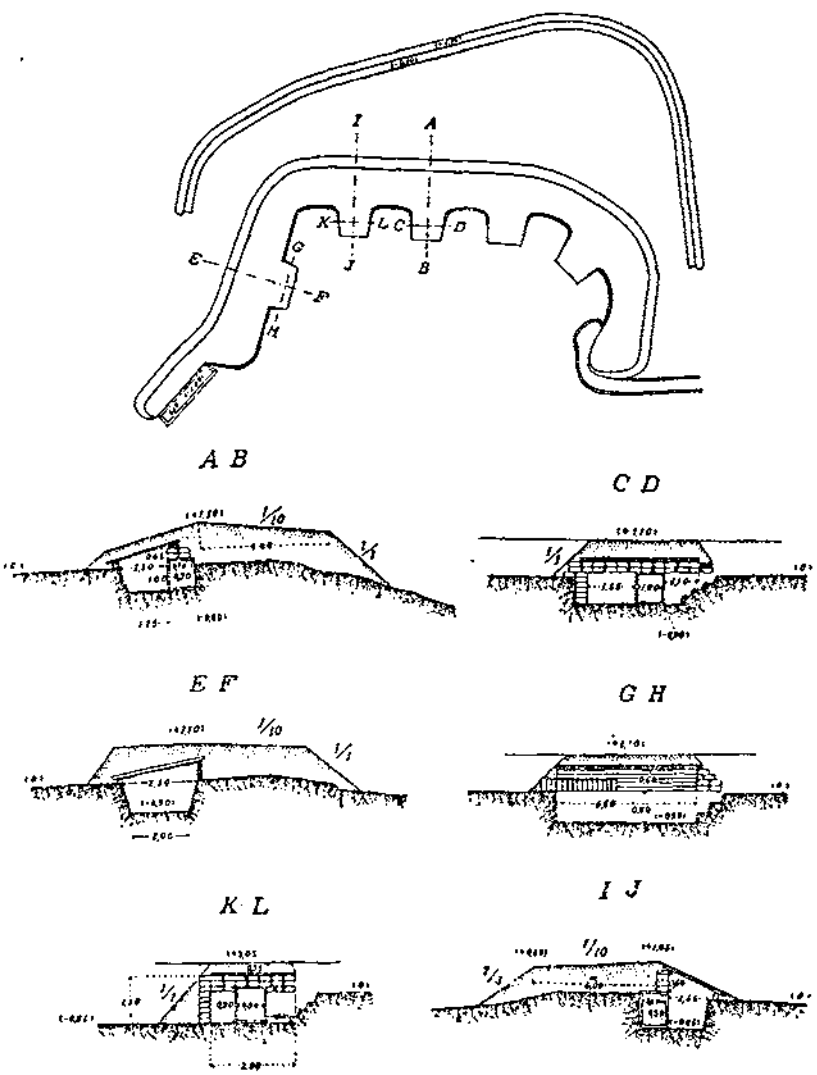
Fortifications of Nan Shan.—Plans of the hills and fortifications of the Nan Shan were made by the engineers of the IInd Japanese Army, after the position was captured. One copy of the general plan, and another showing the plans and sections of the forts situated on the left flank of the Russians were presented to each of the foreign Military Attachés by Marshal Yamagata, and the reader will find them reproduced in Capt. Giannitrapani's book *La Guerra Russo-Giapponese*. In this work no definite details are given of the fortifications on the left flank. Lieut.-Colonel Schwarz, who has a great knowledge of the ground and of the works constructed and projected, published in Nos. 1 and 2 of the *Russian Engineer Journal*, 1906, an article which serves to complete the information given by the Japanese. Lastly General Hamilton, in his notable work *A Staff Officer's Scrap Book*, presents two good panoramic views, the one of the hills of Nan Shan seen from the walls of Kin-cho, and the other of the field of battle seen from one of the Nan Shan Hills. So as not to increase unduly the topographical part of this study we only reproduce the original Japanese general plan of the Nan Shan position (*Plate* II.) and the accompanying plans and sections of Batteries 8, 9, and 12.

The proceedings followed by the representatives of the Tsar in regard to the defence of the Isthmus of Kin-cho, are a reproduction of those usually adopted by those nations who are badly organized in a military sense, and who do not preoccupy themselves with the possibility of international conflicts until the moment when hostilities break out. It should be observed that the recent war has given us one more example, in spite of the theories of international jurists, of the fact that a declaration of war often follows instead of precedes the outbreak of hostilities.

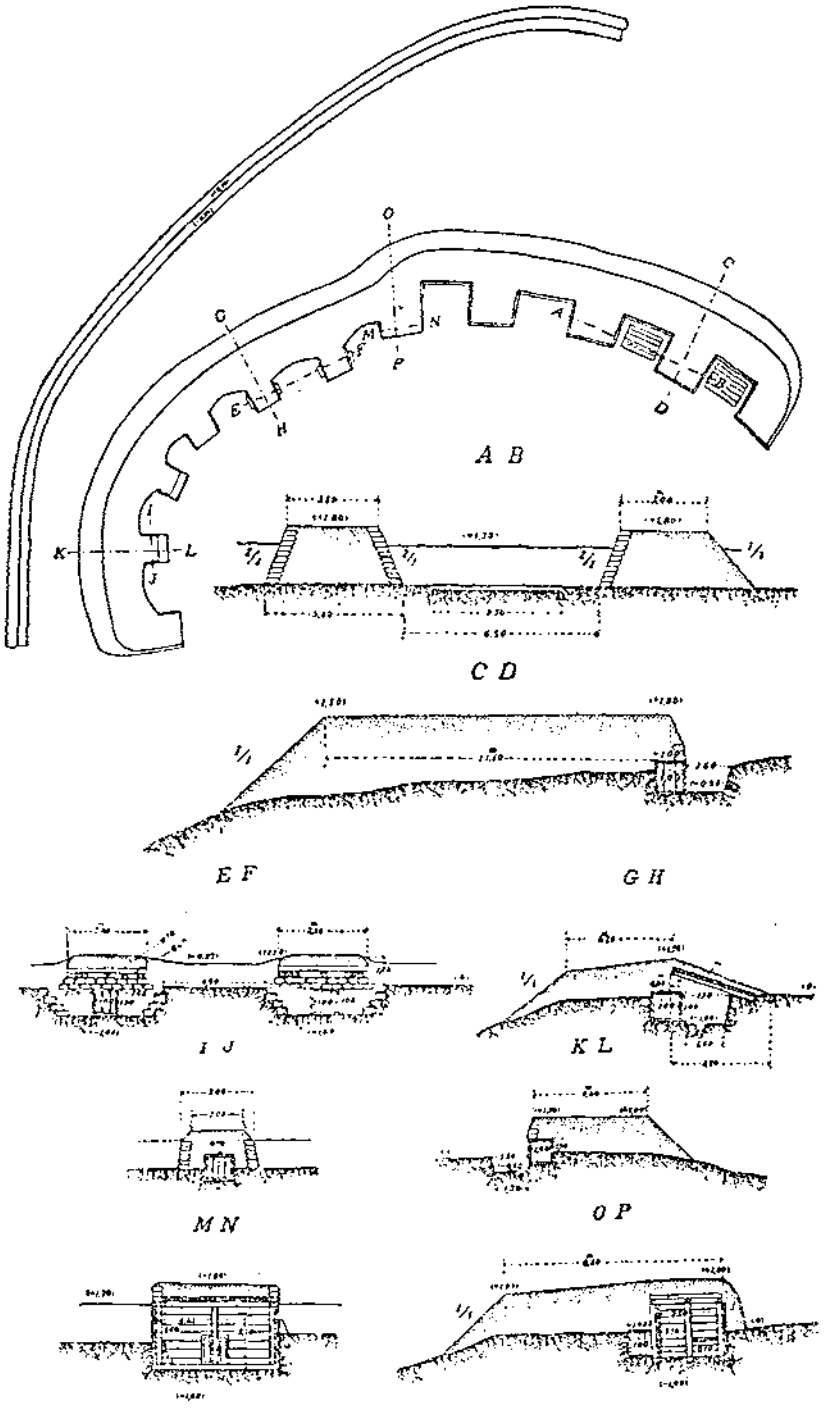
We will now consider in broad outline the instructive process of the defence of the Isthmus of Kin-cho during the short period of six years.

When in 1898 the Liao-tung Peninsula was ceded by China to Russia, the troops of the Tsar occupied the city of Kin-cho. A few months

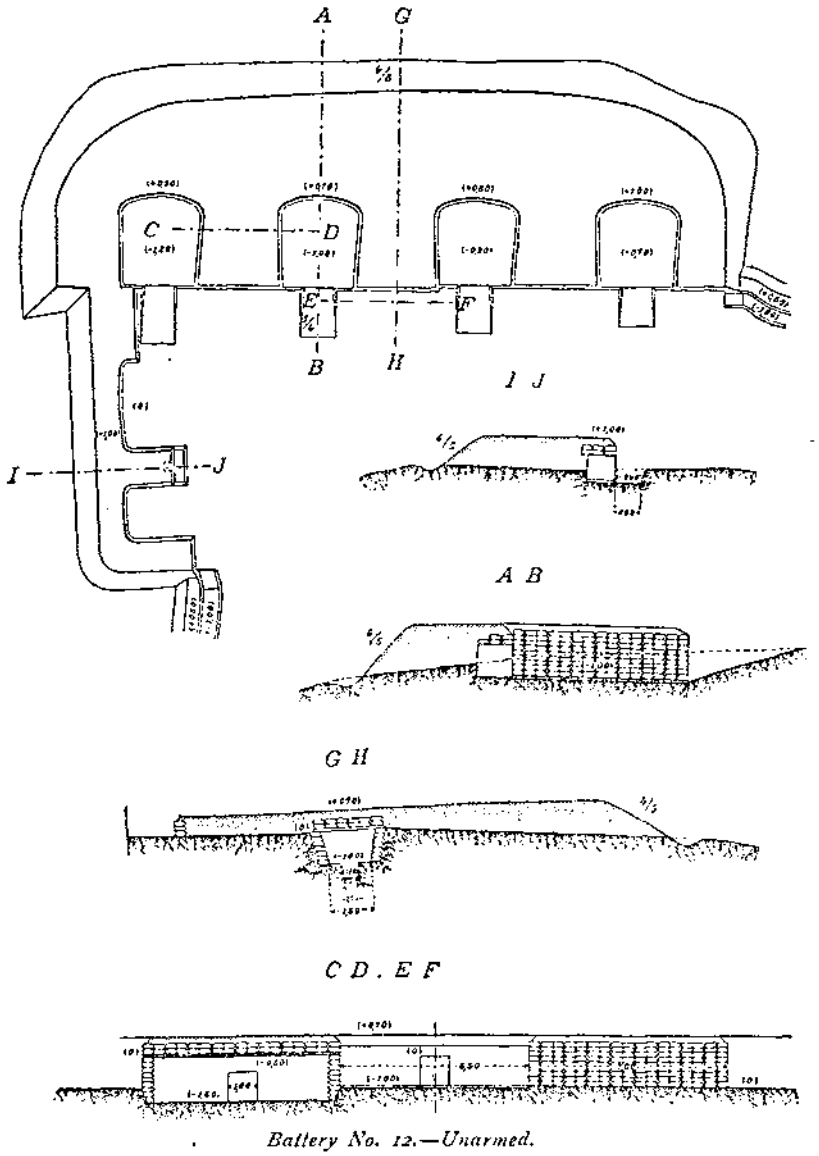
afterwards self-government was given to this place. In 1900, owing to the Boxer insurrection, the Russians commenced to give military importance to the Kin-cho Isthmus; and after reoccupying the city of that name, they constructed two redoubts on the Nan Shan, as well as 12 batteries and numerous trenches, all of a field type. There were only three works provided with shelters. In the spring of 1903 Engineer Capt. Schwarz made a project for the defence of the position, consisting of five permanent forts, three on the crest of the Nan Shan and two on the flanks, united by means of a trench and ditch, so as to form a very considerable obstacle to an attack. This project was approved, but was not carried out. On the 3rd February, 1904, a few days before the commencement of the war, General Kondratenko, with



Battery No. 8.—Armament, 4 8·7-centimetre guns.



Battery No. 9.—Armament, 8 8·7-centimetre guns.



Battery No. 12.—Unarmed.

Colonel Tretiakov, commanding the 5th Siberian Rifles, and Capt. Schwarz reconnoitred the position and presented another project, the estimate for which amounted to £2,000, and in which it was proposed, amongst other things, to reconstruct all the works made in 1900, as they were in a very bad state owing to their not having been kept in repair for four years; to construct numerous blindages; to improve the roads; to facilitate communication by establishing a telephone service to connect the batteries with each other, and with Dalni, Port Arthur and Kerr and Ta-lien Bays; to concentrate the defence of the position on its summit and to extend it towards the north; to organize the south front in

view of a possible hostile disembarkation on the southern shores of the isthmus; and lastly it was considered that the probable points of attack would be the right flank and a part of the north front. This project, which was presented on the 6th February did not receive approval, on account of the estimate being considered excessive. Two days later the Japanese torpedo boats attacked the Russian squadron in Port Arthur. As a consequence of this attack the defence works on the isthmus of Kin-cho were commenced on the 18th February, and, as was to be expected, the Russians had to contend with a dearth of workmen, a difficulty in getting sufficient tools and materials, lack of transport, and lastly frost and snow which, combined with the rocky nature of the soil, prevented the rapid execution of the works. At the beginning of April the main lines of the defence were organized; but all the works continued to be improved up to the 26th May, 1904, on which day the Battle of Nan Shan took place.

The total cost amounted to £6,000, or three times the original estimate.

Regarding the armament of the fortified zone, the following table shows the number and nature of the guns which fell into the hands of the Japanese on the 26th May. In addition, the movable armament consisted of 6 field batteries and 10 machine guns.

The Japanese captured in the emplacements named the guns enumerated in the following official return:—

In the fortress of Kin-cho.		2	guns	of 7·5 centimetres	(field).	
		2	„	„ 8·7	„	
In the batteries.	No. 1 ...	8	„	„ 8·7	„	
	No. 2 ...	4	„	„ 8·7	„	fortress mountings.
	No. 3 ...	4	„	„ 10·5	„	
	No. 4 ...	1	„	„ 15·0	„	
	No. 5 ...	2	„	„ 8·7	„	fortress mountings.
	No. 6 ...	4	„	„ 15·0	„	
		4	mortars	„ 15·0	„	
	No. 7 ...	4	guns	„ 8·7	„	(field).
	No. 8 ...	4	„	„ 8·7	„	
	No. 9 ...	4	„	„ 8·7	„	
		4	„	„ 8·7	„	fortress mountings.
	No. 10 ...	6	„	„ 8·7	„	
		2	„	„ 8·7	„	(field).
	Nos. 11 & 12	No armament.				
	No. 13 ...	2	guns	of 8·7 centimetres	(field).	
	No. 14 ...	2	„	„ 8·7	„	fortress mountings.
To the south of Nan Shan		5	„	„ 15·0	„	without carriages.
		2	„	„ 12·0	„	
On Nan-kuan Ling ...		4	„	„ 8·7	„	(field).
In the permanent batteries of Ho-chang-to, to the east of Liu-chu-tun.		2	„	„ 15·0	„	
		2	„	„ 10·5	„	
Total		74				

Battle of Nan Shan.—It is no part of our intention to enter upon a description of this well-known battle; we shall merely make a few remarks, so as to bring out its essential features.

On the 5th May, 1904, two days after the last attempt made by the Japanese fleet to block the entrance to Port Arthur, the disembarkation of the IInd Army under General Oku was commenced to the east of Pi-tse-wo. On the 25th the Japanese occupied the line Pi-tse-wo—Pu-lan-tien, so as to contain an offensive movement of the Russians from the north. At the proper time the 1st, 3rd and 4th Divisions and one brigade of artillery surrounded the town of Kin-cho, and extended from Lung-huang-miao (*Plate* I.) on the Bay of Kin-cho, to Huang-kia-tun on Kerr Bay. General Oku issued a General Order at 6 p.m. on the 25th for an attack on the town and on the position of Nan Shan. Preparations began at midnight, and at dawn on the 26th Kin-cho was captured. An advance was then made on Nan Shan, the 4th Division being on the right, the 1st Division in the centre, and the 3rd Division with the artillery brigade and two companies of the 5th Battalion of Engineers on the left. The bombardment commenced at 5.30 a.m., four Japanese gunboats in Kin-cho Bay taking an active part in it, and firing on the left flank of the Russians. At 11 a.m. the fire of all the Russian guns, mounted mostly *en barbette*, in the Nan Shan batteries was silenced. A Russian gunboat in Ta-lien Bay kept up a fire for four hours with effect on the left flank of the 3rd Division. The latter was very nearly overthrown by a counterstroke executed by the Russians from Ta-fang-chen under the protection of some Q.F. batteries which had retired early from their positions on Nan Shan to others on the heights of Nan-kuan Ling. Up to 5 p.m. all the Japanese attacks had been repulsed, and their artillery was running short of ammunition, when, almost at sunset, the gunboats in Kin-cho Bay redoubled their fire, and aided that of the 4th and 13th Artillery Regiments to the west of Kin-cho. This fire enabled the 4th Division to advance, and the men, wading up to their waists in water, succeeded in entering the trench, which starts from near Battery No. 8 (*Plate* II.) and runs down to Kin-cho Bay, and into the nullahs which exist between this battery and No. 10. The result was that the 4th Division captured first Fort No. 9, and then No. 8. The Russians then began to retreat, and the 1st and 3rd Divisions made a final attack. At 7.20 p.m. the Japanese flag was flying on the top of the Nan Shan. Two hours earlier the victors were on the point of considering themselves vanquished.

The following tables show the losses incurred and the amount of ammunition used by the attack:—

Losses of the 2nd Japanese Army at Nan Shan.

Units.	Officers.		Men.		Total.
	Killed.	Wounded.	Killed.	Wounded.	
1st Division	14	41	202	1102	1359
3rd „	6	32	161	1222	1421
4th „	8	38	298	1303	1647
Artillery Brigade—					
13th, 14th and 15th Regts.	—	5	15	43	63
2 Cos. 5th Bn. Engineers	1	—	5	8	14
Total	29	116	681	3678	4504

The Japanese buried on the battlefield the corpses of 10 Russian officers and 664 men. The number of prisoners was 23.

Consumption of Ammunition, 2nd Japanese Army, at Nan Shan.

Units.	Common Shell.	Shrapnel.	S.A.A.
1st Division	450	6015	667000
3rd „	462	3249	425148
4th „	806	5000	1110886
Artillery Brigade	2029	16036	—
Total	3747	30300	2202934

CONSIDERATIONS.

(A). The inspection of the battlefield and the study of the means with which the Russians and Japanese fought, has given rise to conflicting opinions regarding the wisdom of the choice of Nan Shan as a defensive position.

It is argued that the Russians should never have massed the whole of their defensive forces in a zone of such small dimensions; and that as numerous guns, redoubts, trenches, entanglements, mines, projectors, telephones, barracks, etc., had been placed within a square of less than 2 miles side, the problem which the attack had to solve in order to demoralize the garrison was simply that of distributing its artillery in such a way as to convert this square into a "common depository" for all its projectiles. This is what the Japanese did, as they directed on it simultaneously from the north and south flanks a concentric fire which soon overpowered the hostile artillery. If the Russians, in place of choosing the position on the Nan Shan, had defended and fortified that of Nan-kuan Ling, 2 miles further to the south, matters would have taken quite a different turn. This position extends from north west to south east, has a greater elevation than the Nan Shan, forms a barrier almost normal to the march of the invader, offers good emplacements for the Russian medium artillery, and from it counterstrokes, which could easily have been prepared, would have rendered the advance of the Japanese by the Isthmus of Kin-cho very difficult.

These are the chief arguments expressed in favour of the occupation of Nan-kuan Ling, and it is possible that military opinion may pronounce against Nan Shan, and attribute to the faulty choice of this position the defeat suffered by the Russians. In our humble opinion this choice was not so faulty as some persons pretend.

(*a*). The phrase "bottling up" of the Russian fleet in Port Arthur has been universally accepted, and we will permit ourselves to say that the Nan Shan was the cork of the bottle of the Kuan-tung Peninsula. It must be agreed that it could not be a matter of indifference to one of the belligerents whether this cork was or was not at the mercy of the other. Port Arthur was doubtless one of the objectives of Japan, and the Japanese used every endeavour to capture it; but once they were in possession of the Nan Shan, they could have contented themselves with blockading the peninsula, and have avoided the enormous losses which

they suffered in besieging the fortress. They might thus have massed stronger forces against General Kuropatkin's field army.

(*b*). The fact that the Russians had fortified and unsuccessfully defended the Nan Shan position, was no bar to their also defending the Nan-kuan Ling position; whilst, if their first intention had been merely to occupy the latter, *ipso facto* they must have abandoned the former.

(*c*). From Nan Shan the permanent batteries of Ho-chang-to are taken completely in reverse; besides this, the entrances and a part of Ta-lien Bay, namely that close to Odin Cove where ships of large tonnage can lie, are enfiladed from the same position.

(*d*). The foreshore of the Nan Shan on Kin-cho Bay is very low and very extensive. On the other hand where the western spurs of the Nan-kuan Ling enter the sea, there are soundings of 2 or 3 fathoms close inshore, so that vessels of considerable draught can enfilade a good part of this position much more easily than they can the Nan Shan position. The help given by the navy to the army on the 26th May was not confined to the bombardment of Nan Shan, but included also that of the Nan-kuan Ling. The gunboats *Akagi* and *Chokai*, both of 620 tons, and four torpedo boats, approached the coast as closely as possible so as to assist the advance of the troops across the isthmus, whilst the gunboats *Tsukushi* (1,372 tons) and *Kenyen* (2,165 tons) could only intervene in the last part of the engagement, and then but indirectly, as they were prevented by their greater draught from coming in closer.

(*e*). As a consequence of (*c*) it may be inferred that when the Nan Shan was captured by the Japanese, Liu-chu-tun and the whole of Dalni Bay was virtually in their hands.

(*f*). The Russians ought not to have abandoned a position with such an open field of fire towards the north and east as was possessed by the Nan Shan. The width of this field of fire explains how it was that successive and vigorous attacks made by the Japanese during 12 hours, could be held back by the musketry fire of the defence. The fire of the artillery posted on the Nan Shan was silenced, as has been said, shortly after the commencement of the bombardment.

Naturally this argument will not be accepted by those who maintain that in spite of the progress made in the construction of firearms, the defence of a position should be organized in depth, and that a field of fire of 200 or 300 yards is sufficient for the main line of defence.

(B). Other criticisms directed against the Russians consist in stating that the choice of a defensive position of which the flanks rested on the sea was inexplicable.

The progress of these fortifications, mentioned above, explains this mistake: and the following extract, copied from the Memoirs of General Kuropatkin, exonerates the author of the scheme of defence:—" . . . the following principles were adopted as the bases of our plan of operations:—Firstly, the relation between the Russian and Japanese naval forces in the Far East is such, that the possibility of the defeat of our fleet cannot be admitted: and secondly, the disembarkation of the Japanese at Yinkow or in the Bay of Korea may be considered impracticable." Experience soon showed, only three months after the commence-

ment of the war, what a great error had been committed by the Russian Commander-in-Chief in expressing these principles.

(C). The Nan Shan position was, in our opinion, well chosen; it was, to all appearance, fortified and armed in a formidable manner; and was, by all accounts, bravely defended by the Russians; but in spite of this, the 2nd Japanese Army captured it after a one-day battle, without constructing any preparatory works, and even without the assistance of field defences, which would have given cover to the assaulting columns. We will now endeavour to make clear the reasons for our opinion.

It is sufficient to glance at the map of the fortifications of Nan Shan to notice that the Russians had massed their defences on their right flank. Two, three and sometimes four lines of accessory defences were arranged in front of the echeloned trenches, amongst which were placed four machine-gun emplacements and seven batteries, armed with 30 guns and mortars. On the left flank, where the heights are less than on the right, there were not many accessory defences, the length of trench is less, and some of the trenches themselves are normal to the coast, as if it had been thought that Kin-cho Bay was inaccessible and that consequently there was no possibility of their being enfiladed. Besides this, Forts Nos. 11 and 12 were unarmed, and as regards Nos. 8, 9 and 10, it is to be observed that the four guns in No. 8 fired towards the north, and the eight in No. 10 fired through embrasures towards the north east. In the same way only four guns of the eight in No. 9 Battery could be readily fired in the direction of Kin-cho Bay. Lastly it must be observed that the profile of all the works indicates that in the opinion of the author of the scheme of defence less thickness need be given to the parapets of the left flanks of the works, presumably because no attack need be expected from the west.

Putting aside the greater or lesser value of the combatants at Nan Shan, it must be remembered that fortifications do not defend themselves, as a passive defence must be absolutely condemned. The Russians, however, made only one counter-attack on their right, and neither official nor private accounts of the battle make any mention of a counterstroke on the left flank, which, besides being inadequately fortified, had to bear the attack of the invaders, who were helped by the flanking fire of their gunboats. The repeated onslaughts of the Japanese against the north and east fronts were repulsed one after the other, and the Nan Shan position fell into their hands when they had concentrated the fire of their land and sea guns against the weak spot on the Russian left, and had supported the artillery by the gallant assault of the 4th Division.

(D). The strength of the Japanese was 32,000 men with 180 Arisaka field guns (7·5 c.m.); the Russians numbered 16,000 men with the artillery enumerated above; but as G. H. Nojin states in his book *The Truth about Port Arthur*, only a small part of these 16,000 men fought at Nan Shan, the defence of which was confided to the 5th Regiment, which sacrificed itself, whilst the remainder of the defenders under the orders of General Fock stayed under the shelter of the Nan-kuan Hills.

General Langlois says " . . . the position is a secondary factor, the strength resides in the troops." Lord Roberts in treating of the defence of a position, explains what are the proportions in which the total dispos-

able force should be distributed between the two principal groups: the one detailed to occupy and defend the trenches, the other to form the general reserve, and adds " . . . we must not forget that the stronger the reserve, the greater will be the probabilities of success."

General Fock took this last principle into consideration, and organized a strong general reserve; but he forgot entirely that the principal strength of a position resides in the troops. The defence was conducted in an exaggeratedly passive manner.

(E). We have already stated, when speaking of the Russian left flank, that the fortifications of Nan Shan were defective. When we went over the ground we took the opportunity of considering the system of defence, which was afterwards reproduced on other sites, and which consisted in placing the batteries on the crests of the hills, each gun in a separate pit or behind a parapet, and below the guns one, two or three lines of trench normal to the probable direction of the attack. That is to say, the vulnerable zone for the Japanese shots, whether long or short, was perfectly well marked, as it was enclosed between the crest of the hill and the trench at the lower level. In confirmation of this view, it will be seen from *Plate* II. how many works and trenches fall within the line of fire of a gun placed east of Liu-kia-tung and firing against Battery No. 6. It will thus be understood how it was that almost all the Japanese shell produced a useful effect, and that a few hours after the commencement of the bombardment, the Russian artillery, mounted *en barbette*, was put out of action, probably by the disablement of the gunners, as the victors captured in every case a good supply of ammunition and found the guns in their respective emplacements, generally speaking in good condition.

We have been unable to explain what induced the Russians to place four 6″ mortars in No. 6 Battery, on one of the highest points of the position, with a command of 288′, when they could easily have found a less visible site for them.

(F). The effect of the Japanese field artillery, although use was made of common shell filled with Shimoze powder, was small against the fortifications, and of no effect against the wire entanglements.

The troops of the IInd Army, in this their first battle, almost entirely neglected the use of field fortification; but the growing importance which was afterwards given to this means of defence, was most marked as they advanced northwards against the troops of General Kuropatkin.

In this connection we will mention a detail which is of some interest. As is known, the Arisaka gun was not provided with a shield. In the first battles the gunners confined themselves to making small parapets to the right and left of the gun for the purpose of protecting the gun numbers. Soon afterwards the use of gunpits became the custom; still later wooden shields were constructed in the theatre of war for the field guns, and were afterwards replaced by metal ones, sent from Japan. Finally at the Sha Ho guns were sited in provisional casemates. All this shows that the Japanese, who were always on the offensive, endeavoured to cover themselves from the enemy's fire, in such a way as not to hinder their making full use of their arms, and for this purpose

they took advantage of the ground, of shields, sandbags, etc., that is to say of field fortification in its various aspects.

Summary.—In concluding the first part of this study, we will make the following brief summary :—

(1). The Russians were right in fortifying and defending the Nan Shan position.

(2). The works attacked by the Japanese, though sufficiently complete in their details, were far from perfect in their general organization.

(3). The scheme of permanent forts drawn up by the Engineer Schwarz would perhaps have been a preferable solution.

(4). The principal cause of the defeat of the Russians was the passivity of their defence. The limited use of their mobility and of that reserve which, according to Lord Roberts, is the bearer of success, was fully apparent.

(5). When the Nan Shan had been lost, the Russians should not have retired, abandoning Dalni and Ta-lien Wan, but should have defended the Nan-kuan Ling.

(6). The use of field fortification is as necessary for the attack as for the defence.

'M.'

TRAVELLING IN THE AIR.

By Col. J. E. Capper.

Now that travelling in the air by means of dirigible balloons and aeroplanes must be looked on as an ordinary procedure in war, and as likely to be greatly developed for peaceful purposes, the accompanying paper on "Map Making by Balloon Photography," communicated to me by Capt. Scheimpflug of the Austrian Army is likely to prove of interest to R.E. officers.

There seems to be every reason to believe that the exceedingly ingenious apparatus he has evolved will be of the greatest assistance in enabling correct plans of defensive works, etc., to be rapidly obtained and entered on existing maps for military reconnaissance, and that, in the absence of accurate maps, his method of map making by photography from dirigible balloons will be of great value for the reconnaissance of country in war, or for exploration work and check surveys in peace.

For military reconnaissance, where finished contour maps should not be necessary plastic views giving stereoscopic effect in a special stereoscope can be quickly evolved—and require a comparatively small equipment of instruments.

J. E. Capper.

Scheimpflug's Balloon Apparatus

consists of a central camera which at the moment of exposure points vertically downwards, and of a ring of inclined cameras fixed around the central one in such a way as to take oblique photographs in all directions towards the horizon, slightly overlapping one another and the central photo.

All these cameras are photogrametrically adjusted; that is, they are provided with reference marks, and the focal distance of each objective, and the angles between all the optical axes are accurately ascertained.

A well-built and adjusted apparatus of this description for balloon purposes is an instrument which is capable of measuring angles to within 15 to 20 seconds of arc. With photographs taken from a height of 3,000′ to 6,000′, this means an error of only 4″ to 8″ in the location of landmarks—ordinary surveys can never attain such accuracy in every detail.

The shutters of all the cameras work by one common mechanism, and can be operated either pneumatically or by electricity, the latter being necessary where the camera alone is sent up.

Provision is made for a rapid levelling of the apparatus at the moment of exposure—except in the case of captive balloons or kites, where violent oscillations frequently interfere.

When required, such balloon apparatus can be constructed with levels and a small compass, which are automatically photographed on the plates and thus indicate the inclination and direction of every exposure.

The present apparatus is built for glass plates; they ensure irreproachable results, but in comparison with roll films have the disadvantages of greater weight and slower manipulation in changing. Scheimpflug recently conceived an idea which he hopes will help him counteract the influences of possible distortions in films. The use of films would materially increase the number of views that can be taken during each ascent.

As now constructed the apparatus, when carefully levelled, photographs a circular area the diameter of which is about equal to five times the height of the camera above the grouud, that is, about 2 square miles from a height of 1,500′, 8 square miles from 3,000′, 32 square miles from 6,000′, 128 square miles from 9,000′.

In practice, the apparatus has fulfilled the highest expectations: on three ascents Scheimpflug obtained about 75 views without the slightest hitch; all the photographs were faultless except four panoramas, where the plates proved imperfect. Scheimpflug therefore has given practical proofs that the opinion frequently expressed, viz.: that balloon photography presents excessive difficulties, is incorrect.

SCHEIMPFLUG'S PHOTO-PERSPECTOGRAPH.

This instrument transforms perspective views by photography, and consists in the main of a photographic objective between two plate carriers, with the necessary accessories for photographic reproduction. The plate carriers are not restricted to positions which keep the plates perpendicular to the optical axis, as for ordinary reproductions; the carrier can be set at any angle, and the plates can be made to slide or revolve in their planes. Scheimpflug discovered the laws that govern the relative position of plates and objective for any angle and scale required in the transformation.

His first model was constructed for reducing the oblique photographs obtained by the lateral cameras of his balloon apparatus to the plane of the central photograph. As the optical axes of the lateral cameras all form a permanent angle with that of the central one, it was possible to fix the plate carriers at a permanent angle also; the apparatus is therefore comparatively simple, and very rigid. In Model II. only one plate holder is fixed, the other is movable; this allows of a transformation at different angles or to different scales, but not both together in any desired combination. Model II. proves particularly useful for various industrial purposes.

In Model III. both plate holders are movable, and thus transformations as to angle and as to scale can be performed at one setting.

Where the angle of the required transformation and its scale are known, the setting can be calculated and effected, as the apparatus is provided with the necessary linear and circular divisions and indices.

But, in balloon photographs this angle is usually known only approximately, and there are other practical difficulties when it becomes necessary to transform a balloon view in such a way that it agrees with a given skeleton map. For this purpose an automatic focussing appliance is essential, in addition to the interdependence of the plate holders, which exists already in Model III.

Several years' experiments and a new, still unpublished idea, the product of Scheimpflug and Kammerer's joint studies, led to the construction of an instrument of precision fulfilling all the requirements in balloon photogrametry. While Model III. still requires two differential operations for transformation at *small* angles, the latest construction can transform at angles from 57° down to 0°; in addition it focusses the plates automatically and can resolve compound distortions. Different sizes of plates can be used, and the shapes of the reproductions, as well as their scale, can be adjusted at will. With an instrument of this kind one can either determine, from the readings on the divisions, the orientation of a view (by "optical coincidence" *i.e.* by adapting a transformation to a given skeleton map), or inversely, effect the required setting on the divisions for the given orientation of a view. The object of these operations is explained in the following.

Scheimpflug's Process of Balloon Photogrametry.

The utilization of balloon photographs for military reconnoitring and for the verification of existing maps has been frequently attempted, and there are already the beginnings of a technique in this direction, but the endeavour to utilize balloon photographs for actual map making encountered a variety of serious obstacles.

Firstly, the position from which the views are taken can rarely be ascertained with sufficient accuracy for geodetic purposes. Secondly, in most cases the balloon camera is but imperfectly levelled; the views are therefore distorted and their inclination is not known with sufficient accuracy. The prevalent geodetic methods, for determining the position and inclination of the views, fail, because the angle of vision of an ordinary camera is too small and the apparatus cannot be accurately adjusted. Even the best existing maps are not so precise that all landmarks can be implicitly depended upon; triangulation marks, which are reliable, are too sparse, and are frequently buried underground, so that they cannot be identified on the photograph; churches and chapels are almost the only objects available for orientation, but there are rarely as many as three (the required minimum) such points within the angle of vision.

These and other difficulties rendered a systematic use of balloon photographs for geodetic purposes impracticable. These difficulties are however got over by the little appreciated fact that the geometrical relations between a photograph and a good map of a flat tract of land are such as not to exclude the transformation of the photograph to a map, even where the position of the balloon and inclination of its camera are not accurately known, for, the photograph and the corresponding

portion of a map are perspective, and can be related to each other in accordance with the rules of projective geometry; with certain precautions this holds good even for other than flat regions. The transformation can, and has already been attempted by calculation and design, but this method is necessarily tedious and inaccurate. Scheimpflug considers himself entitled to lay claim to having been the first who tried to transform balloon views into actual maps by photography, and who created, theoretically and practically, the necessary instruments for this purpose.

The first task consisted in enlarging the field of vision of the balloon camera. This he accomplished by his balloon apparatus described above. From the fact that accuracy in the determination of geodetic positions by the prevailing methods increases approximately as the square of the field of vision, it becomes evident what advantages an angle of vision of about 140° affords compared with one of only 60°.

The deficiencies of balloon photographs due to inadequate adjustments of the camera were eliminated by the application of a new method for adjusting the balloon apparatus, which thus becomes as efficient as a theodolite, for measuring angles.

To make himself independent of maps—which are either not accurate enough or may not exist at all—Scheimpflug made experiments in two ways; on the one hand he invented and developed the method of "optical coincidence," which enables him to fit empirically the transformations of balloon views of unknown orientation upon existing maps and to determine thereby the inaccuracies of such maps as well as the orientation of the views; on the other hand, he succeeded in deriving a correct map from two balloon photographs of one and the same tract, but taken from different, though unknown positions. This latter method is particularly important for surveys of countries where no maps exist as yet.

Supposing now that the photographs are taken from a free balloon with a balloon apparatus as described above, and that the consecutive positions from which they are taken are chosen in such a way that the "panoramas" overlap one another well; further, that the apparatus was levelled approximately and that its remaining inclination can be determined from the images of the levels on the photographs, then the proceeding is as follows:—The photos are developed and diapositives made therefrom. The views taken by the outside circle of lenses are reduced to the plane and scale of the central one, by which they take the shape of trapeziums; these are then fitted around the central view, forming one "panorama." Up till now the plates had to be copied and the copies cut up and fitted together by hand, but a special appliance recently invented by Scheimpflug will enable him in future to do this joining most minutely.

The panoramas have then to be reduced to perfectly horizontal perspectives, either on the basis of the indications of the levels on the photographs or, where maps exist, by means of a photo-perspectograph, or by another new method thought out by Scheimpflug.

From panoramas thus accurately levelled a contour plan can be derived in various ways: either graphically or by calculation or by

means of a stereo-comparator. These contour plans serve for the reduction of the level panoramas to true vertical projections. In order to carry out this reduction Scheimpflug invented a "Zonal Transformer," based on the following observations:—In balloon views the images of points appear the further *outside* or *inside* their vertical projection, the *higher* or *lower* they are, and the further they are away from the plumb line through the position from which the view is taken. Contour areas above the mean level consequently appear larger, below the mean level smaller, than their true orthogonal projections. It is therefore only a question of reducing or enlarging the perspective projections of the successive areas in the ratio of their distances from the mean level, and with regard to the plumb line. The "Zonal Transformer" can do that photographically.

The orthogonal projections, reduced to the desired scale, can then be joined into maps bounded by meridians and parallels at right angles. There now only remains the names, altitudes, boundaries, etc., to be added. Important details can be accentuated and the contour zones toned off according to their heights; then the map is ready for reproduction by any of the approved methods.

In the case of photographs taken from captive balloons or kites, the readings on the levels, as photographed on the plates, are not reliable owing to sudden and violent oscillations; therefore the views must be located by geodetic methods dependent upon landmarks. Three points are requisite and sufficient for each panorama; they are determined orthogonally by triangulation, then marked on the focussing screen of the perspectograph in a perspective projection corresponding with the level bird's-eye view to be derived from the panorama, and with approximate data for the position of the balloon camera. The balloon view is then projected upon the focussing screen in that transformation which brings the images of the landmarks into precise coincidence with the identical marks on the screen. Now the divisions are read off from the perspectograph, and from these readings the position of the balloon and the inclination of the view are calculated. The transformed view is photographed and supplies the level perspective. From the scale of the markings on the focussing screen and from the inclination of the original view, calculated from the readings on the apparatus, the correct position of the balloon can be determined, from which in turn the horizontal projection, the contour plan, and the final map are derived.

Instead of expensive and slow triangulation, existing maps may be used for the transformation of a balloon view into a horizontal perspective, and for its orientation; insufficient accuracy in the required points is compensated for by the great number of available points: roads, paths, railways, etc., are especially valuable as they are usually very distinct on the views and accurate on the maps. In this case a photographic copy or, still better, a skeleton tracing of the map, omitting inessential details, like hatching, etc., reduced to the proper scale, is put on the focussing screen, and the balloon view is brought into the closest possible coincidence, so as to minimize small discrepancies and to eliminate gross errors in the map. The readings on the divisions of the

perspectograph supply the necessary data for the calculation of the position of the balloon and of the inclination of the view.

In coast surveys from ships, when triangulation is either impossible or impractical, the outline of the coast may be obtained by stereoscopic views taken with two apparatus, fore and aft, accurately adjusted in their relative positions. The coast line thus laid down can serve for the orientation of views taken by captive balloons or kites sent up from the ship. The subsequent procedure is as described above. This method offers particularly good chances of success because balloon photographs show details at a depth of 10′ to 15′ under water and thus may replace the tedious process of sounding in the ordinary way.

RECENT PUBLICATIONS OF MILITARY INTEREST.

JULY, 1910.

(*Published Quarterly*).

THE following extracts from the list compiled by the General Staff, War Office, are published in the *R.E. Journal* by permission of the Army Council.

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*PART II.**

SECTION I.

AERIAL NAVIGATION.

AIRSHIPS OF THE WORLD, 1910 (Die internationalen Luftschiffe, 1910). By Capt. Neumann. 102 pp., with numerous illustrations. 8vo. Oldenburg, 1910. Gerhard Stelling. 4s. 6d.

The author is the Director of the new School of Aeronautics founded by the German Aeronautical Society at Friedrichshafen in October, 1909, and the information contained in the book concerning the details of construction of the airships of the various States up to February, 1910, may be taken as reliable. Aviation is not dealt with.

Many interesting details, hitherto not published, are given regarding German airships. The Parseval airships have received a nomenclature (A-G) according to the type of construction. A-II. and B-I., for instance, are the P-I. and P-III. owned by the State.

The following table shows, according to the author, the number of airships built, building and projected throughout the world :—

State.	Built.	Building.	Projected.	Total.
Germany	14	7	3	24
Belgium	1	1	—	2
England	1	1	2	4
France	5	1	3	9
Italy	2	2	—	4
Austria	1	1	2	4
Russia	1	1	—	2
United States	1	—	—	1

Readers are warned that pages 2 to 15 are not bound in chronological order and must not be confused when reading the accounts of the "Belgique II." and the "Parseval A-I.," the details of which are mixed up together.

BOOKS OF REFERENCE.

WEAPONS OF WAR (Waffenlehre). By Major-General R. Wille. 48 pp. 8vo. Berlin, 1910. Eisenschmidt. 2s. 6d.

This forms the sixth bibliographical addendum to the third edition of Major-General Wille's exhaustive treatise on literature dealing with weapons of war. The following are new headings of this year's addendum :—"Captive balloons, airships and aeroplanes." "Projectiles and weapons for their equipment and attack." "Searchlights."

CAVALRY.

WAR AND THE ARME BLANCHE. By E. Childers. 379 pp., with Introduction by Field Marshal Earl Roberts, V.C., K.G., and index. 8vo. London, 1910. Edward Arnold. 7s. 6d.

* The titles of all books are given in English; this does not indicate that the books have been translated. The original title in the language in which a work is written, if not in English, is given in brackets.

In this book Mr. Erskine Childers maintains, and claims to have proved, that for mounted troops in modern war the *arme blanche* is "as dead as the dodo." The essential points of the theories he advances are—that the rifle is always the master of the sword; that although the latter may be of use on some occasions those occasions are very few, and that even then the rifle can be used instead of the sword, with better results; that it is as impossible for mounted troops to become efficient in the use of both rifle and sword as it is for a man to serve two masters; and that the only way to ensure the efficient training of our cavalry in the use of the rifle is to deprive it of lance and sword altogether. Mr. Childers favours bold offensive action, but always with the object of overwhelming the enemy by fire and never with the object of using cold steel. Cavalry charges he believes in, but not the charge as now understood; in his view cavalry should charge to "within 5, 10, 50, or 100 yards" of the enemy, and then shoot him down, either from the saddle, or dismounting to fire. In the term "cavalry" he would include all mounted troops, maintaining that all should be armed alike and act on the same principles. Fire from the saddle should be freely used, even, it would appear, when moving at speed, as in pursuit.

* * * * *

Although we maintain that the *arme blanche* is by no means obsolete, it must be admitted that if Mr. Childers's contention could be upheld as to the impossibility of training cavalry to the efficient use of both rifle and cold steel, there would be a strong case against the retention of sword or lance. The arguments given in the foregoing pages refer more particularly to the battlefield, on which the results of all military operations are decided. Even on the battlefield, however—still more in the operations preceding the battle—it cannot be denied that for one opportunity of using cold steel effectively there will be many of using the rifle. For this reason there can be little doubt that, if cavalry cannot be made efficient in both weapons and must be restricted to one, that one should be the rifle.

* * * * *

We believe that cavalry which is capable of using either weapon, as occasion may demand, will be more useful in war than cavalry which can only use one of the two. We believe that the possibility of becoming efficient in both must remain a matter of opinion until cavalry which has been carefully trained to both has been fully tried in war. And we believe, meanwhile, that the opinion of experienced cavalry officers on training is a safer guide to follow than the opinion of Mr. Childers. Their opinion is that regular cavalry can be trained to both. It must be remembered that our present peace training aims at producing dash, cohesion and discipline, combined with an offensive spirit and good horsemanship; and that, even if Mr. Childers proves correct in his views, the time spent in inculcating these qualities cannot be said to have been thrown away, unless it can be proved that the training in fire tactics has been neglected in consequence to a dangerous extent.

* * * * *

The combination of the power of the two weapons seems to us the ideal to aim at and we cannot agree that it is beyond our reach.

It may be that there is sometimes a tendency to favour training with the steel weapon at the expense of training with the firearm. We agree that this is unsound, but we do not agree that it is necessary to take away sword and lance altogether in order to correct this tendency, and we think that in proposing such a remedy Mr. Childers has rushed into the extremes that he complains of in others.

FORTIFICATION AND MILITARY ENGINEERING.

THE ORGANIZATION OF GROUND ON THE FIELD OF BATTLE (L'organisation du terrain sur le champ de bataille). By Capt. G. Bastien. 172 pp., with diagrams. 8vo. Paris, 1909. Lavauzelle. 2s. 6d.

The leading idea of this book is the defensive-offensive to check the attack in such a manner as to enable an effective counter-stroke to be delivered.

The defending troops are divided into the advanced guard, occupying detached entrenched positions in front, and the main body, entrenched in rear. The advanced guard is to check and, if possible, immobilize the enemy; the main body is to counter-attack him.

The general officer commanding decides as to the tactical organization of the defence. He then divides the ground and the troops into sections, and the commanders of sections ride forward to reconnoitre and report as to the entrenchments which will have to be constructed. On receiving these reports the general officer commanding distributes the technical troops, tools, etc., to the sections, and he and the Chief Engineer ride round to see that touch is maintained between the defences of the sections.

In the meantime the troops march straight to their sections and commence work with the 181 portable tools carried by each company. If the time available is short, the tools, etc., are distributed without waiting for section reports.

The tactical organization of the defence is based on the lines of attack open to the enemy. Each such line is guarded by a separate section of the advanced guard. The main body is stationed in the offensive section, that is, the section most favourably situated for delivering a counter-attack.

The entrenchments of each section consist of natural or artificial supporting points connected by successive lines of detached trenches or works. Dummy entrenchments are freely used.

Each individual position is defended at first by long-range fire from advanced posts and from guns under cover behind the position. The main line of defence is not disclosed till the attack advances to short range.

Dead ground in front of the position must be held, unless it can be swept by flanking fire.

Natural parapets are to be used as far as possible; failing these, shelter trenches with low inconspicuous parapets must be dug.

In arranging entrenchments, the guiding principle is: "Do everything which, if you were attacking, you would wish the defender not to do." An example illustrating this principle, with a sketch map, is given.

It is probable that the men and tools available will not suffice to execute all the necessary works; they must be carried out successively rather than progressively, in order of importance. Reliefs must not exceed two hours. Ploughs are of great assistance in making trenches.

In Part II. the theoretical propositions laid down in Part I. are applied to a concrete case, that of a division defending the valley of the Oise. The example is worked out in great detail, and includes general and special ideas, appreciation of the situation, orders and reports. The reconnaissance of the section held by one battalion is described, and the distribution of the companies and tools is given. The works to be constructed are discussed. A specimen of battalion orders for the execution of the defences is given; this is very elaborate, and would take an hour to write.

A second example, based on the same situation, deals with the entrenchment of the main body of the force; this is treated in the same way as the first example, but the tactical situation is discussed at much greater length.

A feature of the book is the amount of written work, including reports, returns, orders and distribution tables which the author expects the officers to execute. The author requires the commander of a section to decide every detail of the works to be executed, and leaves nothing to the initiative of subordinate commanders on the spot.

ENGINEERS IN COMBINATION WITH THE OTHER ARMS (L'Emploi des Troupes du Génie en liaison avec les autres Armes). By Capt. Camut. 72 pp., with 1 map. 8vo. Paris, 1910. Chapelot et Cie. 1s. 6d.

This is a useful book for the young Royal Engineer officer. The author takes the tactical problems set in the *Journal des Sciences Militaires*, and shows what part the divisional and army corps engineer companies ought to play in the solution. Especially interesting is his insistence on the necessity of the officer commanding a company reconnoitring the country in advance of his unit, and thus seeing what are the likely tasks it will have to perform and what are the available local resources.

FIELD FORTIFICATION. PART I. TECHNICAL [Règlement pour l'instruction speciale des troupes du génie dans l'Armée Russe. Fortification de campagne Partie 1^e^. Technique]. (Translated into French by Capt. G.

Wehrlin and Capt. J. Virlet). Published by the French General Staff. 272 pp., with 204 plates and illustrations. 8vo. Paris. Chapelot et Cie. 3s. 4d.

The Russian Manual of Field Fortification gives evidence of the changes which have been introduced into field engineering methods by the experience gained in the Russo-Japanese War. Fieldworks of all kinds played a prominent part in that war; and the deliberate nature of the operations led to a development of works which differed little from those formerly admissible only in siege warfare. This development does not detract from the value of the lessons of the Russo-Japanese War, but discretion must be exercised in their application. The necessity for the concealment of works, and for ample means of communication within and to them are keynotes of the book. The entrenchment of machine guns and of field artillery is dealt with exhaustively, 65 pages and 50 plates being devoted to artillery alone. The sections relating to the organization of defences and redoubts, the preparation of villages and woods for defence, and the use of ground are of peculiar interest. The illustrations, though small, are clear; dimensions are given in metres. The translation is well worth study, and should prove of particular interest to artillery officers.

Features of the book.—Chapter I. deals with fire trenches, shelters, communications, cover for machine guns. The machine-gun emplacements are usually designed in pairs. An example is given of an entrenchment for four machine guns, placed in front of the main firing line so as to flank its whole length. Chapter II. treats of the entrenchment of field artillery. The tactical siting of gun positions is considered; many varieties of gun and howitzer emplacements are illustrated, observation posts, telephone and battery commanders' shelters and facilities for ammunition supply are dealt with in detail. Chapter III. is concerned with closed fieldworks and redoubts. The necessity for traverses and blindages is emphasized. A thickness of 7′ of earth is the protection proposed to resist the fire of field howitzers. Chapter IV. is devoted to the organization of field entrenchments, both as regards development of fire and for the convenience of the troops. It includes matters such as the supply of ammunition, ranging, rifle rests, provision of latrines and water supply for the fighting troops. Chapter V. discusses the tactical organization of defences, the special treatment of roads, railways, houses, villages and woods for defence. Examples are given showing defences proposed for typical Russian, German, and Chinese villages. Special attention is drawn to the preparation of a second position, and to the delivery of counter-attacks in such cases. Chapter VII. deals with obstacles of all kinds. Chapter VIII. refers to methods of concealment, the use of dummy trenches and masks of smoke. Ten appendices contain tables of tools, calculations of labour and materials, range tables, penetration data, etc.

THE TACTICAL EMPLOYMENT OF FIELD FORTIFICATIONS (Essai sur l'emploi tactique de la fortification de campagne). By Colonel L. Piarron de Mondesir. 132 pp., with 9 maps and diagrams. 8vo. Paris, 1910. Berger-Levrault. 2s. 6d.

This is the fourth edition of a well-known work first published in 1904. The author, formerly a professor at the French Staff College, is a great authority on all matters connected with military engineering, and the theories advanced by him in this volume are of considerable interest.

Colonel de Mondesir has divided his book into three parts; the first deals with temporary field fortifications pure and simple, the second with semi-permanent defences, and the third with a concrete example of the works to be executed in the occupation of a position. Parts I. and III. are the most interesting, and the author has stated his opinions and theories with much ability. Perhaps the most important of his contentions is that troops acting on the defensive should generally occupy the rear edge of a plateau, where they are less exposed to the fire of the hostile artillery. Colonel de Mondesir says that the forward slopes of such a position can be swept by oblique fire, whilst the direct fire of the defenders should be reserved for the moment when the attacking infantry has reached the forward crest. He insists that the adoption of a defensive attitude must be only temporary, and that the offensive must be assumed as early as possible with all the available strength, a principle which is in accordance with our own regulations.

THE PRINCIPLES OF FORTIFICATION AND COMMUNICATIONS (Grundriss der Befestigungslehre sowie des Verkehrs-und Nachrichtenwesens). By Capt. W. Stavenhagen. 338 pp., with appendix 60 pp., 8 plates, and an index. 8vo. Berlin, 1910. Mittler. 11s. 6d.

This is the fourth edition of the treatise, the previous edition having been written prior to the Russo-Japanese War. It is a very comprehensive work, and the principles are copiously illustrated by references to all the most important existing inland and coast fortifications.

The work is divided into two parts. Part I. deals with Fortification, and is subdivided under the headings: "Peace, or Permanent Fortifications," and "War Fortifications." Under Peace Fortifications the author discusses the defence of a State by means of fortifications, illustrating this by the methods employed by Germany, France, Russia, the British Empire, and other Powers. In the tactical and technical portion of this subhead both inland fortresses and coast defences are dealt with in detail.

War fortifications are treated under the headings of Provisional and Field Fortifications, and there are numerous references to the methods employed in various countries and in actual wars.

Part II. deals with the science of communications. Under this somewhat comprehensive heading the author treats of land communications (viz., roads, railways, and mechanical transport), water communications, and the communication of news and orders. Under this last subhead are included telegraphy, airships, motor cycles, *ski*, field post-office and pigeon-post. A chapter is devoted to methods of interrupting communications.

The appendix deals with the details of weapons, materials, dimensions of works, etc., and contains a very useful list of modern literature on the subject of fortification. Some 200 illustrations are contained in the plates at the end of the book.

HISTORICAL.

THE MILITARY LIFE OF MARSHAL NEY. Vol. I. (La Vie Militaire du Maréchal Ney). By General Bonnal. 418 pp., with portraits, autograph letters, and 8 maps. Large 8vo. Paris, 1910. Chapelot. 8s. 4d.

The first instalment of General Bonnal's work covers 35 years, from the birth of Ney on 10th January, 1769, the same year that Napoleon and Wellington entered the world, until 5th January, 1804, when he was the representative of the Republic in Switzerland. There is no preface, but it is evident from the contents that the volume is mainly based on the personal papers of the Marshal. A military account of the operations in which he took part is added to make a continuous and coherent history. The work is not so much a biography as the story of the hero's public life.

The son of a cooper, Michel Ney, familiarly known to his comrades and men as "Rougeot" (Carrots), first tried life in a notary's office and an iron foundry; at the age of 20, less one month, he ran away from home and enlisted in the cavalry and found his career. He served over two years before getting his corporal's stripe and a year more before he was sergeant; then war broke out and 4½ years later he was general of brigade. His rapid promotion was due partly to election by his comrades and partly to reward for personal bravery.

Ney seems to have had considerable doubts as to his own ability for high command; in April, 1799, he formally refused the promotion to general of division, writing in his official letter, "I should have accepted the honourable decision if my talents were able to respond to the benevolence of the Government." The Directory persisted, however, in promoting him. When ordered later in the same year to take over the temporary command of the Army of the Rhine, Ney again addressed the Directory, and asked them if they had "weighed the insufficiency of my military qualifications for such an important post in these critical times." Although he had no great knowledge he had at least "energy, activity, intelligence, in a word, the will to conquer," and the esteem of the army, valuable assets which his predecessor Leonard Müller never possessed. His want of confidence in himself was exhibited even in his wooing.

As a commander of an army General Ney issued very "detailed instructions, one for

each large unit, in which the cantonments of companies and squadrons were determined, the alarm places fixed, the principal eventualities indicated, with the measures to be taken in each case." "The Commander-in-Chief, it is seen," says General Bonnal, "entered into details and gave minute orders instead of fixing the object to be attained and leaving the choice of means to his lieutenants. This vicious method, employed on account of the prime incapacity of the subordinates, was continued during all the wars of the Revolution and Empire; it gave brilliant results as regards unity of action, but such results could not be but ephemeral; for a commander, even if he is a Napoleon, must exhaust and tire himself out if he has to foresee everything and order everything."

Ney's "General Instructions," issued when he was commanding the cavalry of the right wing of the Army of the Rhine, which consist of 23 articles, hardly give the impression of having been drawn up by a great cavalry commander; *e.g.* :—

"Article 8.—By day and while advancing, each regiment will be preceded by a section as advanced guard.

"Article 9.—Bivouacking will always be resorted to with exceptions. (As General Bonnal remarks, 'the bivouac is deadly to cavalry').

"Article 10.—Boot and saddle 3 a.m., relief of piquets 4 a.m., while the main body mounts and awaits orders. (This was, however, the custom of the time).

"Article 12 (Article 11 is lacking).—The brigade commanders and paymasters will occupy houses near the bivouacs so that they can devote themselves to clerking. (*Se livrer aux travaux d'écriture*).

Article 22 is the best. It reads: "Carbines carried *en baudoulière* having caused great inconvenience in the recent campaigns, a number of troopers have lost them. The carbine is therefore to be carried by the horse by means of a system of straps."

In 1797 General Ney transferred to the infantry a hussar "for having killed several Government horses by overriding them." In notifying this he says "I hope that this example, which has already had the best effect, will obviate the necessity of my having to give a similar punishment for a long time," and General Bonnal remarks, "This is a right that generals commanding cavalry divisions should have at all times."

Generally the book will be found of interest because it gives a good picture of army life of the period and of the relations of the generals to their staffs and troops. It confirms the view usually held with regard to Ney that his sword arm was better than his head, that he was a loyal subordinate, but without the instruction and education necessary to make a good tactician or a clever strategist.

ORGANIZATION AND ADMINISTRATION.

SUPPLY OF ARMIES IN THE FIELD (Verpflegung der Armeen im Felde). By Feldmarshalleutnant Otto von Meixner (Austrian Army). 103 pp., with map. 8vo. Vienna, 1910. Seidel & Son. 4s.

The sixth and concluding section of this work is divided into two parts, of which the first deals with the Russo-Japanese War. The theatre of operations is first described with special reference to supply questions and communications, and then the opposing forces and the organization of their supply and transport services are dealt with in detail. In the second part of the book the supply services in the Austro-Hungarian, German and Russian Armies are studied.

VON LÖBELL'S ANNUAL REPORT ON ARMIES AND MILITARY MATTERS, 1909 (v. Löbell's Jahresberichte über das Heer-und Kriegswesen: XXXVI. Jahrgang: 1909). Edited by Major-General v. Fröbel. 484 pp., with 7 diagrams in the text and 8 illustrations. 8vo. Berlin, 1910. Mittler. 11s. 6d.

A change of editorship of this valuable annual has taken place, owing to the death of Lieut.-General v. Pelet-Narbonne, who was for many years its editor.

The same lines have been followed as in previous editions, Part I. being a guide to the military systems of foreign countries; Part II. dealing with the development of tactics, fortification, means of communication, material and recent military literature; while Part III. gives an account of the Spanish War in Morocco and the usual obituary for the armies of all nations.

The chief points of interest in Part II. are the reviews of new drill books or amendments, viz., Germany, Infantry Drill, p. 271; Cavalry Drill, p. 300; Foot Artillery Drill, p. 321; England, Field Service Regulations, p. 286; Japan, Infantry Drill, p. 276; and the general remarks on permanent fortification, p. 338.

POLITICAL.

British India (L'Inde Brittanique). By Joseph Chailley. 530 pp., and 2 maps. 8vo. Paris, 1909. Armand Colin. 8s.

M. Joseph Chailley, who has already established a reputation by his former works on Indo-China, Madagascar, etc., has spent 10 years over this book and has made several voyages to India for the purposes of study and at long enough intervals to enable him to form a correct estimate of his first impressions.

The book is divided into two parts.

Part I. contains chapters on the country itself and Native Society and Natives of all classes. Part II. contains chapters on the Native States of India, the Tribes and Chiefs in Burmah, Agricultural and Landowning Classes, Law, Justice, the Problem of the Education of Natives, the share of Indians in the administration of their own country.

The author does not formulate his conclusions and leaves the reader to form his own. The book is most carefully and thoroughly written.

Chapter II. Part I. gives an interesting account of the present situation from a Frenchman's point of view.

TRAINING AND EDUCATION.

The German Staff College Entrance Examination Papers, 1910, with Solutions (Die Aufgaben der Aufnahmeprüfung, 1910, für die Kriegsakademie). By Major Krafft. 66 pp. 8vo. Berlin, 1910. Mittler. 1s. 6d.

This book contains the papers set at the 1910 examination for admission to the *Kriegsakademie*, together with solutions and hints as to what to read in order to prepare oneself for the examination. The various subjects are as follows:—Military history, tactics (general and applied), technique of artillery and small arms, fortification, reconnaissance, topography, history, geography, languages (French, English and Russian), mathematics.

STRATEGICAL AND TACTICAL.

Tactical Problems (Première Série de Travaux Tactiques publiés par le Journal des Sciences Militaires. Thèmes et Solutions). 5 maps. Paris, 1909. Chapelot. 3s. 4d.

A useful collection of tactical problems and their solutions. The general idea, taken from the situation at the end of December, 1870, is the same for the entire 18 problems. The French maps are at first somewhat difficult to read. The book is interesting because the solutions have been worked out by a committee of staff officers and give an insight into the tactical ideas prevailing in the French Army.

A Précis of Strategy. By Brevet Lieut.-Colonel W. D. Bird, D.S.O. 171 pp. 8vo. London, 1910. Hugh Rees. 3s. 6d.

Colonel Bird deals with his subject in a clear, concise and attractive manner, and his book, which fills a want, should pave the way to a deeper study of the subject.

He bases his information mainly on the correspondence of Napoleon and Moltke and the works of Jomini, Hamley, Von der Goltz, Blume, Henderson, Derrécagaix, Bridge and Mahan.

He has divided his work into five short chapters dealing with—National defence, peace and war strategy, offensive and defensive, base and lines of communication, movements, plan of campaign, concentration, strategy as influenced by sea power, geography, obstacles, weather, moral factors, good information, strategical formations, exterior and interior lines, positions on the flank of an advance, detachments, fortresses, pursuit and retreat, conduct of operations.

TACTICAL STUDIES ON THE CAMPAIGN OF 1806 (Études Tactiques sur la Campagne de 1806). By Capt. Bressonnet of the French Infantry. 395 pp., with 18 maps. Large 8vo. Paris, 1909. Chapelot. 10s.

This book is published by the Historical Section of the French General Staff. Its talented author died in 1908, before reaching the age of 40, and it has been prepared for the Press by Lieut. Boudot. It contains a very detailed account of the Battles of Saalfeld, Jena and Auerstedt, with comments.

While recent German authors have attributed the double defeat of Prussia on the 14th October, 1806, to her army having consisted of paid troops instead of a nation in arms, and to slavish adherence to the tactics of Frederick the Great, Capt. Bressonnet makes it clear that there was little to choose between the Prussian soldiers of 1806 and 1814-5. Jena and Auerstedt were by no means easy victories; they were purchased at very heavy loss, Davout's Corps leaving two-thirds of its numbers on the field, Suchet's Division one-third, etc., and the struggle on both fields lasted nearly 10 hours.

The French author considers—here agreeing with von Clausewitz, whose book *Nachrichten über Preussen in seiner grossen Katastrophe* (Information regarding Prussia in her great Catastrophe) he does not appear to have read, for he does not quote it—that the defeats were principally due to the incapacity of the Prussian commanders and senior officers, men promoted to high rank solely because they had held junior staff appointments or performed deeds of personal bravery in the days of Frederick. The great service rendered to Prussia by her King was that after 1806 he ruthlessly removed such individuals from the army.

As regards tactics it is stated that "it is entirely inexact to pretend that in 1806 two absolutely different tactics were in presence, just as it is not true to say that the French and Prussians practised the same tactics." The battles offer uniformly the aspect of two lines of battalions, more or less supported by reserves, deployed opposite each other at musket range and firing on each other for hours." One of the differences lay in the employment of skirmishers (*tirailleurs*, the equivalent of the modern scout, about 40 or 50 per battalion); the French used them to prepare and cover the advance of their units, the Prussians collected them and used them in the general line as light infantry; in consequence "the advance of the Prussian battalions in open ground was rendered more costly, but the absence of skirmishers did not prevent them holding their ground stubbornly and resisting vigorously until the action of fresh French troops on the weak points of the line or on their flanks obliged them to give way."

A further point of difference was the treatment of localities. "The French seized the villages and used them for manœuvres. The Prussians, on the contrary, seemed to avoid them. The latter, one would say, considered localities as an inconvenience in a pitched battle, the French looked on them as indispensable *points d'appui*." This use of localities gave the French an important advantage.

The secret of the victories is to be found in the skill with which the French generals understood how to adopt their formations to the ground and circumstances, to make use of localities, to put in their reserves and combine their efforts. The Prussians, on the contrary, lacked skill and resolution and acted without combination; they thought the essence of the Frederician tradition lay not in the vigorous offensive but in the use of echelon, and behind the echelons there was no reserve. "On the side of the French there was careful concentration, and at first a disposal of the troops in considerable depth. Their forces were deployed successively to present a line of fire as extended as that of the adversary; there was an extreme economy in the front line, but the distances used left room for manœuvre; finally, the reserves were handled parsimoniously, but expended to the last man at the decisive moment."

The author concludes that "the value of an army is to be measured entirely by that of its cadres and its generals. The soldier always fights well; but his efforts are always useless if the direction of the army lacks skill."

STRATEGIC STUDIES (Études Stratégiques). By Commandant Mordacq, commanding 25th Battalion of Chasseurs of the French Army. 270 pp. Small 8vo. Paris, 1910. Fournier. 2s. 11d.

Commandant Mordacq has produced a very attractive and valuable little work, simple enough to be understood by all who have a knowledge of military history, yet well worthy of study. At the close of the book he sums up his views, in agreement with Von Clausewitz, that "strategy represents an eminently simple art, yet difficult in the sense that before it can be approached, it requires long practice of the military profession and a profound knowledge of the tactics of the three arms." For these reasons he approves of its not being taught at the French Staff College "except incidentally in studying a campaign." "The officers who are at the college are too young, they have not yet acquired a sufficient maturity of mind to enable them to be initiated in the conduct of the masses which compose the armies of to-day." He thinks that an officer's military instruction should be completed by a course of strategy when he reaches the rank of lieut.-colonel, if it is intended to promote him to command.

Operations in Wooded Country (La manœuvre en terrain boisé). By Lieut. Barthélemy. 141 pp., with 18 Diagrams. 8vo. Paris, 1910. Lavauzelle. 2s.

The author has had considerable experience of forest life in the Vosges, and has produced a useful and interesting book. He shows the necessity of careful training for wood fighting, describes the different kinds of woods and their characteristics, and gives suggestions as to the tactical methods to be employed. He emphasizes the value of experts with a thorough knowledge of woodcraft, with special reference to the French "Chasseurs Forestiers," or forest guards, who should prove extremely valuable in a campaign on or near the eastern frontier of France.

TRAVEL AND TOPOGRAPHICAL.

Trans-Himalaya: Discoveries and Adventures in Tibet. By Sven Hedin. 2 volumes. 859 pp., with 388 illustrations from photographs, water-colour sketches, and drawings by the author, and 10 maps. 8vo. London, 1909, Macmillan. 30s.

Dr. Sven Hedin explains that his main object was to see with his own eyes the unknown districts in the midst of Northern Tibet, and, above all, to visit the extensive areas of unexplored country stretching to the north of the Upper Brahmaputra, which had never been seen either by Europeans or natives of India. He was strongly of opinion that there must exist one or more mountain systems, running parallel with the Himalayas and the Karakorum range, peaks and ridges, lakes and rivers, which had not yet been revealed to any explorer. He also wished to visit one or more of the great lakes of Central Tibet, which had been discovered by Nain Singh in 1874, but had never been seen by a European. The great traveller also desired to discover the source of the Indus, which had never yet been inserted in its proper place on the map of Asia.

On the 16th October, 1905, Dr. Sven Hedin left Stockholm and, travelling via Constantinople and the Black Sea, through Turkish Armenia, across Persia to Seistan and through the deserts of Baluchistan to Nushki, a journey which he dismisses in a very few words, reached Quetta in May, 1906. From Quetta he went to Simla, and thence to Srinagar and Leh. After obtaining a Chinese passport, permitting him to travel in Chinese Turkestan, he started on his adventurous journey from Leh on the 10th August, 1906.

Starting from Leh, the explorer reached Shigatse in February, 1907, having lost almost all his transport animals from cold, and after innumerable dangers and difficulties, and in spite of the numerous attempts on the part of the Chinese officials to turn him back. Leaving Shigatse in March, Dr. Sven Hedin, with one or two divergencies, followed the course of the Brahmaputra, and made for the holy lake of Manasrowar. Thence following the course of the Gartok River, he marched to Gartok. He touched the Nepal-Tibet frontier once, discovered the sources of the Brahmaputra, the Sutlej and the Indus, and crossed the Trans-Himalaya five times. He reached Gartok on the 26th September, 1907.

Once there, he realized that there was no chance of his being allowed to continue his explorations, so he determined to disguise himself and to return to Ladak, penetrate into Tibet from the north and traverse the whole country once more. In this way he hoped

to gain his object, which was to cross the space shown blank on all the maps of Tibet, and marked "unexplored."

He therefore made for Drugub, two or three marches from Leh on his original route, and thence, early in December, 1907, started once more. After striking due north for about 18 marches, he turned east for about the same distance, and crossed his first route again at a point on the southern boundary of the unannexed province of Aksai-Chin. Marching south-east, he traversed the unexplored country within the boundary of his first route and then, when about half-way across, he struck almost due south to the Brahmaputra, touching that river close to where he had struck it the year before. Thence he marched as far as the Lake Teri-Nam-Tso, and then, striking due west, he crossed the line of his second route some 20 marches north of the Brahmaputra, and again reached the holy lake of Manasrowar. From there he followed roughly the course of the Sutlej, and reached Poo on the 28th August, 1908. A few days later he was again in Simla.

THE GATES OF INDIA. By Colonel Sir Thomas Holdich, K.C.M.G., K.C.I.E., etc. 555 pp., with index and 5 maps. 8vo. London, 1910. Macmillan. 10s. 6d.

The work, which is described by the author as "an historical narrative," is one which will appeal strongly to the student of Asian geography. To a wide and intimate personal knowledge of the subject upon which he writes, Sir Thomas Holdich has added the results of prolonged study and research. Commencing with an examination of the earliest relations between East and West, he traces the history and geography of Central Asia in turn through the days of Greek, Arab, English and French exploration. Persia, Seistan, Afghanistan and Baluchistan, the "Gates" of India, are dealt with in exhaustive detail, and although the literature which has already been produced bearing on these same regions may be truly described as stupendous this latest addition to it can claim that it throws light upon many spots which have hitherto been obscure. It also points the way for further advances in directions in which modern science will enable the explorer of the future to unravel problems which were beyond the powers of those of days gone by.

SIKKIM AND BHUTAN. By J. Claude White, C.I.E. 326 pp., with a map, index and numerous illustrations. 4to. London, 1909. Arnold. 21s.

The book is the outcome of 21 years' experience on the north-east frontier of India. The author enjoyed unique advantages in studying the geography and people of Sikkim, Bhutan and Southern Tibet, and has succeeded in compiling a most useful and instructive record of his observations. Sikkim is first dealt with and a short history of the State is given, followed by interesting accounts of expeditions and explorations in the interior.

Bhutan is more fully treated and the historical account of the country given by the author is particularly valuable as it represents practically the only work that exists on the subject. Not the least interesting portion of the book is that which reviews and explains the foreign relations between Bhutan and the neighbouring states of China, Tibet, Nepal and India. A chapter is also devoted to the records of the various missions which have visited the country from as far back as 1774.

MISCELLANEOUS.

FINANCE AND WAR. By Capt. R. S. Hamilton Grace, 13th Hussars. 72 pp. 8vo. London, 1910. Hugh Rees. 2s. 6d.

A short book dealing with the following:—The cost of the principal wars during the past 200 years; how the cost of wars during the past century has been met; the effect of these wars on money; England compared with other nations as regards revenue and population.

The author concludes the book with some deductions. He holds that no nation will be stopped from plunging into war by the want of money; that loans will always be forthcoming; that the cost of war is not so stupendous as has been imagined, though it may be crushing to the vanquished, it may possibly be trifling to the victor; that during war money has little effect, it is before in preparing for it and afterwards in making peace that its effect is felt; that England should form a national insurance by preparing for war; that great wealth is of little avail against a successful invader.

WIRELESS TELEGRAPHY.

FIG. 1.

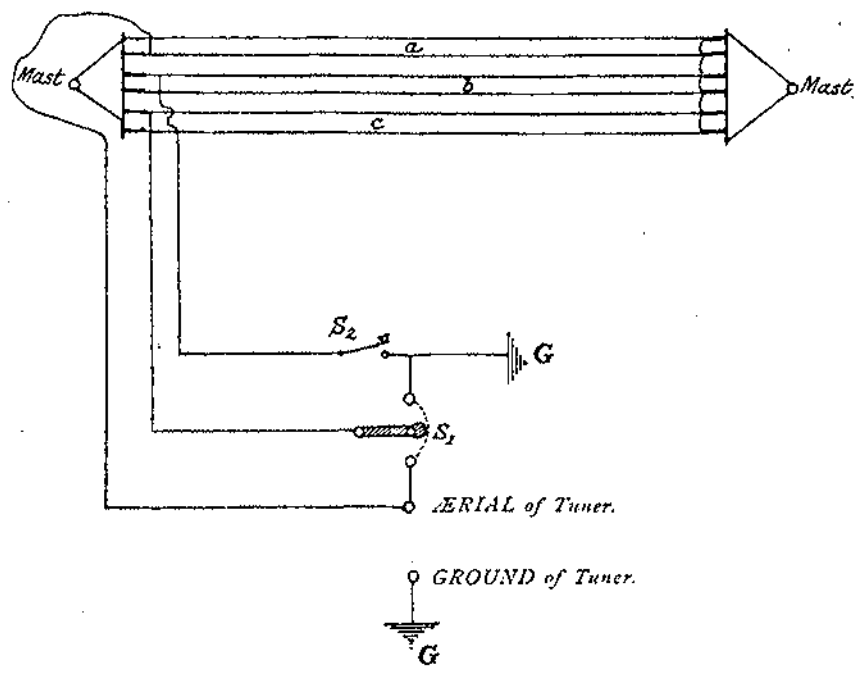
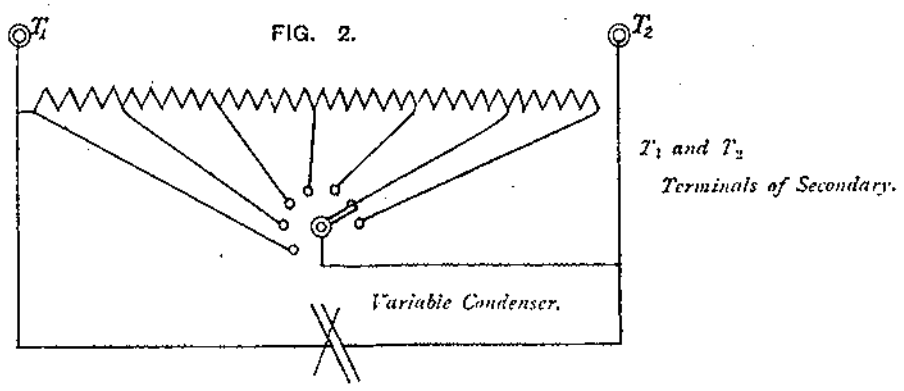
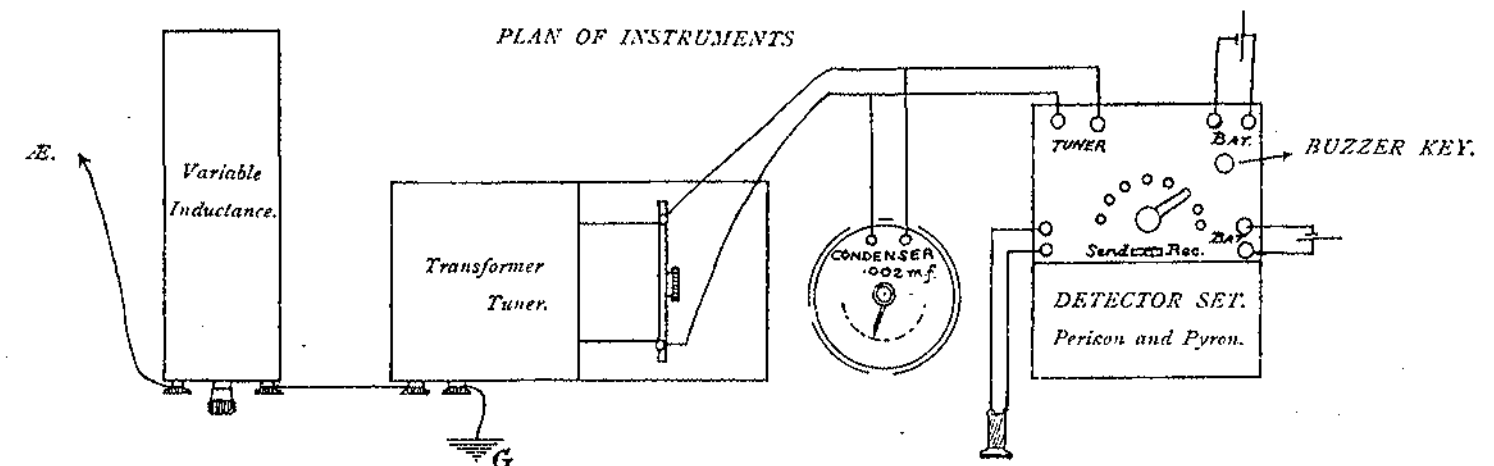


FIG. 2.



PLAN OF INSTRUMENTS



CIRCUIT DIAGRAM.

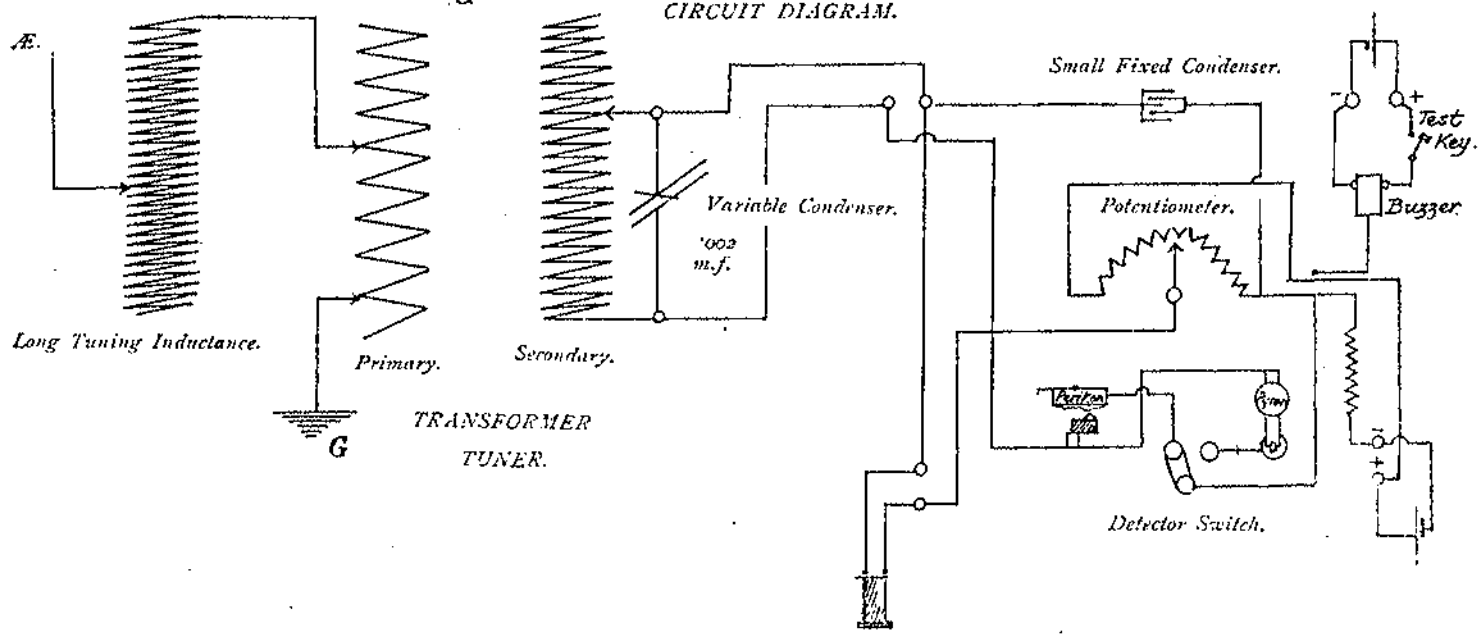
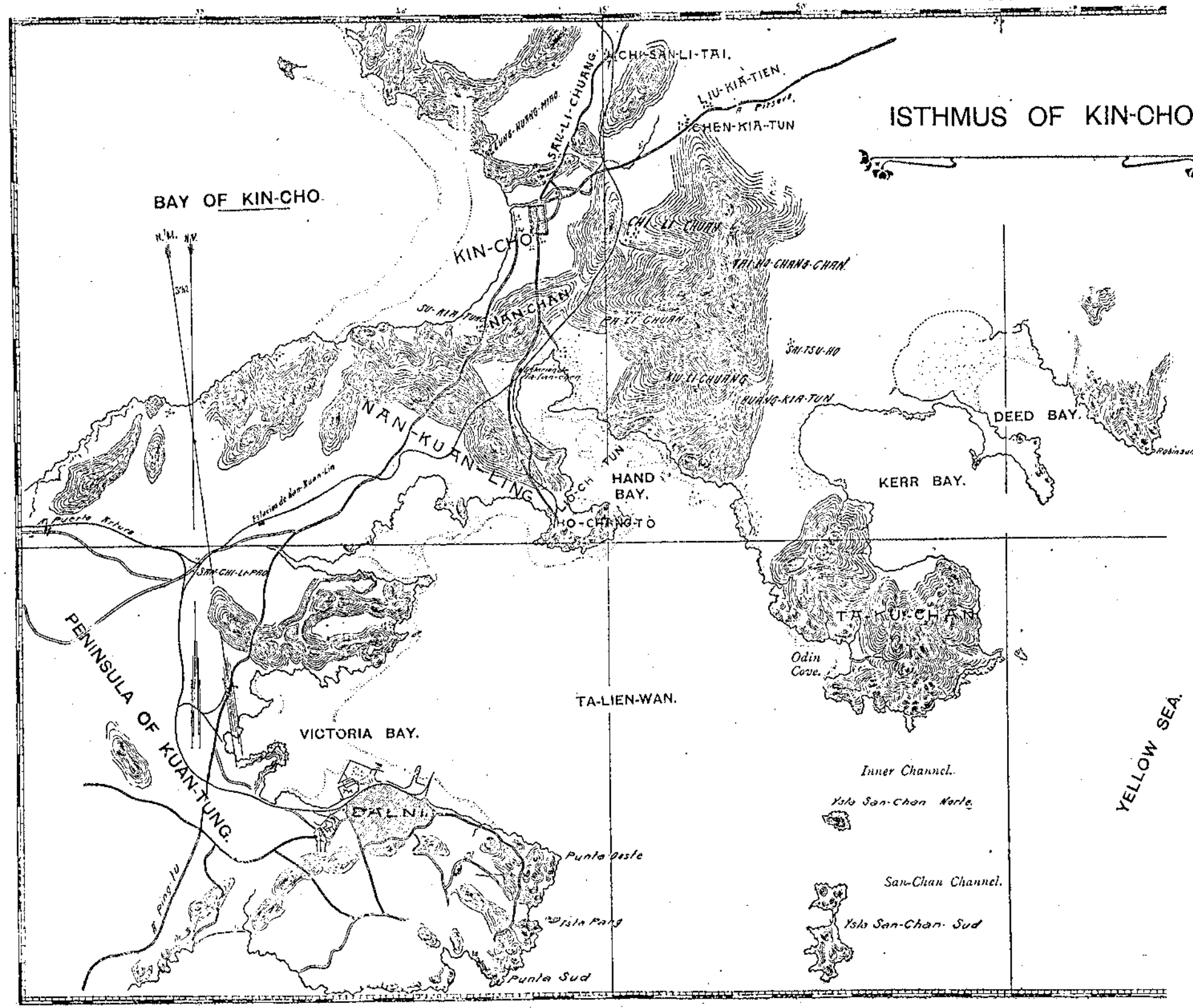
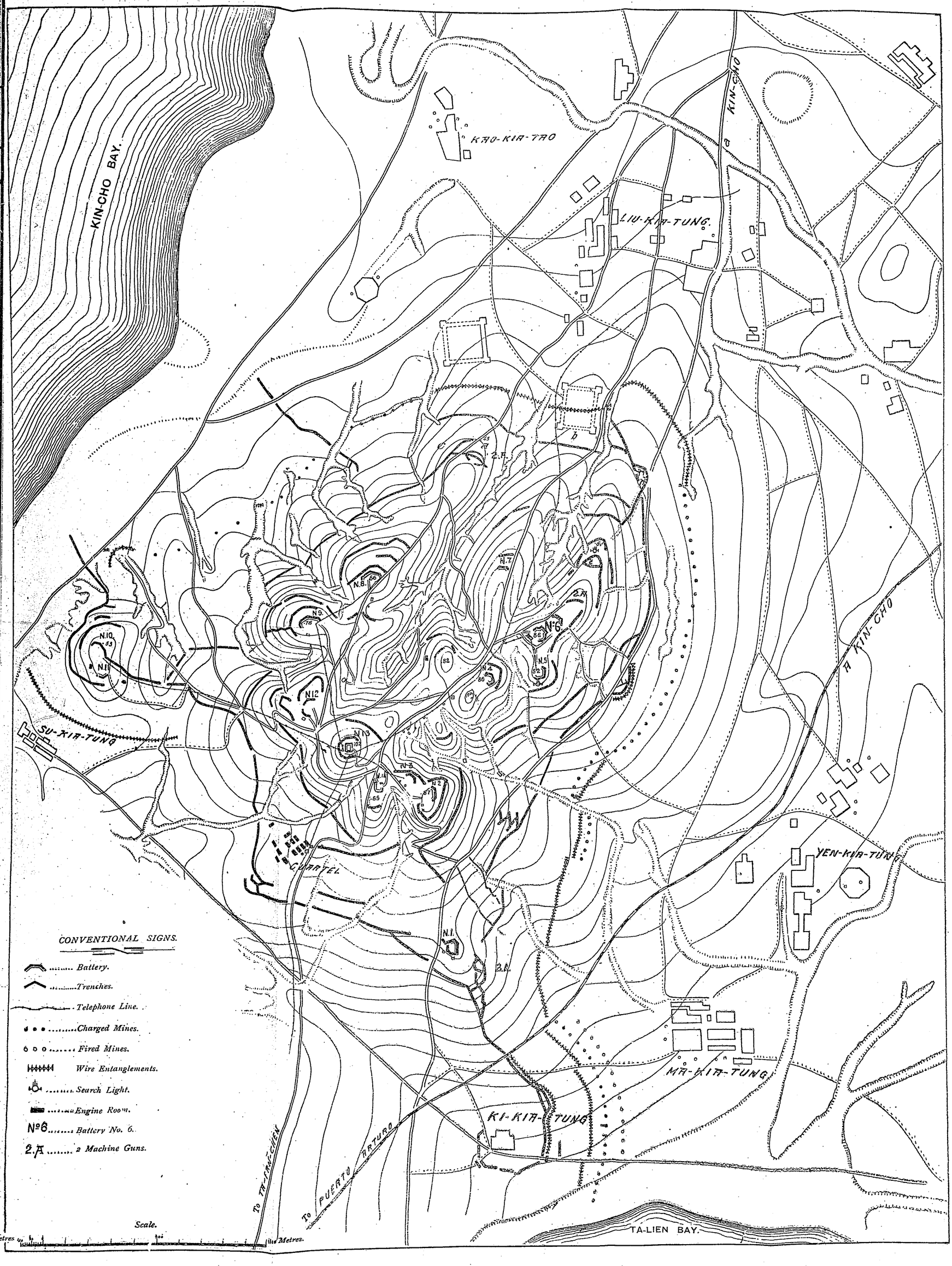


DIAGRAM OF CONNECTIONS.

MERIDIAN E. GREENWICH 122°.

ISTHMUS OF KIN-CHO.




KIN-CHO BAY.
KAO-KIA-TAO
KIN-CHO
LIU-KIA-TUNG.
N.8.
N.9.
N.10.
N.11
N.12
N.13
N.7
N.6
N.5
N.4
N.3
N.2
N.1
SU-KIA-TUNG
CHARTEL
YEN-KIA-TUN
MA-KIA-TUNG
KI-KIA-TUNG
TA-LIEN BAY.
To TA-LIEN-CHEN
To PUERTO ARTURO
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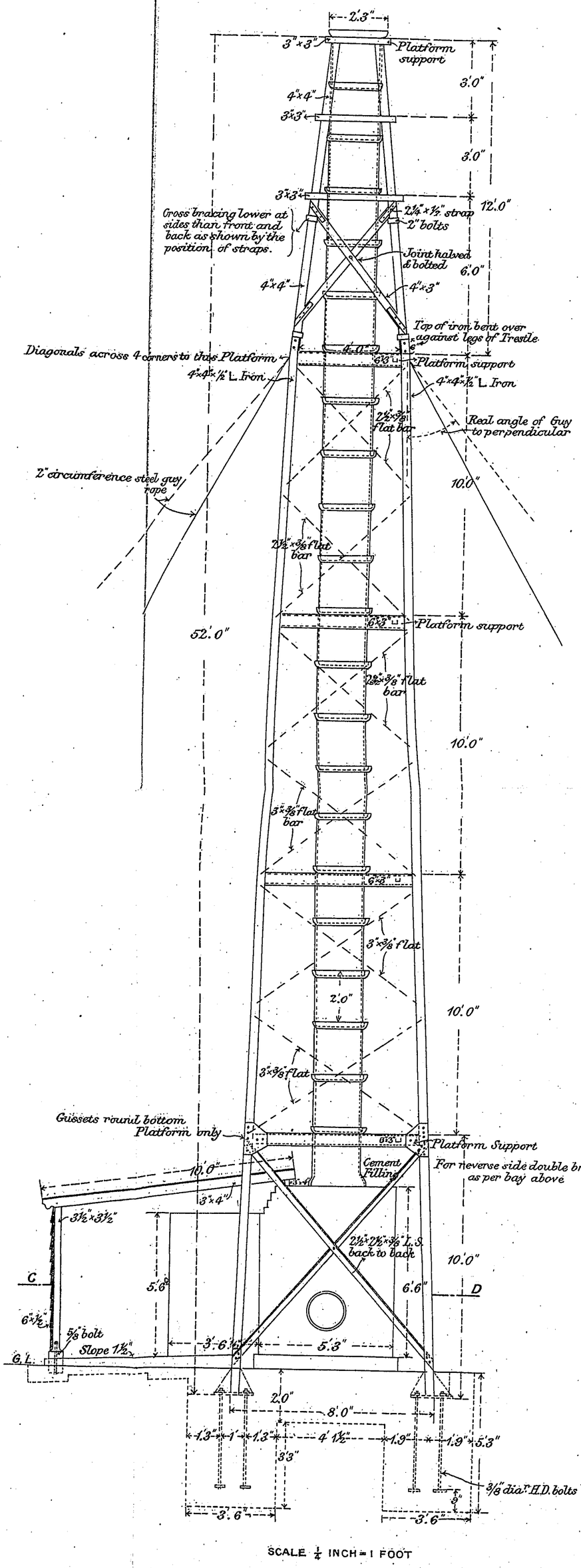
..... Trenches.
Telephone Line.
Charged Mines.
Fired Mines.
Wire Entanglements.
Search Light.
Engine Room.
№6..... Battery No. 6.
2.A ..... 2 Machine Guns.
Scale.
Metres
Metres

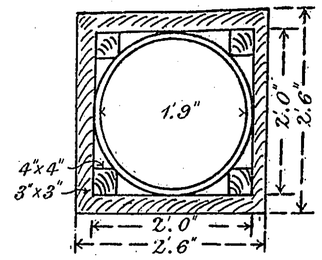
CORDITE FACTORY, ARUVANKAD.
VITRIOL CHIMNEY.

SIDE ELEVATION



SCALE ½ INCH = 1 FOOT

PLAN OF TOP
OMITTING PIPE FLANGE



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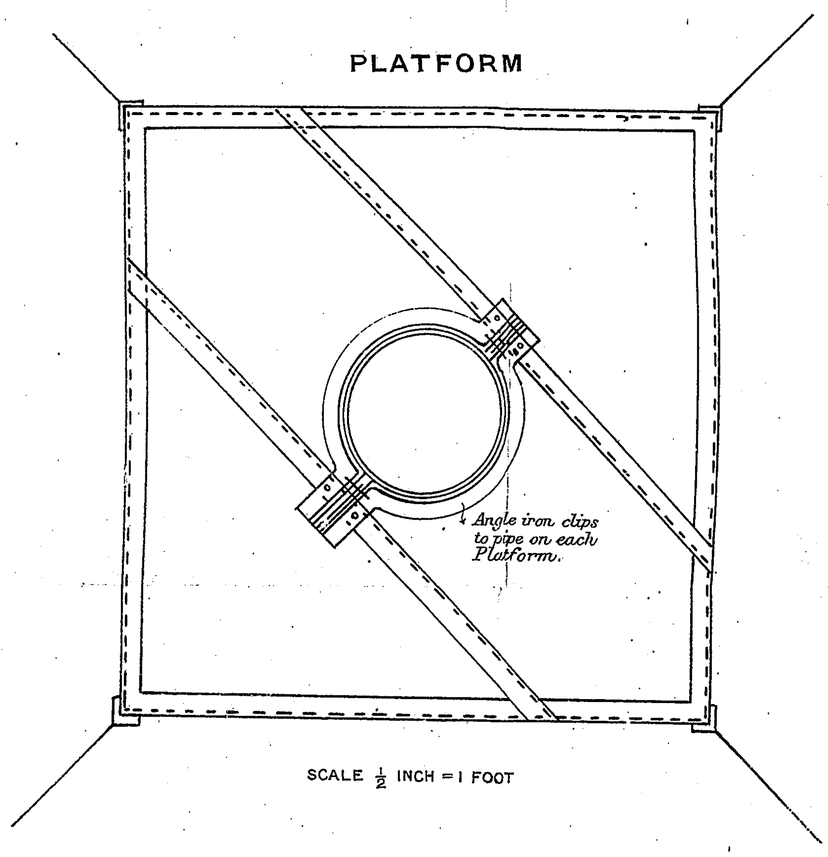
PLATFORM



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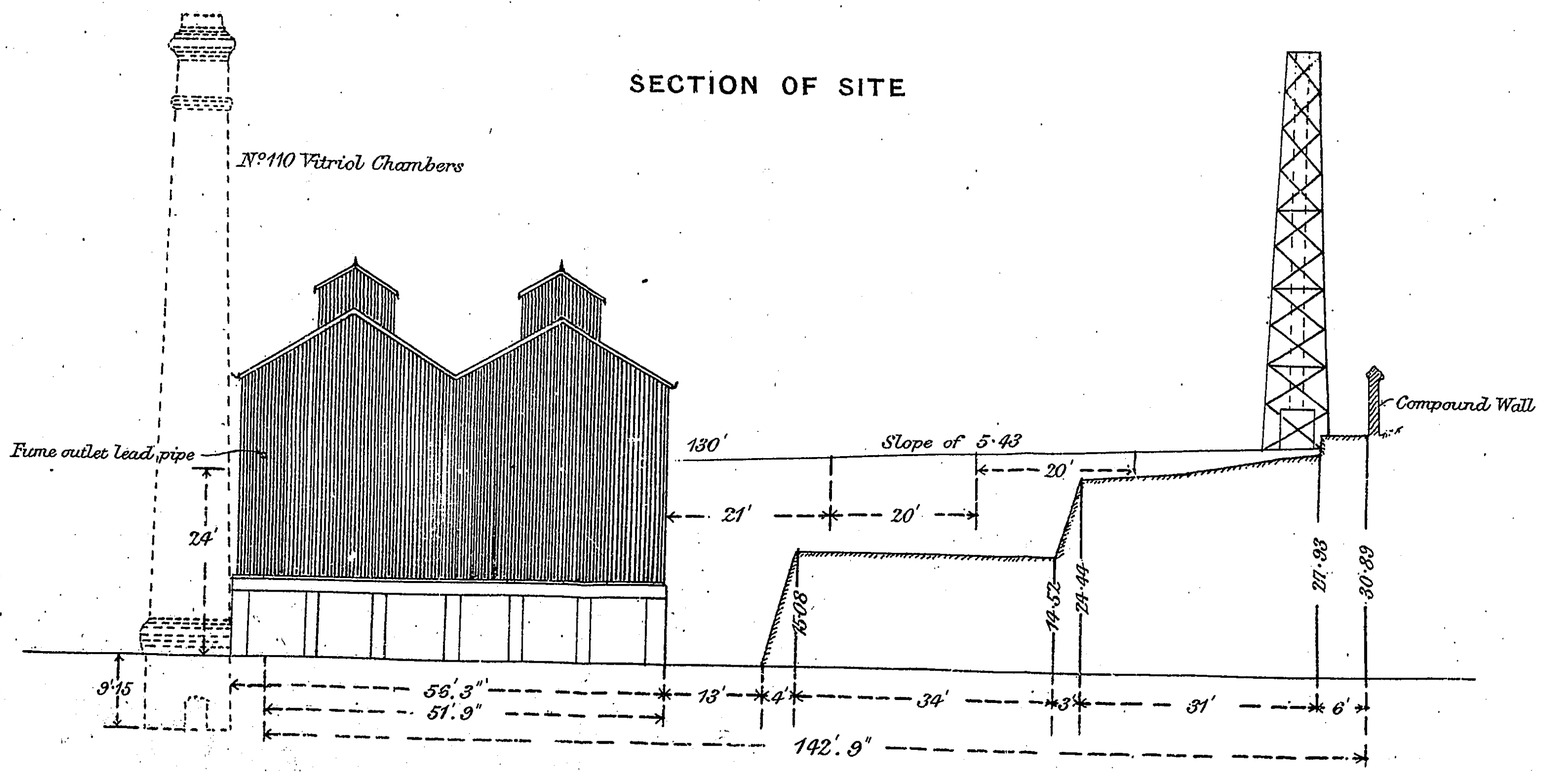
SECTION OF SITE



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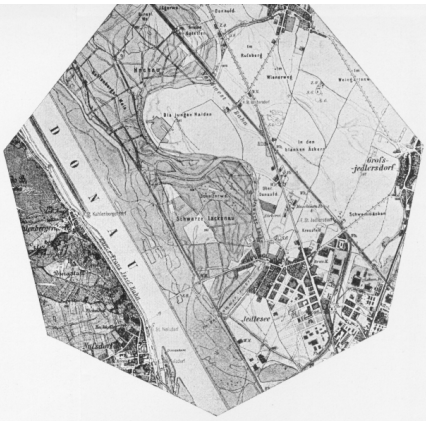
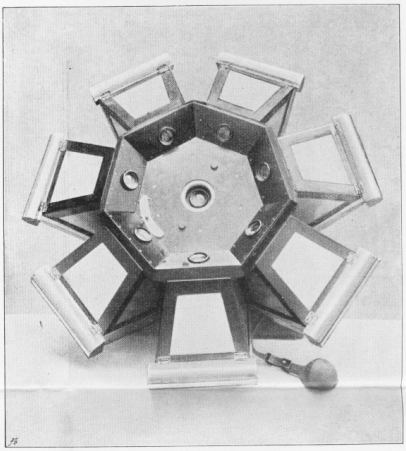
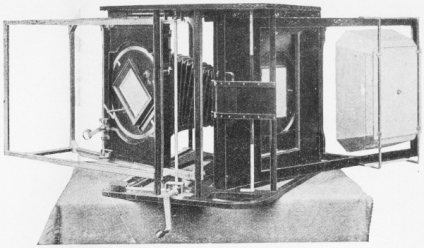


Portion of Ordinary Map (A).





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