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Subject Index.

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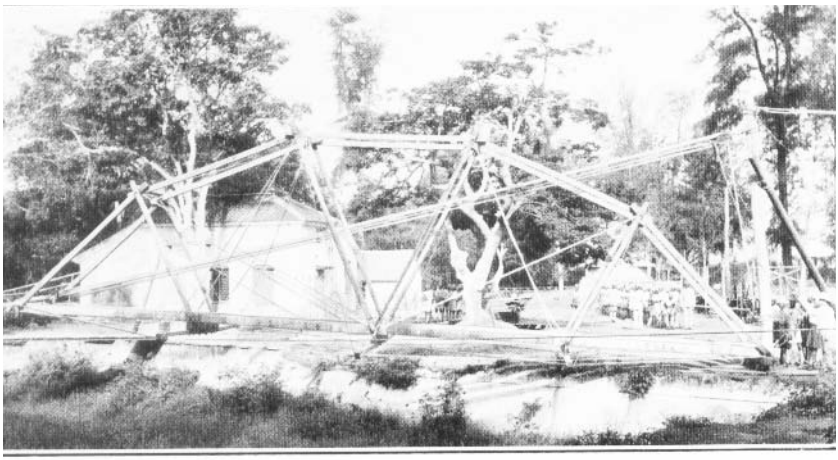

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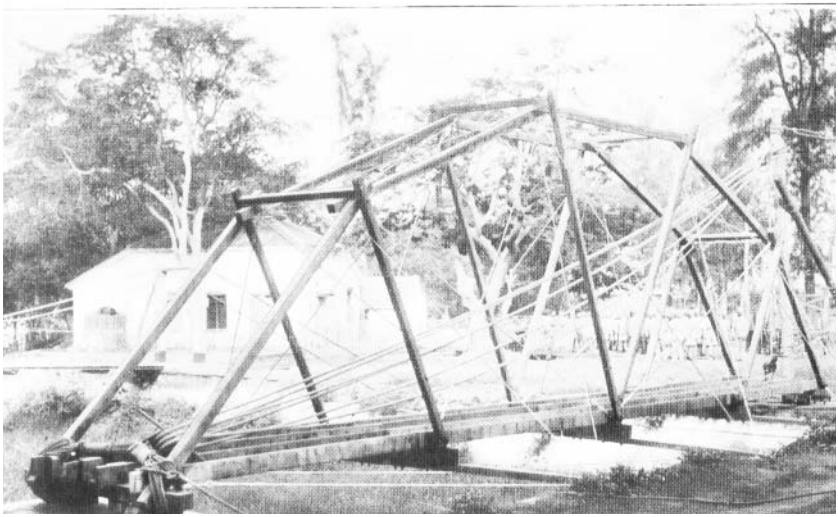


A Portable Field Girder

A PORTABLE FIELD GIRDER.

MARK II.

By Bt. Major R. L. McClintock, D.S.O., R.E.

In the July number of the *R.E. Journal* there appeared an article describing a Portable Field Girder, in the construction and launching of which certain experiments had been carried out at Bangalore by the "Queen Victoria's Own" Sappers and Miners.

Faults of Original Pattern.—The original girder bridge on closer acquaintance, however, appeared capable of improvement in two directions :—

(*a*). In longitudinal stiffness.
(*b*). In vertical rigidity.

Any lack of the former quality affects this type of bridge both during the operation of launching and when under a load, causing a tendency to buckle sideways in each case. On the original bridge this tendency was somewhat marked during launching, and had to be neutralized by temporary cross-bracing placed horizontally at the road level. When under a load the buckling tendency was very much less, and the usual wind-ties from each side of the bridge to the banks were sufficient to resist it.

The lack of *vertical* rigidity only affected the bridge during launching, at which time the tie-beams of the girders came into compression and had a tendency to buckle upwards out of the horizontal plane, which, if permitted, would have led to the "shutting up" of the girders. This tendency was met by lashing temporary struts up and down across the girders, as explained in the para. "Launching Expedients," and shown in *Photos* 1, 2 and 3 of the original article. Both the horizontal cross-bracing and these struts were removed as soon as the bridge was safely across the gap.

Now, if the bridge were to be truly portable, it was necessary to cart about these temporary additions equally with the other components of the girders. So it seemed that they might as well be incorporated with the system at once—especially if any additional and permanent rigidity was to be gained thereby. In this it seemed as if they might be substituted for certain other parts of the bridge, such as the main ties OB, MC, MD, and NE (*vide Fig.* 3, original

article). These, being made of timber instead of wire, would thus be capable of first acting as struts during launching (and so prevent the rising of the roadway), and later as ties, when the bridge came under a load.

In addition to the above alterations, the experiment was made to see whether a saving of weight could be effected by replacing the double 5 in. × 4 in. compression members AB, CD, EF (*vide* p. 4, line 13, and *Fig.* 3, original article) by single ones 5 in. × 5 in. in section, similar to the rest of the compression members BC and DF.

Mark II. Bridge.—On these lines a new 60-ft. girder bridge was constructed, which is fully described in the accompanying photos, plans and tables. It is calculated for infantry in file and loaded pack mules, or $3\frac{3}{4}$ cwt. per foot run dead load. The roadway is 6 ft. wide, and it is hardly necessary to point out that the construction of a narrow bridge like this is a more severe test of the system than would be one of similar span and a roadway of normal width.

This improved bridge is known as the "Bangalore Girder, Mark II.," and has given entire satisfaction both by its behaviour during launching and under its full load. There are now no extras of any sort to be added to the bridge for launching: it is put across the gap absolutely complete except for the chesses. The system is also quite rigid in every direction under all conditions, and so stiff horizontally that wind-ties are hardly necessary. The gain in individual stiffness of the two girders, due to the above substitution of timber ties for certain of the wire ties, also considerably facilitates the putting together of the bridge prior to launching.

In addition to the alterations already mentioned, the experiment was made of providing each shore transom with two runners (*Fig.* 11, *Plate* II.) both to facilitate the rotation of the near shore transom round the foot of the derrick during launching, and to enable the bridge to be moved slightly forwards or backwards after launching, should this be necessary. They are advantageous but not essential.

Weight of Complete Bridge.—The increase of launching weight of Mark II. over the original bridge is the difference between 5,799 lbs. and 5,436 lbs.—*i.e.* 363 lbs. The weight of the original bridge as given (5,436 lbs.), however, was exclusive of the temporary struts and cross-bracing, which were necessary in launching it. These are now included in the total weight of Mark II. (5,799 lbs.), and as they represent well over 600 lbs., a distinct saving has been attained by the new design. The whole bridge (Mark II.) including chesses can now be carried in eight two-wheeled Indian ox-carts.

Launching.—The method of launching Mark II. is identical with that described in the original article, no improvement on that system having been discovered. As an experiment in shortening the derrick as much as possible, the 60-ft. bridge (Mark II.) was launched complete—except for chesses—with a *twenty*-ft. derrick and a $4\frac{1}{2}$-in. tackle, the operation of raising, swinging and lowering occupying just five minutes. Convenient trees were used instead of artificial holdfasts for the derrick guys.

Durability.—As regards the durability of this type of bridge it is impossible to speak without longer experience. The bridge shown in the photos, however, has been launched, picked up and relaunched several times during the last six months; has been loaded from time to time with various sorts of loads; and has in the intervals stood across the gap shown, enduring an Indian hot-weather and rains without so far showing any signs of decay.

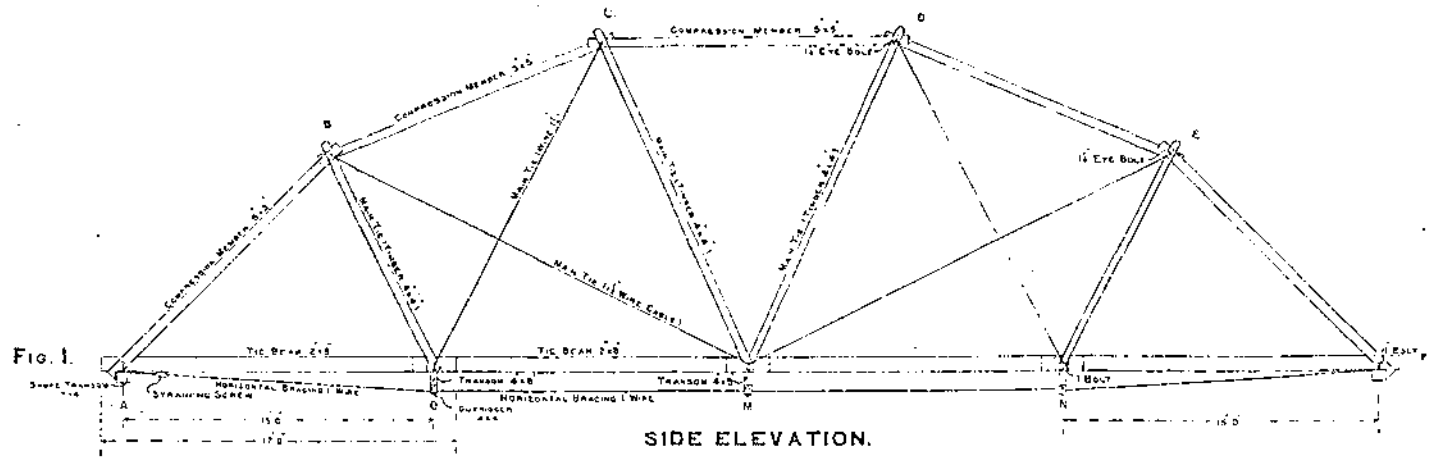
NOTE.—My thanks are due as before to Regtl. Sergt.-Major King, R.E., and Q.M.S. Instr. Dolan, R.E., of the "Q.V.O." S. & M., who respectively assisted me in the design of the bridge and its launching, and also to Sergt. Short, R.E., who prepared the working drawings.

Weights and Sizes of Component Parts of 60-ft. Bangalore Girder Bridge, Mark II.

Name or Position of Piece.	Size of Section. Ins.	Ins.	No. of Pieces.	Weight of each. Lbs.	Total Weight. Lbs.	Remarks.
Woodwork.						
Compression members	5	5	10	164	1640	Timber: "Honnee" or "Honay" (Pterocarpus marsupium). Weight: 56 lbs. per cubic foot.
Tie-beams and road-bearers	8	2	16	84	1344	
Main ties (timber) long	4	4	4	120	480	
„ „ short	4	4	4	100	400	
Shore transoms ...	9	6	2	150	300	
Roadway transoms ...	8	4	3	102	306	
Cross struts	4	4	4	40	160	
Outriggers	4	4	6	65	390	
Blocks	–	–	8	8	64	
Ironwork.						
Eye-bolts (S)	$1\frac{3}{4}$" round		8	10	80	
Eye-bolts and brackets (TU)	1"	„	20	16	320	
Main ties, $1\frac{1}{2}$ in., long	$1\frac{1}{2}$" circum.		4	15	60	
„ short	„	„	4	10	40	
Runners, complete with brackets (shore transom)	—	—	4	25	100	
Top bracing, 1-in. cable	1" circum.		1	25	25	
Horizontal bracing, with straining screws ...	1"	„	1	30	30	
Outrigger bracing, with straining screws ...	1"	„	2	30	60	
					5,799	

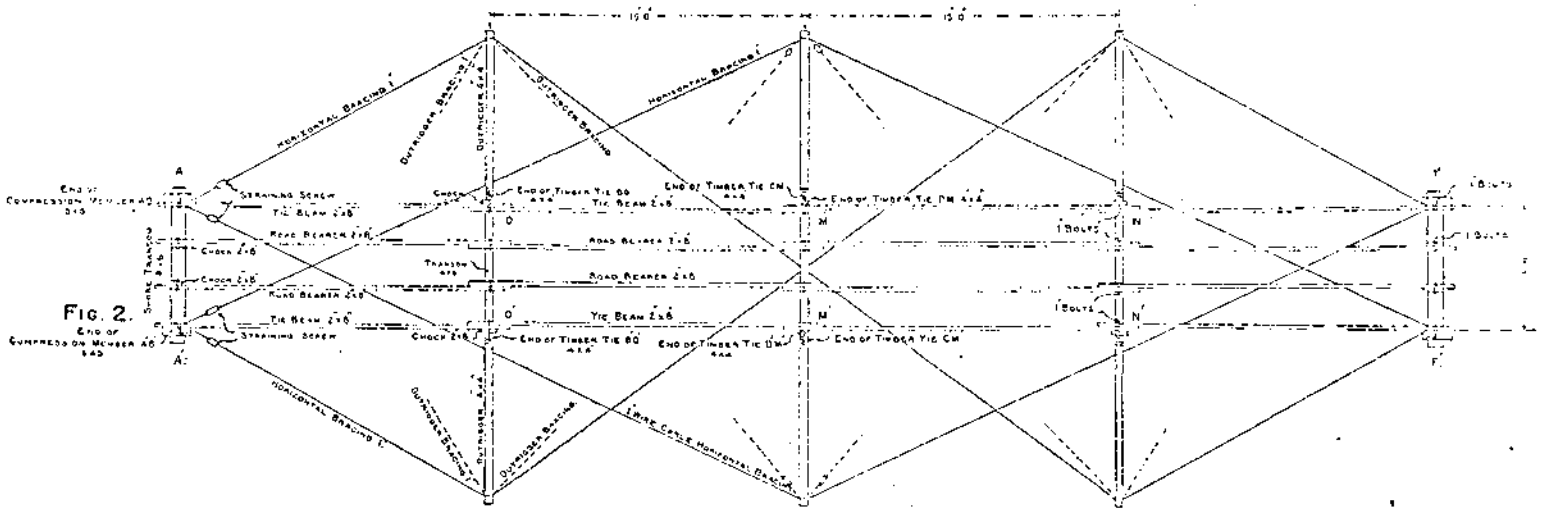
"BANGALORE" GIRDER BRIDGE. MARK II. PLATE I.

FIG. 1.



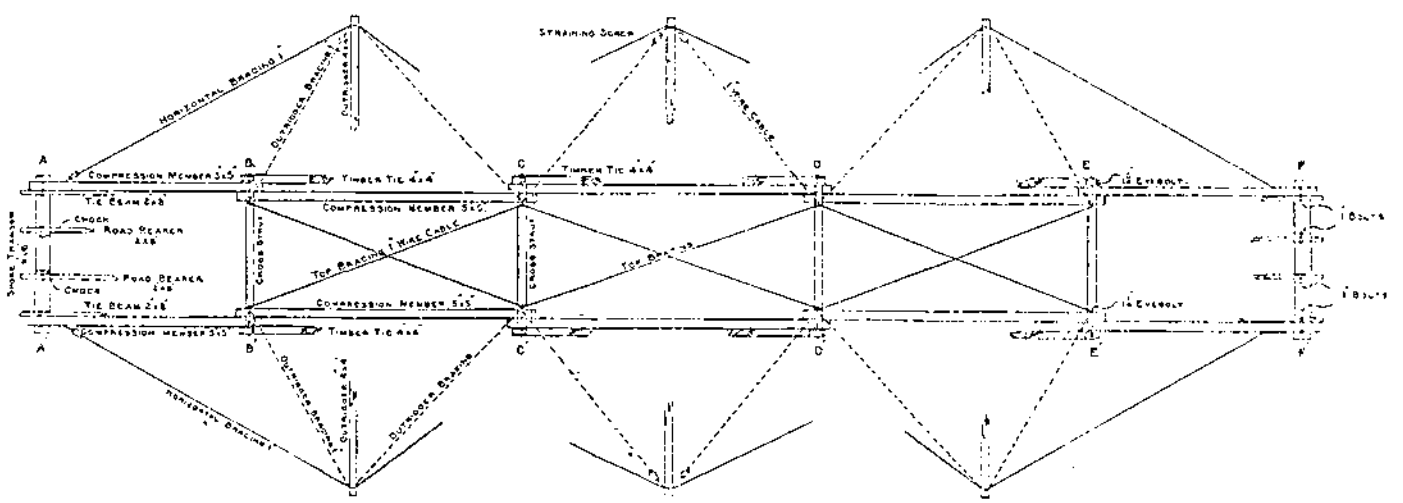
SIDE ELEVATION.

FIG. 2.



PLAN OF ROADWAY.

FIG. 3.



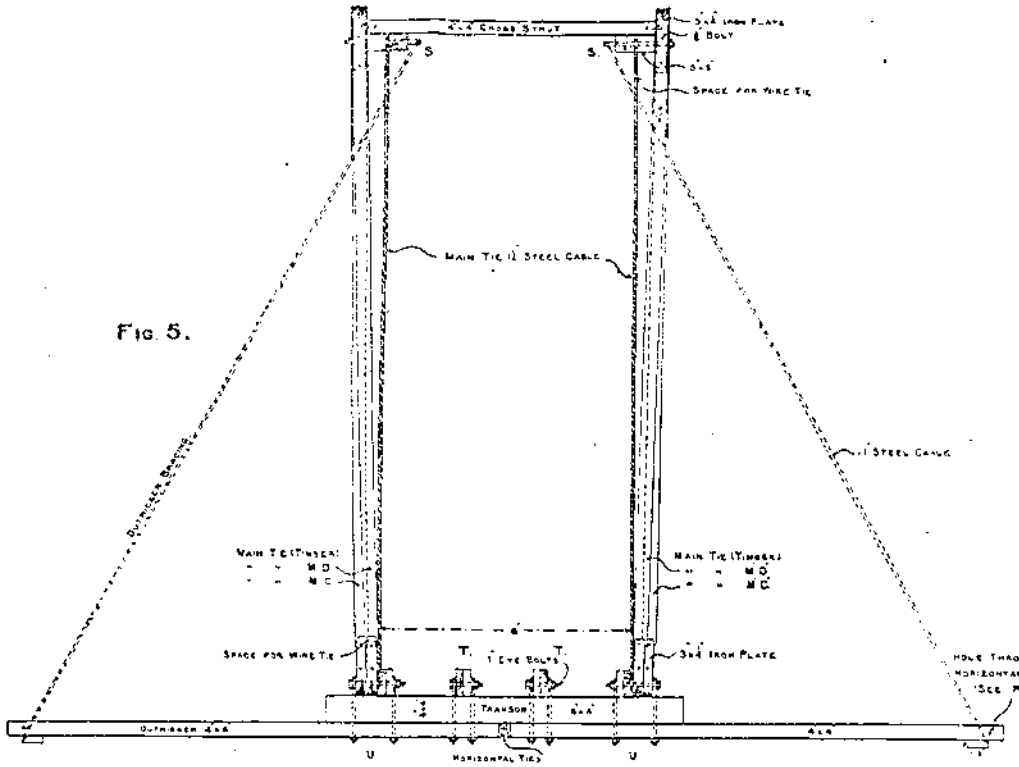
PLAN OF TOP OF GIRDER.

INCHES. FEET

"BANGALORE" GIRDER BRIDGE.

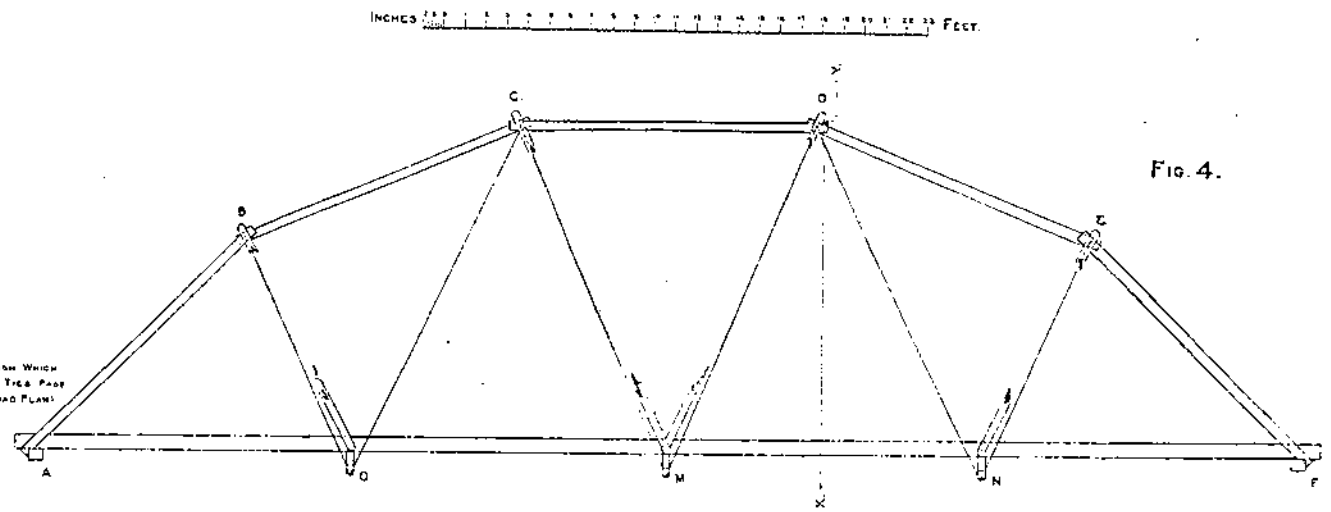
MARK II.

Fig. 5.



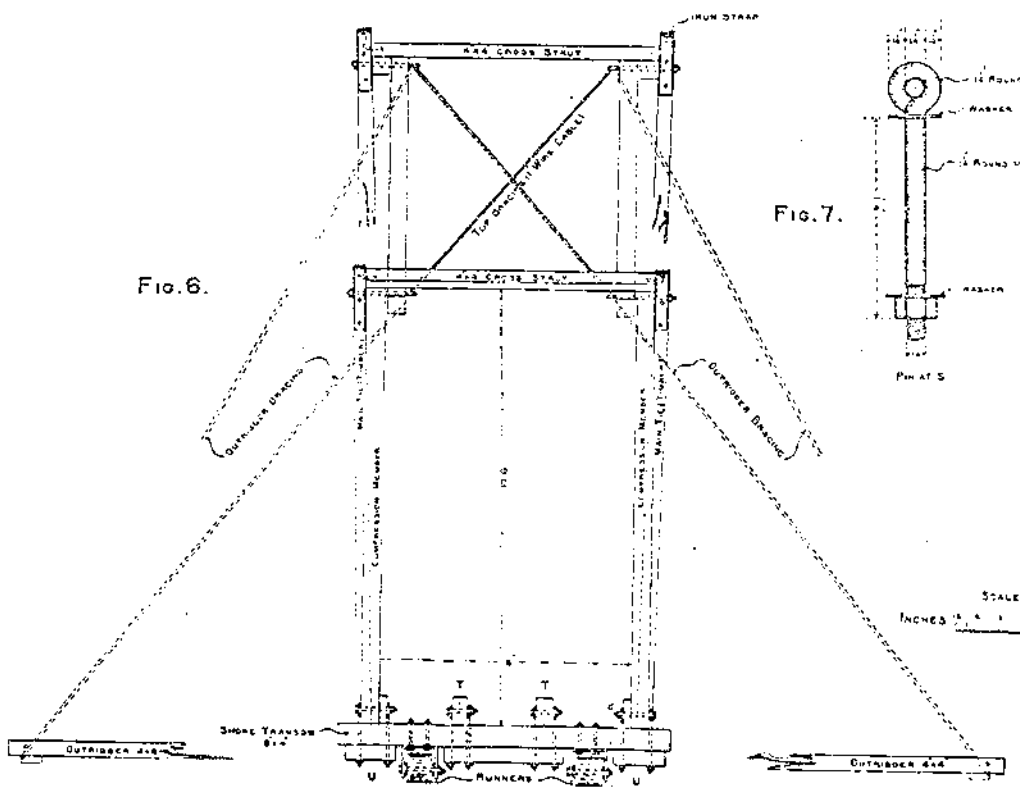
— SECTION ON X.Y. —

Fig. 4.



— ELEVATION SHEWING OUTRIGGER BRACINGS. —

Fig. 6.



— ELEVATION OF END A A. —

Fig. 7.

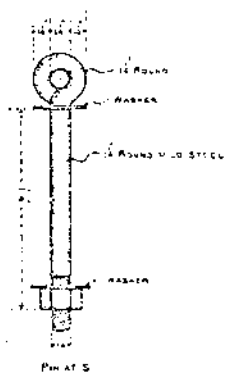


Fig. 8.

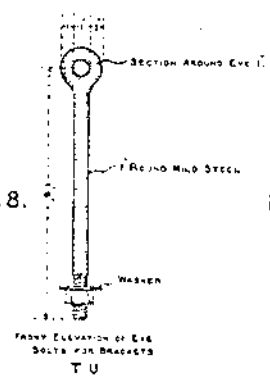
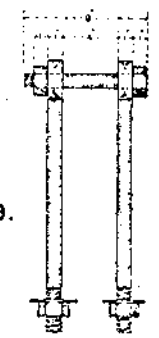
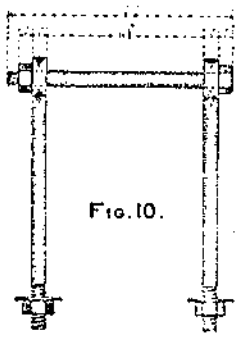


Fig. 9.



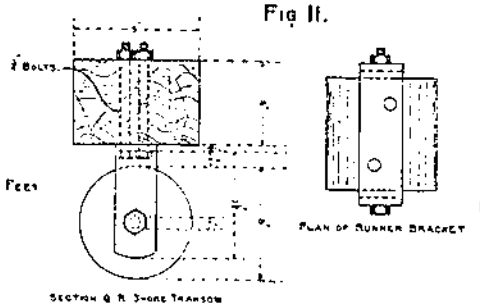
Bracket complete securing Road Bearers to Transoms T

Fig. 10.



Bracket complete securing Tie Beams, & Compression Members to Transoms

Fig 11.



Scale for Section & Elevation A A

Inches — Feet

Scale for Details

Inches — Foot

FURTHER NOTES ON THE EMPLOYMENT OF ROOF TRUSSES FOR BRIDGE REPAIRS.

By Capt. W. G. S. Dobbie, R.E.

In Capt. Borton's interesting article on bridge repairs, which appeared in the December, 1912, number of the *R.E. Journal*, he pointed out that if the tie beams of the trusses were to be loaded, it would be necessary to use six trusses instead of four to carry infantry in fours. This of course involves the expenditure of extra time and trouble in taking down the two extra trusses and in transporting them to the site of the bridge. Further, the three trusses on each side of the bridge are rather unwieldy, especially in cases where lateral space is a consideration. The difficulties arising from the loading of the tie beam may, I think, be more easily avoided, by hanging the roadway in slings supported at the various joints in the principal rafter. In the case of a king post truss there would be three slings, viz. one at the ridge, and one at the end of each of the struts. The following stress diagrams show that loading the truss at the ridge in this way will not unduly strain it.

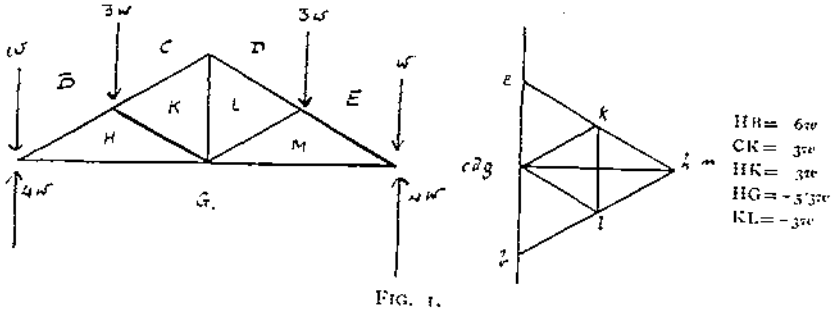


Fig. 1.

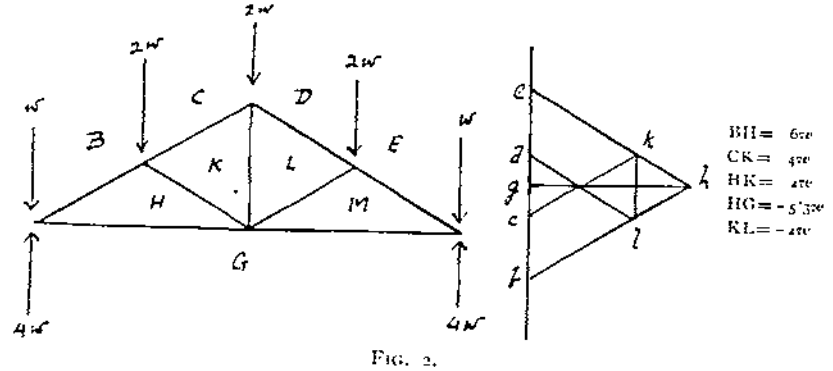


Fig. 2.

In *Fig.* 1 the truss is shown loaded in the normal way for a roof, *i.e.* in the way for which it was originally calculated.

In *Fig.* 2 the truss is loaded as now suggested, and it will be noticed that no member is subjected to a greater stress than before, with the exception of *ck*. This, however, will not matter as the principal rafter will naturally be the same size all the way along. If then three road transoms (in the case of a king post truss) are slung in the manner suggested, the truss will be able to stand it.

Similarly queen post trusses can be shown to be capable of standing a load applied at the ridge. Iron roofs are usually calculated for loads applied in this way.

As regards the slings, the weight which has to be carried by them is not very great. In the case of a king post truss each pair of slings has only to take one quarter of the total load. With a queen post truss, each pair has to take one-sixth of the load, and so on. In fact, in most cases it will be found that the road transoms will not have to be spaced more than 7 ft. apart, and each sling will therefore have to carry no more than $\frac{1}{2} \times 7 \times 1\frac{5}{2}$ cwt., or $26\frac{1}{4}$ cwt. It should not be difficult to find suitable material for slings in these circumstances.

For the transoms, the purlins will usually be suitable. In the case of a 30-ft. span, and a king post truss the load on each transom will be $\frac{30}{4} \times 5$ cwt. $= 37\frac{1}{2}$ cwt.

Supposing the slings are 10 ft. apart laterally, and using the rough formula $w = \frac{bd^2}{L}k$, we get $bd^2 = 375$ or $b = 4\frac{3}{4}$ in. and $d = 9$ in. According to the table in Hurst the purlins for 30-ft. trusses, if spaced at 10 ft. will be $5\frac{1}{2}$ in. $\times$ 9 in., which would consequently be strong enough, unless the trusses were spaced less than 10 ft. apart. The common rafters would no doubt serve as road bearers.

This method of hanging the roadway has the additional advantage that the level of the roadway can be more freely adjusted, by arranging the length of the slings to suit the particular gap. Instead of only having two levels at which the roadway could be laid, far more freedom is now allowed, and this might on some occasions prove a very great convenience.

THE ORDINARY VERSUS THE QUENCHED SPARK IN WIRELESS TELEGRAPHY.

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

IN the early days of wireless, the single oscillating circuit transmitter was invariably used. In this method, the only high frequency oscillation circuit was the aerial circuit consisting of the elevated aerial wire—the spark gap—and thence to earth. The capacity necessary for oscillations to occur was that of the aerial itself with respect to the earth—the inductance again that of the aerial, with perhaps an additional portion in the shape of a few turns of wire to increase the wave length.

A transmitter of this kind is not very efficient for the following reasons :—(*a*). It can have but little capacity and hence can store but a small quantity of energy. (*b*). It has a large damping factor, and hence oscillations do not persist but rapidly die out.

As the science improved and long distance work began to be attempted, the closed circuit transmitter became practically universal. The general use of syntony in wireless also caused persistence of oscillation to be desirable. The closed circuit of an ordinary modern spark system transmitter can store a large amount of energy owing to the large condensers provided ; it also possesses persistence of oscillation.

There is almost no limit to the amount of energy that can be stored in a closed circuit of the ordinary type if the correct precautions are taken and the necessary conditions are fulfilled. Such a circuit will also oscillate freely and persistently and with a true time constant ; it cannot however radiate.

In order to obtain radiation this closed circuit has to be combined with an open or aerial circuit. The two circuits are brought into inductive relationship, so to speak, and the almost ideal conditions obtaining in the closed circuit when examined by itself are found no longer to exist.

The obvious intention of combining these two circuits, is that the oscillations of the closed circuit shall be set up in the open circuit by induction ; that this latter circuit shall radiate the energy thus obtained ; that the closed circuit shall continue persistently to oscillate, with the result that the open or radiating circuit can receive fresh supplies of energy from the closed circuit ; hence the energy stored up in the condensers of the closed circuit is, or should be, usefully radiated from the open circuit.

If this programme was carried out in precisely the manner indicated, a very efficient transmitter would result, for the two desirable conditions would both be fulfilled, namely a great quantity of energy would be stored up, and this great quantity would be usefully radiated in the form of persistent waves.

This, however, does not occur in its simplicity, for, since action and reaction are equal, the secondary circuit, when its oscillations have reached a certain amplitude, begins to react on the primary circuit which thus becomes a drag or useless load on the secondary circuit. This of course is due to the mutual inductive effect of the two circuits, and there is a continual give and take of energy between them, instead of the ideal condition of the primary doing all the giving, and the secondary doing all the taking. The oscillations induced in the secondary circuit grow in amplitude until the primary oscillations become a minimum, when the energy is transferred in the opposite way and the amplitude of the primary oscillations in turn begins to grow as the secondary oscillations diminish.

The following curves make the state of things clear :—

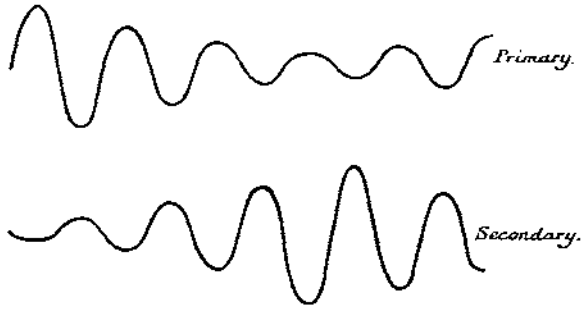


FIG. 1.

It will be seen that the energy is radiated in the form of beats and the total energy radiated, is not as great as that sent out with like power conditions by a slightly damped persistently oscillating aerial circuit.

There is yet a further disadvantage of this method of transmission. We have just seen that energy is wasted, owing to the primary re-absorbing energy from the secondary, which forms as it were a drag on it ; but in addition to this there are present in each circuit two waves of different frequencies. Of these waves, one is rather longer and the other rather shorter than the true natural wave length of the circuit by itself. The actual presence of these two waves can be detected by a wave meter, for they can each be measured.

The reasons for their existence are not difficult to follow. When the primary is imparting energy to the secondary, the primary is so to speak being retarded and the secondary is being accelerated ;

when the transfer of energy is reversed the circuits are affected contrariwise.

It comes to this, then, that helping and opposing electromotive forces are alternately brought to bear in each circuit, causing this double wave to be produced. The drawback of this double wave is that the energy of only one of them is of use to operate the distant receiving instruments, the receiving station being out of tune for the other wave whose energy for practical purposes is wasted.

To sum up, then, the ordinary spark system, or what is known as the Marconi System, appears to have two chief disadvantages. These disadvantages are both due to the mutual action between the primary and secondary oscillating circuits, or, in a word, to the persistence of oscillations in the primary circuit. These disadvantages are minimized by having a low percentage of coupling, but this entails a waste of energy.

The essential feature of the Quenched Spark System is that as soon as the primary circuit has imparted its energy once to the secondary circuit, the primary becomes electrically incapable of oscillating at all, until the next spark occurs, say, $\frac{1}{500}$ of a second later at a spark frequency of 500.

This condition immediately removes the two disadvantages pointed out above, for the secondary is now free to oscillate quite independently of the primary, which having done its useful work takes no further part in the proceedings.

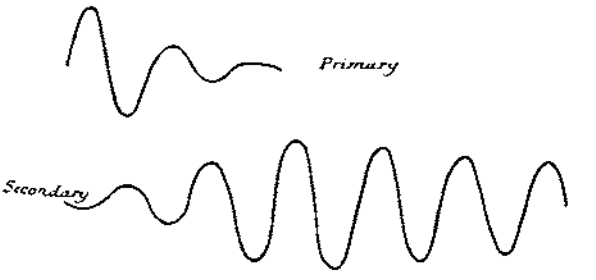


FIG. 2.

Fig. 2 represents the oscillations in the two circuits of the Quenched Spark System. It will be seen that the secondary oscillations become a maximum just when the primary has imparted all its energy, and that from that point a persistent train of slightly damped oscillations continues in the aerial circuit.

The total useful energy thus radiated is far in excess of that obtained from the ordinary spark system under similar conditions of power, etc. This can readily be seen when it is realized that the secondary circuit is free to oscillate without the restraining influence of the primary, and that all the energy is transmitted by one wave, for there is no trace of a double wave in the aerial circuit. The

writer hopes in a further article to consider the conditions necessary to obtain a "Quenched Spark," and to go generally into the details of the system.

Attached are figures showing results of a comparative test of the two systems. It is to be understood that the conditions as to power used—capacity of primary circuits, aerial, etc.—were identical. The inductances had to be altered slightly for tuning purposes, owing to the difference in resistance of the "Quenched" spark and "ordinary" spark.

	Ordinary or Marconi.	Quenched Spark.
Root mean square value of current in secondary	3·7	6
Overall efficiency ratio	13·7	36
Logarithmic decrement for damping ...	·167	·063
Ratio of persistence (relative number of oscillations for each spark)	29	74
Coupling*	10%	18%

With the aid of a four-faced mirror revolving at some 7,000 R.P.M. some instructive photographs of the sparks were taken. Photographs were taken of the ordinary sparks which clearly showed the effects of beats—as far as can be seen each wave train seemed to comprise from 20 to 24 sparks. It is an open question whether the oscillations continued for a longer period, but not with sufficient light intensity in the spark to show on the photograph.

There appeared to be no very obvious difference in the duration of the spark in the primary, and of a small spark across the gap inserted in the secondary. This secondary spark however seemed to endure rather longer. In the "Quenched" spark photos, the primary spark appears very intense. Three distinct sparks and sometimes four are visible, but no more. The spark in the secondary endures considerably longer, and this is very clearly seen when looking at the two sparks simultaneously in the mirror.

These photographs bear out in a striking manner the advantages claimed for the "Quenched" spark.

Up to the time of writing, a photograph has not been obtained showing the sparks in the primary and secondary (Quenched System) on the same plate simultaneously, but such a photograph would afford a very useful practical indication of the relative and actual persistence of oscillations in the two circuits.

I wish finally to mention that I was enabled to see these photographs, and the sparks themselves, in the rotating mirror through the kindness of Mr. Chambers of the Helsby Wireless Company, to whom my thanks are due.

* Coupling reduced to minimize double wave effect.

CONCRETE GROYNE AT CLACTON-ON-SEA.

By 2ND LIEUT. H. S. BRIGGS, R.E.

THE following is a brief report on the construction of a concrete groyne now being made at Clacton, and shows one of the measures being taken for the prevention of coast erosion on the East Coast. No important deviation from common practice is involved, and the general dimensions are such as have already proved satisfactory in the construction there of a similar groyne.

Object of the Groyne.—It has been found that the N.E. winds have the effect of carrying the sand and shingle in a south-westerly direction, *i.e.* down the beach: the westerly and south-westerly winds are not powerful enough to carry the stuff back. The result is that the beach is gradually being washed down the coast, and out of the Town Council's land. During the last two years the beach level at the S.W. boundary of the Council's foreshore has fallen something like 18 inches. To prevent this scour it was decided to erect a groyne which would check the movement of the shingle, etc. To let through any shingle which might be carried during a west or south-westerly wind, a sluice was to be provided in the groyne which could be opened during these winds and closed when the wind was in the opposite direction.

Construction.—The groyne is practically a solid block of concrete carried down to the natural bed of Platimore (London clay), which provides an excellent foundation. The upper surface is stepped to follow the slope of the beach. A batter is given to the sides. Other details can be seen from the *Plate*.

Concrete.—The face of the groyne is of granite chippings and Portland cement in the proportion of 3 to 1. It is afterwards grouted with cement and rubbed down with a brush. The remainder is of pit ballast and Portland cement in proportion of 3 to 1. The work has to be done between tides. With two men laying the stuff, a layer of 2 ft. × 50 ft. can be usually completed at a time. A layer of burrs is placed between each layer of concrete. The end of each layer is keyed into the one contiguous to it (see *Plate*). The concrete is mixed with sea water at the shore end of the groyne; the mixture here is practically dry—about 15 per cent. of water only—and it is carried to the head of the groyne and there mixed with the requisite amount of water *in situ*. The drop from the barrow to the work is from 12 ft. to 13 ft. Six men are employed in mixing and carrying the stuff.

Timber Work.—No underwater work is required, but an exceptionally low tide will be required for the last 50 ft. or so of the groyne.

King-Piles are 12 in. × 12 in., shod with W.I. 3-faced nose. The pile driver used is hand-worked with a fall 4 ft. to 9 ft. and 3-cwt. monkey. A pile usually takes 1½ to 2 hours to drive. No difficulty up to the present has been found with this part of the work. Each transverse pair of piles is tied by a 1-in. tension rod. When the work is completed the former are cut off level with the lower edge of the battered face of the groyne. King-piles are spaced with 10-ft. centres.

Sheet Piling is of 12 in. × 4 in. with a bevelled nose, and is driven in tight between the king-piles. For the construction of the battered portion of the groyne, a temporary wall of 2-in. sheeting is used.

Walings 6 in. × 12 in. and 3 in. × 11 in. secure the sheet piling on the outside and inside respectively; waling is secured to the king-piles by ¾-in. W.I. bolts. The king-piles, sheet piling, and waling will be left in position when the concrete is completed, the tops of the king-piles being sawn off. For convenience in bringing up the material, a temporary gangway of 9 in. × 3 in. is spiked to the heads of the piles (see *Plate*).

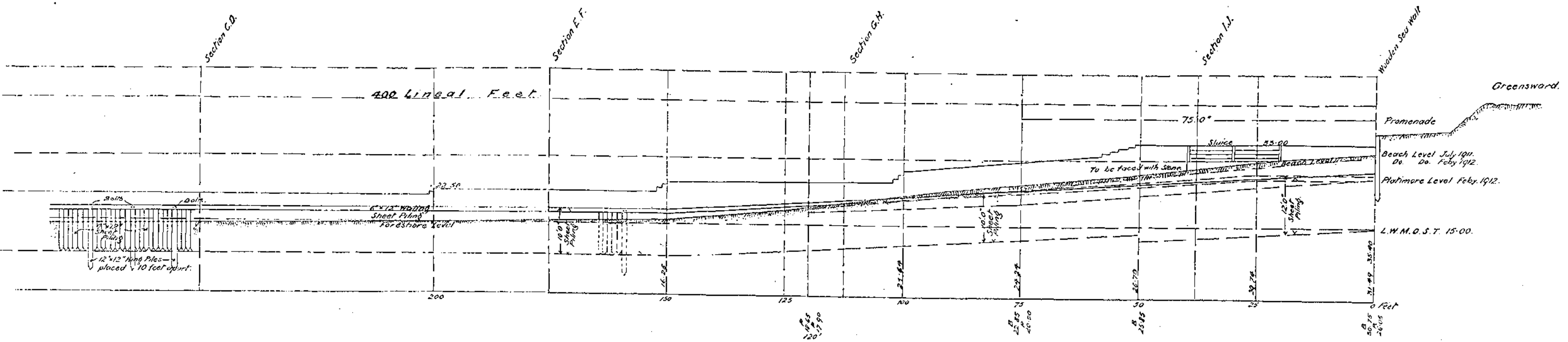
Sluice.—This is merely a 20-ft. gap in the concrete about 40 ft. from the shore end. The removable portion consists of 10 in. × 4 in. planks sliding in 6 in. × 6 in. × ¾ in. angles (see *Plate*). The planks will be shifted by hand when desired.

Cost.—The total cost is about £1,750, apportioned roughly as under:—

	£	s.	d.
Wages	600	0	0
Cement	230	0	0
Gravel, etc.	110	0	0
Bolts, angle irons, and tool repairs...	110	0	0
Water	5	0	0
Granite chippings	30	0	0
Pitch pine timber	650	0	0
Sundries	15	0	0
Total ...	£1,750	0	0

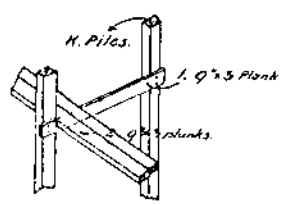
My thanks for the above information are due to Mr. D. J. Bowe, C.E.

CONCRETE GROYNE AT CLACTON-ON-SEA.

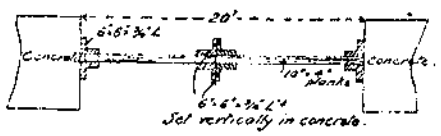


ELEVATION OF GROYNE.

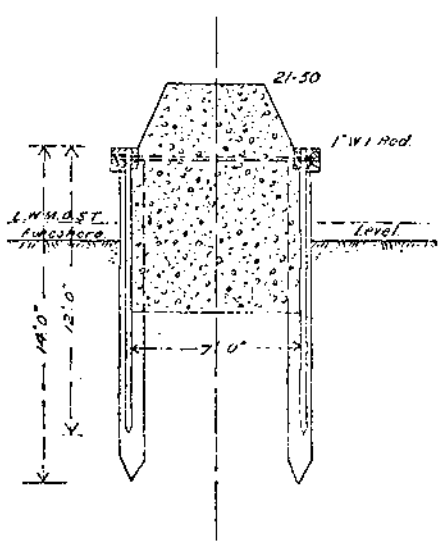
KEY TO CONCRETE.



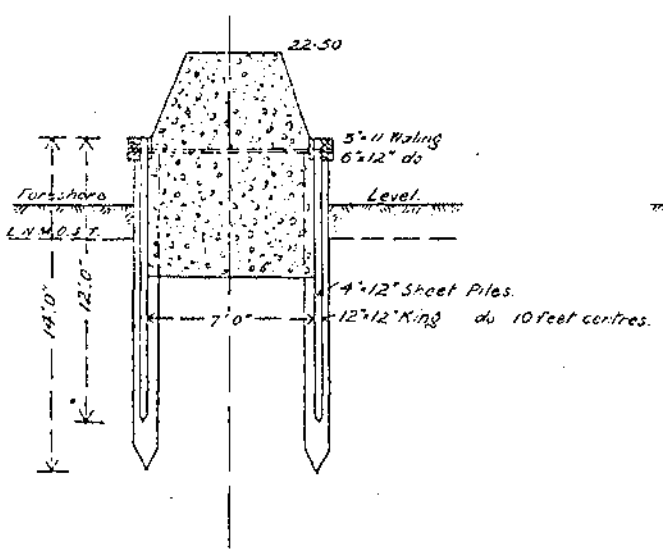
PART OF TEMPORARY GANGWAY.



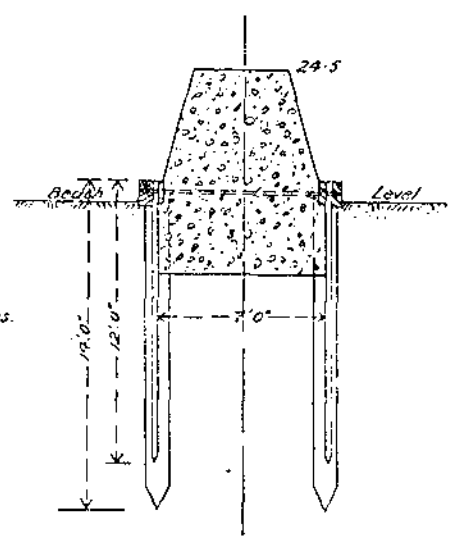
PLAN OF SLUICE.



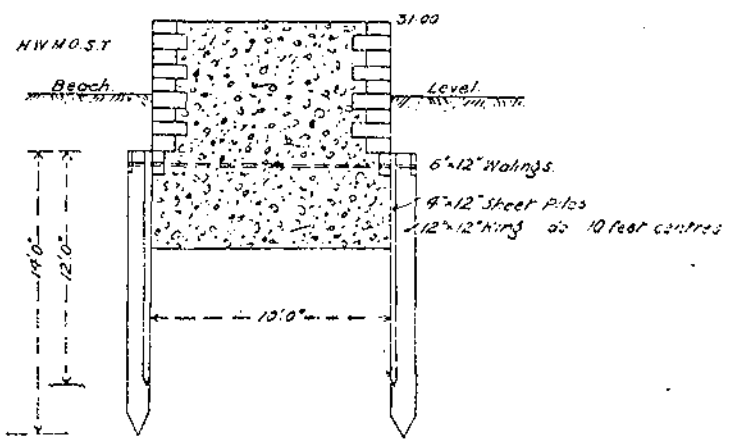
SECTION C.D.



SECTION E.F



SECTION G.H.



SECTION I.J.

PAPERS OF FIELD MARSHAL SIR JOHN BURGOYNE, BART., G.C.B.

AN interesting and valuable addition has recently been made to the R.E. Museum, by the inclusion of a large number of letters and documents written to, and by, Sir John Burgoyne. The papers not only include his Peninsula diaries, notes on the principal sieges, etc., etc., but also his letters and memoranda written in the Crimea, and various criticisms on the Histories of the War. Amongst other papers is the following letter from the Duke of Wellington which is of considerable historical interest. Written in January, 1847, as a criticism to a memorandum drawn up by Sir J. Burgoyne on the defenceless state of the country, it was sent to the press without his knowledge or permission by a lady to whom he had shown it. The hostile reception and bitter comments which it met with in the public press, deeply wounded the Duke who had considered it a confidential communication, and it is said that he never entirely forgave Sir John Burgoyne for its publication, although he was really in no way responsible for it.

In his article Sir John pointed out that "there may be in Great Britain and Ireland perhaps 30,000 regular troops including infantry and cavalry; of which at least from 20,000 to 25,000 must remain for the protection of Ireland, of garrisons, etc., leaving not more than 5,000 to 10,000 men disposable to oppose the efforts of ten times their number," and it is on these data that the Duke's remarks are based.

Although there was no apparent reason for such complications as referred to by the Duke, at the time the letter was written the Government of France was probably in an unsettled state. Early in the following year Louis Phillipe was driven from the throne and the Second Republic was proclaimed, and four years later this in its turn gave place to the Second Empire. The Crimean War, however, seemed to show the want of reserves, for Sir J. Burgoyne writing from before Sebastopol in February, 1855, says "When we started here we were in about equal force, each perhaps 25,000 men, and we took about an equal extent of ground to cover. Since then we are reduced to about 12,000, whilst they" (the French) "are augmented to above 70,000."

*Copy of a letter from Lord Wellington to Major-General Sir John Burgoyne, K.C.B., etc., etc.**

STRATFIELD SAYE,
9th January, 1847.

MY DEAR GENERAL,—

Some days have elapsed, indeed a fortnight has, since I received your note with a copy of your observations on the possible results of a war with France under our present system of military preparation.

You are aware that I have for years been sensible of the alteration produced in maritime warfare and operations; by the application of steam to the propelling of ships at sea! This discovery immediately exposed all parts of the coasts of these islands, which a vessel could approach at all, to be approached at all times of tide; and in all seasons, by vessels so propelled from all quarters. We are in fact assailable, and at least liable to insult, and to have contributions levied upon us; on all parts of our Coast; that is the Coasts of these including the Channel Islands; which till this time from the period of the Norman Conquest have never been successfully invaded.

I have in vain endeavoured to awaken the attention of different Administrations to this state of things; as well known to our Neighbours; Rivals in power at least, former adversaries, and enemies, as it is to Ourselves.

I hope that your paper may be attended by more success, than my representations have been!

I have above in few words represented our danger. We have no defence, or hope of chance of defence; excepting in our Fleet!

We hear a great deal of the spirit of the People of England, for which no Man entertains higher respect than I do, but unorganized, undisciplined, without systematic subordination established and well understood, this spirit opposed to the fire of Musquetry and Cannon, and Sabres and Bayonets of disciplined Troops, would only expose those animated by such spirit to confusion and destruction.

Let any man only make the attempt to turn to some use this spirit, in a case of partial local disturbance. The want of previous systematic Organization, and subordination, will prevent him even from communicating with more than his own menial Servants and dependants! and while Mobs are in movement through the Country, the most powerful will find that he can scarcely move from his own door!

It is perfectly true that as we stand at present, with our Naval Arsenals and Dockyards not half garrisoned; 5,000 Men of all Arms, could not be put under arms if required for any Service whatever, without leaving standing without relief, all employed on any duty; not excepting even the Guards over the Palaces and the person of the Sovereign!

I calculate that a Declaration of War should properly find our Home Garrisons of the strength as follows; particularly considering that one of the most common accusations against this Country is, that the practice

* No alteration has been made in the orthography of the letter.

has been to commence reprisals at Sea; simultaneously with a declaration of War, the Order for the first of which must have been issued before the last can have been published.

We ought to be with Garrisons as follows at the Moment War is declared:—

Channel Islands besides the Militia of each, well organized, trained and disciplined	10,000 Men.
Plymouth	10,000 ,,
Milford Haven	5,000 ,,
Cork	10,000 ,,
Portsmouth	10,000 ,,
Dover	10,000 ,,
Sheerness, Chatham and the Thames	10,000 ,,

I suppose that one half of the whole Regular Force of the Country would be stationed in Ireland, which half would give the Garrison for Cork! The remainder must be supplied from the half of the whole force at Home stationed in Great Britain.

The whole force employed at Home in Great Britain and Ireland would not afford a sufficient number of Men, for the mere occupation and defence on the breaking out of War of the Works constructed for the defence of the Dockyards and Naval Arsenals; without leaving a single Man disposable! The Measure upon which I have earnestly entreated different Administrations to decide; which is Constitutional, and has been invariably adopted in time of Peace for the last 80 years; is to raise, embody, Organize, and discipline the Militia of the same numbers for each of the three Kingdoms united as during the late War. This would give a Mass of Organized force amounting to about 150,000 Men, which we might immediately set to work to discipline. This alone would enable us to re-establish the Strength of our Army! This with an augmentation of the Force of the Regular Army, which would not cost £400,000, would put the Country on its Legs in respect to personal force, and I would engage for it's defence! Old as I am!

But as we stand now, and if it be true that the exertions of the Fleet alone are not sufficient to provide for our defence, we are not safe for a Week after the declaration of War!

I am accustomed to the consideration of these questions; and have examined and reconnoitered over and over again the whole Coast from the North Foreland, by Dover, Folkestone, Beachy Head, Brighton, Arundel to Selsey Bill near Portsmouth, and I say that excepting immediately under the fire of Dover Castle there is not a spot on the Coast on which Infantry might not be thrown on shore at any time of tide with any wind and in any weather! and from which such Body of Infantry thrown on shore would not find within the distance of Five Miles a Road into the interior of the Country through the Cliffs, practicable for the march of a Body of Troops.

That in that space of Coast, that is between the North Foreland and Selsey Bill, there are not less than seven small Harbours or Mouths of

Rivers each without defence, of which an enemy having landed his Infantry on the Coast might take possession, and therein land his Cavalry and Artillery of all calibre, and establish himself and his communication with France!

The nearest part of the Coast to the Metropolis is undoubtedly the Coast of Sussex from the East and West sides of Beachy Head and to Selsey Bill.

There are not less than twelve great Roads leading from Brighton upon London, and the French Army must be much altered indeed since the time at which I was better acquainted with it; if there are not now belonging to it forty Chefs d'Etat Major-General, capable of sitting down and ordering the March to the Coast of 40,000 Men; their embarkation with their Horse and Artillery at the several French Ports on the West, their disembarkation at named points on the English Coast; that of the Cavalry and Artillery in named Ports or Mouths of Rivers; and the assembly at named points of the several columns; and the March of each of these from Stage to Stage to London.

Let any Man examine our Maps and Road Books; consider of the matter, and judge for himself!

I know of no mode of resistance much less of protection from this danger, excepting by an Army in the field capable of meeting and contending with its formidable enemy! aided by all the means of fortification which experience in War and science can suggest.

I shall be deemed foolhardy in engaging for the defence of the Empire with an Army composed of such a force of Militia! I may be so! I confess it! I should infinitely prefer, and should feel more confidence in an Army of Regular Troops! But I *know* that I shall not have these! I may have the others, and if an addition is made to the existing Regular Army allotted for Home defence, of a force which will cost £400,000 a year, there would be a sufficient disciplined force in the field to enable him who should command to defend the Country!

This is my view of our danger and our resource.

I was aware that our Magazines and Arsenals were very inadequately supplied, with Ordnance and Carriages, Arms, Stores of all denominations and Ammunition. The deficiency has been occasioned in part by the sale of Arms and of every description of Ordnance Stores from time to time since the termination of the late War; in order to diminish the demand of Supply to carry on the Peace Services of the Ordnance; in part by the conflagration of the Arsenal which occurred in the Tower some years ago, and by the difficulty under which all Governments in this Country labour in prevailing upon Parliament in time of Peace to take into consideration measures necessary for the safety of the Country in time of War!

The state of the Ordnance, Arms, Ammunition, etc., in Magazine is in part a question of expense and perhaps in some degree one of Time. I would recommend to have the Alphabetical List of the Stores examined by a Committee; and made out in a form as upon the inclosed half sheet of Paper, by ascertaining what there was in 1804 and what there is in Store now of each Article and the difference between the two accounts.

I have taken the year 1804 as the Standard as that was the year in which the Invasion was threatened; it was previous to the employment of the Armies in the Peninsula or North America. In short as nearly as possible similar to the political circumstances in which we stand at this moment; excepting that we are now at Peace with France. We were then at War!

A fourth Column would be the estimate of the expense of bringing the Magazines to the state in which they were in 1804!

With this information before him, The Master-General could give the Government accurate information of the wants of Ordnance, Arms, Ammunition and Stores in the Magazines of the Country.

You will see from what I have above written, that I have contemplated the danger to which you have referred. I have done so for years! I have drawn to it the attention of different Administrations at different times. You will observe likewise that I have considered of the measures of prospective security, and of the mode, and cost of their attainment! How such knowledge can be acquired. I have done more, I have looked at and considered these localities in great detail; and have made up my mind upon the details of their defence! These are questions to which my mind has not been unaccustomed, I have considered and provided for the defence, the successful defence of the Frontiers of many Countries!

You are the Confidential Head of the principal defensive Department of the Country! I will if you and The Master-General of the Ordnance choose, converse or otherwise communicate confidentially with you upon all the details of this Subject, will inform you of all that I know, have seen and think upon it, and what my notions are of the details of the defensive system to be adopted, and eventually carried into execution!

I quite concur in all your views of the danger of our position, of the magnitude of the stake at issue!

I am especially sensible of the certainty of failure, if we do not at an early moment attend to the measures necessary to be taken for our defence and of the disgrace, the indelible disgrace of such failure. Putting out of view all the other unfortunate consequences, such as the loss of the political and Social position of this Country among the Nations of Europe; of all it's Allies, in concert with, and in aid of whom, it has, in our own times, contended successfully in arms for it's own Honour and safety, and the independence and freedom of the World!

Where did any Man hear of Allies of a Country unable to defend itself? Views of economy of some and I admit that the high views of National Finance of others induce them to postpone those measures absolutely necessary for mere defence and safety under existing circumstances, forgetting altogether the common practice of successful Armies, of all Armies in modern times, imposing upon the conquered enormous pecuniary contributions, as well as of other valuable and Ornamental Property.

Look at the course pursued by France in Italy and Germany and Russia. At Vienna repeatedly, at Berlin, at Moscow, the contributions levied beside the subsistence, maintenance, clothing and Equipments of the Army which made the conquest! Look at the conduct of the Allied

Army which invaded France and had possession of Paris in 1815. Look at the account of the pecuniary sacrifices made upon that occasion under their different Heads of Contributions; payments for subsistence and maintenance of the invading Armies including Clothing and other Equipments. Payment of old repudiated State Debts! Payment of Debts due to Individuals in War in the different Countries of Europe. Repayment for Contributions levied, and movable and immovable property sold in the course of the Revolutionary War.

But such an account cannot be made out against this Country. No! But I believe that the means of making some demands would not be wanting! Are there no claims for a Fleet at Toulon in 1793? None for debts left unpaid by British Subjects in France who escaped from confinement under cover of the Invasion in 1814 by the Allied Armies? Can any man pretend to limit the amount of the demand on account of Contribution de Guerre?

Then look at the conditions of the Treaties of Peace of 1814, 1815.

France having been in possession of nearly every Capital in Europe, and having levied contributions in each, and had in its possession or under it's influence, the whole of Italy and Germany and Poland, is reduced to it's Territorial limits as they stood in the year 1792.

Do we suppose that we should be allowed to keep, could we advance a pretension to keep, more than the Islands composing the United Kingdom? ceding disgracefully the Channel Islands on which an Invader had never established himself since the period of the Norman Conquest!

I am bordering upon Seventy Seven Years of Age! past in Honour!

I hope the Almighty may protect me from being the Witness of the Tragedy, which I cannot persuade my contemporaries to take measures to avert.

Believe me,
Ever Yours most sincerely,
(Sd.) WELLINGTON

THERMIT WELDING FOR TRAM RAILS.

By Capt. D. Hoysted, R.E.

While driving through the streets of Alexandria a short time ago, I noticed that the system of electric trams was being extended and that, when putting down the new rails, the workmen were welding all the joints, instead of fishplating them to allow for expansion and contraction.

The lowest average temperature in the shade in this part of Egypt is 32° F. while the highest is 104° F. The first is a night reading, and the second is a reading by day, to which 50° F. may be added to obtain the highest average heat of the sun to which tram rails are subjected. This gives a difference of temperature of 122°. But the tram rails, when laid flush with the street, are mostly protected from the heat of the sun by their covering of concrete and road material. In addition, this covering being in the form of a homogeneous mass is capable of producing a sufficient stress to counteract the expansion of the heated rail. Thus, if a steel bar is warmed and compressed with an equivalent force, it will retain its original length, and it has been found in practice that this method is quite safe, even in a hot climate like Egypt, for steel rails buried up to the tread, and that the welded lengths do, as a fact, remain apparently unmoved in their beds.

The method of making the joint is a very interesting and simple affair though the heat to be developed is very high. The chief requirement is to obtain a level joint so that there will be no jump or displacement when the car wheels pass over it, and at the same time to secure complete and permanent electric continuity.

This the Thermit Process professes to do. Thermit is a mixture of aluminium and oxide of iron in certain proportions and in a granular state. Such a mixture has remarkable properties. It may be stirred with a red-hot iron, or molten cast iron may be poured on the top of it without result. If, however, any portion, and quite a small portion is sufficient, be raised to a temperature of 3,000° or 4,000° F. then the aluminium at once reduces the oxide of iron and forces it to part with its oxygen, in order that it may seize upon the oxygen itself and become oxide of aluminium. The heat thus produced is sufficient to leave the iron so formed and the oxide of aluminium (alumina or emery), both in a fluid state at a temperature of over 5,000° F.

But it has been found that if the contents of a crucible in which a

quantity of thermit has been fired are poured on two butted rail ends in a mould, the alumina slag which is the lighter will run first and form a film on the rails, and the heavier molten iron which comes after never gets a chance of forming a real fluid contact with them. By this means the heat of the thermit may certainly be used, but the iron, as iron, would be wasted.

This makes it necessary to devise some expedient for ensuring that the reduced iron should be delivered to the rails first, so as to thus melt the surface and adhere to the steel rails and become a single piece with them.

If this can be done the slag which follows will merely fill up the mould, and retain the heat until the whole section of the joint can be brought to a uniform high temperature and a thorough weld secured.

The temperature thus obtained is greater than is actually required for the work in hand, and experience has shown that it is better to reduce it slightly. This is done by adding to the thermit mixture about 15 per cent. by weight of wrought iron in the shape of filings, etc.

Thermit contains nearly half its weight in iron which is available as metal, and with the addition of 15 per cent., the yield becomes nearly two-thirds of metallic iron.

Tram rails of 100 lbs. per yard run, require 22 lbs. of thermit for a satisfactory joint, and thus nearly 14 lbs. of iron is available to form a strengthening shoe, a shoe not bolted or clamped but absolutely homogeneous with the rest of the rails.

In actual practice, the butted ends of the rails, when they have been brought to this high temperature, are very slightly but forcibly drawn together by means of two screw clamps so as to make sure of as perfect a weld as possible. This upsets the metal at the tread to a small extent and the irregular surface thus formed must afterwards be planed true.

The mould in ordinary use is made of fireclay placed round the desired point of junction and banked up with sand, and above it is placed a conical crucible resting on an iron tripod.

A small rod projects through a small hole in the bottom of the crucible, and rests on the spade-like end of a short lever which stands on the top of the mould. This rod is a piece of ¼-in. iron bar and reaches nearly to the top of the hole piercing the bottom of the crucible. The top of the hole is closed with an iron disc, covered with a little asbestos and sand over which the charge of thermit mixture and filings is placed. The crucible consists of sheet iron lined with baked magnesia.

To ignite the charge, a thimbleful of a special mixture is placed on the top of the charge and lit with a fusee. This produces an intense local heat and starts the reaction in the charge, which becomes a molten mass in less than half a minute. As soon as the mixture is

melted the spade-like lever is forced up, lifting the rod and the covering over the exit hole. At the same time the spade lever is removed. The molten iron runs first around the joint and is followed into the mould by the slag. After waiting three minutes till the butted ends of the rails are uniformly heated, the clamps are screwed up about half an inch and the joint is allowed to cool for a couple of hours. The fireclay mould is then broken up with a hammer, and the mass of alumina slag, which fills the upper part of the mould just clear of the rail, is knocked off and is available as a by-product for use in emery works. I saw a joint cut through the middle and was unable to find the slightest irregularity in the exposed section or any sign of want of homogeneity.

The igniting mixture is kept a secret by the manufacturers of thermit, and is supplied in bags with the charges.

I am indebted for the above information to the courtesy of the Director of the Alexandria Tramway Company.

FERRO-CONCRETE DOOR FOR A RACQUET COURT.

By MAJOR A. R. WINSLOE, D.S.O., R.E.

FOR those interested in racquets, the following description of a ferro-concrete door made at Quetta may be useful in places where uncovered courts exist. In such cases the best wooden doors give trouble in time, whereas a well-made ferro-concrete door gives no trouble. The details of the door are shown in the *Plate*.

The cement concrete consists of 1 part Portland cement, 1 part sand, and 2 parts broken stone ballast (pea size to $\frac{1}{2}$ in.). The reinforcement consists of $\frac{1}{2}$-in. expanded metal on a frame of 1 in. × 1 in. × $\frac{1}{8}$ in. angle iron, stiffened by diagonals of round bar $\frac{1}{3}$ in. in diameter. Excluding the diagonals, the reinforcement works out to 2 per cent. nearly. In setting, care must be taken to allow the air to get at both surfaces, otherwise warping will take place. The first door constructed was made to shut against reveals in the racquet court wall. The weight of door however was so great that the continual shutting damaged the edges of the door.

A free swinging door (as shown in *Plate*) was then made to run on a racer, and there is no difficulty about opening or shutting this. The improvement in the game made by a door of this sort is very great, for the resiliency is considerable ; and, though the ball does not come off with quite the same force that it does off the adjacent racquet court wall, it comes off quite true.

In fact I think that if the door were made 2 in. thick instead of 1$\frac{1}{2}$ in., the difference in resiliency would be hardly noticeable. This is important in a fast game. A reduction in the size of the door could be easily made to keep down its weight.

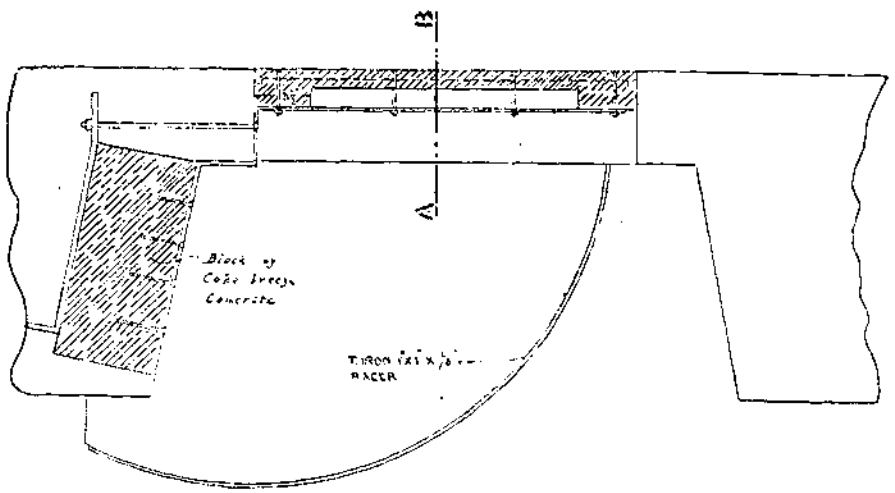
The inner face of the box to contain balls should also be of ferro-concrete. Such a door would, I think, prove useful in covered courts.

REINFORCED CONCRETE DOOR FOR RACQUET COURT.

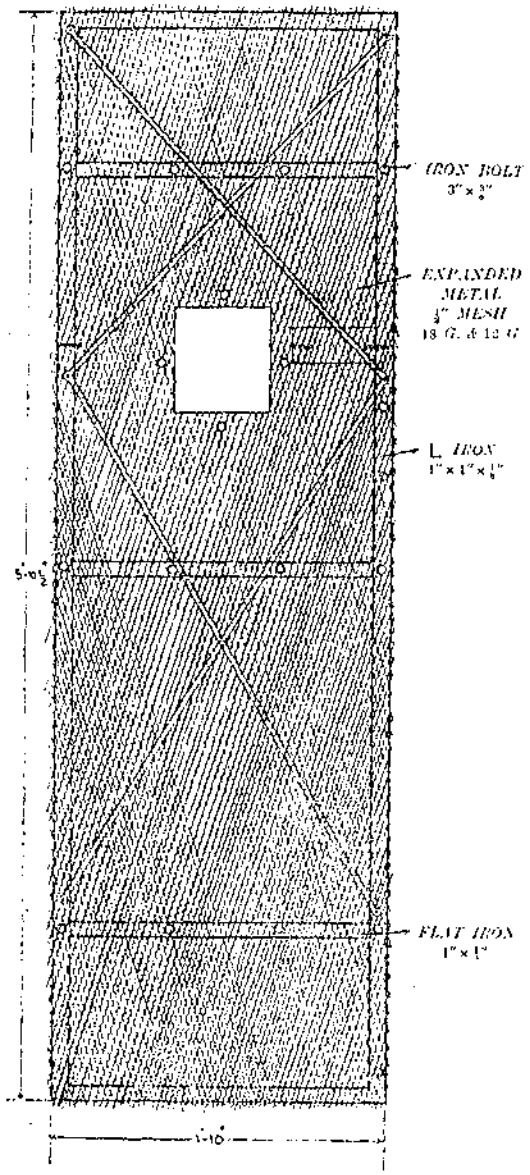
Scale—1 in. = 1 ft.

12" 9" 6" 3" 0" 1' 2' 3'

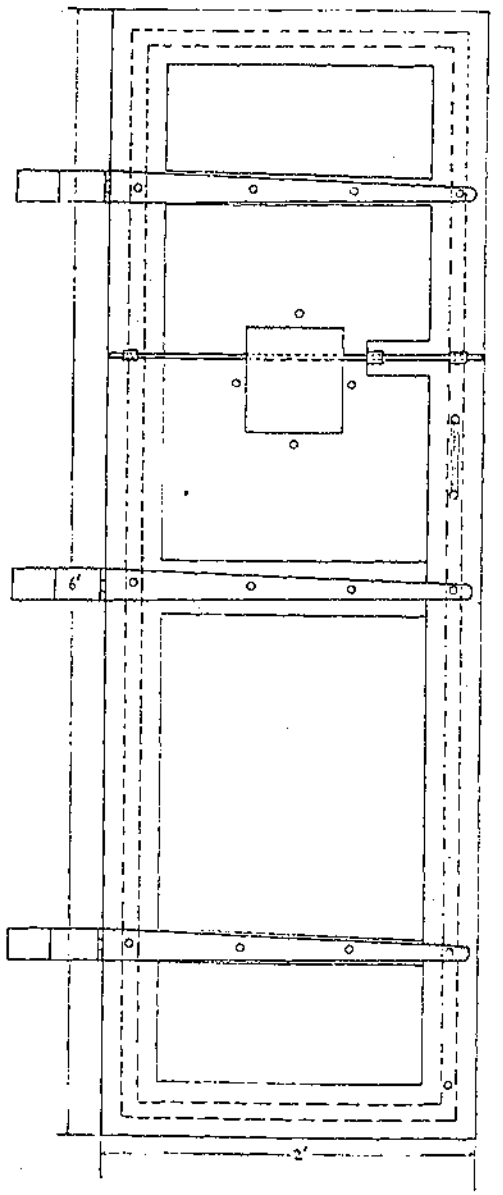
PLAN.



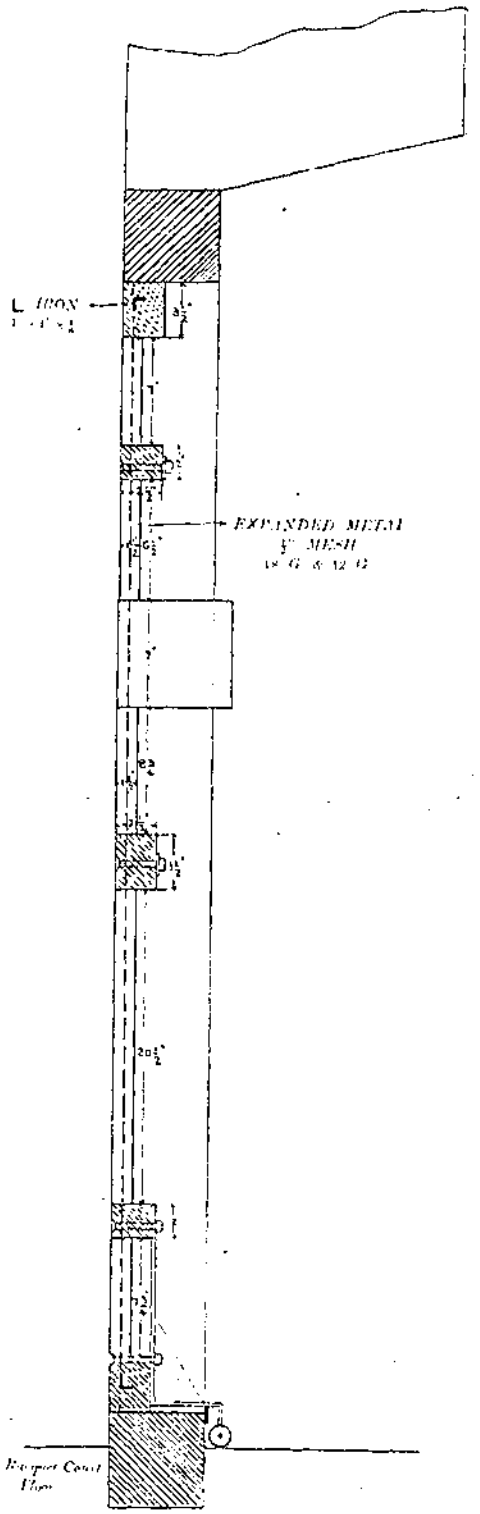
EXPANDED METAL.



ELEVATION.



SECTION ON AB.



THE SIEGE OF GIBRALTAR.

THE following interesting letter giving a detailed account of the attack by, and destruction of, the Spanish floating batteries in 1782, was written by Sir William Green to his son-in-law, Mr. Nicols. It was given by his grandson, General Nicolls, R.A., to Major-General Whitworth Porter, R.E., and has been recently handed over to the R.E. Museum.

GIBRALTAR,
20th Sept., 1782.

MY DEAR NICOLS,

Ever since May and June last, the enemy have been perceived to make the most active, extensive, and formidable preparations possible, for a violent and vigorous attack of this place both by sea and land. Their ten great floating batteries, (or ships fortified and converted into such) were commenced upon at Algeziras, about the middle of May, and seemed to be got all perfectly ready about the 1st of September, as was every other preparation by sea, including 3 bomb ketches, 16 Gun Boats, 8 mortar boats, 16 large boats with mantlets across their bows, to let down with a hinge for the easier disembarking of troops, about 30 boats of a particular kind for the readier taking the shore, carrying and disembarking of troops, besides about 2 or 300 boats, brought from the adjacent coasts, to assist in throwing troops ashore, and other occasional movements peculiar to such attacks, besides a kind of floating battery or fort, of a particular construction, which I took to be intended for our shallow waters, in order to perfect those breaches, by which they imagined, (or had planned) were to be first opened by their large floating batteries. The whole of this sea attack, as we thought, was to be supported by 9 line of battle ships (7 Spanish and 2 French) and which had been in the bay for some time. And *with them only*, on the 9th and 10th instants, made a flying irregular attack under sail, upon our southern defences, which was answered by such of our batteries as could properly bear upon them, but without any material effect, or damage on either side.

On the 8th September, we set on fire by the means of redhot shot, their most centrical battery upon the Isthmus, called by them the Mahon Battery of 6 guns, besides a battery of two guns, just finished, adjoining it, notwithstanding all their possible endeavours to prevent it, in which they lost some men.

On the 9th September, The Duke de Crillon, opened all his new batteries at sunrise. The chief of 64 embrazures besides his four new mortar batteries all which were keeped playing, chiefly upon our works

upon the northern fronts, the 9th, 10th, and 11th rather with great activity and violence. But on the 12th to our great astonishment in comes their grand combined fleet, and anchored at the head of the bay, consisting of 41 large ships, 7 of which are 3 deckers, and now, conjointly with the foregoing 9, makes 44 of the line, and about 6 Fiftys, in all 50. A formidable fleet you'll say, and commanded by eight Admirals.

About the 15th August, arrived in their camp, to serve as Volunteers, the Count D'Artois, one of the French King's brothers, and the Duke de Bourbon, son (I believe) to the Prince of Condé, and towards the 10th September, arrived a great deal of Spanish and French Nobility and Gentry, to see Gibraltar knocked to pieces, and swallowed up; and accordingly as we suppose, everything being ready on the 13th September (the day after the arrival of their grand fleet) about seven in the morning, their ten large floating batteries were perceived to be under sail, and it was soon conjectured, intended to bear down and attack the garrison, and by ten o'clock, anchored, as we judge in their proscribed stations, the Southernmost not a great way to the South of the King's Bastion, off Columbine's Parade, and the Northernmost a little to the Southward of the Old Mole Head. They immediately began a furious well served cannonade, upon our sea three fronts, between the King's Bastion and the North Bastion, including the Montagu, and the Prince of Orange's Bastions. Five of their batteries were constructed upon two deckers, and five upon single deckers, in all about 144 pieces of artillery, besides from 4 to 7 spare guns in each, making 43 more, in all 187 exceeding fine guns, all cast on purpose. They were immediately answered, in full as lively and active a manner, from all our prepared batteries that could properly bear upon them, but with much more judgement, precision and execution, particularly from our redhot shot with which we plied them most amply, and efficaciously, together with our shells from mortars, howitzers, and from 24 and 32 Pr. guns, in so much, that rather early in the afternoon, we could perceive some of them, by the issues of smoke, seemed internally to be on fire, and as if some lurking embrios of fire were labouring to burst forth, which notwithstanding all their visible efforts to extinguish, two of them actually did flame out about midnight, and before daylight 5 more were on fire, and before twelve at noon next day two more were on fire, and the last and tenth was set on fire by ourselves. As by daylight the enemy had abandoned the whole, except 340 Privates, and 9 Officers, which were left behind, so that by four o'clock in the afternoon of the next day, or in about 32 hours after they drew up before our walls, this truly formidable Armada was annihilated. Seven of them, when the fire approached their magazines, blew up with an awful and tremendous explosion, to our great joy and satisfaction, particularly as they had, neither in their attack nor explosion done our works, or batteries, any very great damage comparatively speaking, for such a long and violent effort, powerfully supported during all the time of this sea attack, with a very heavy fire from all their batteries upon the isthmus, as already in some degree described.

The expense of time, labour, materials, and money to fit out this Armada, exceeds all description, as they pretended to be so constructed and fitted out, that they should be entirely proof against shot, shells, and fire, and not to be sunk; but our well plied red hot shot, etc., etc., soon convinced them of their error, and it was perceivable, that even so early as about five in the afternoon, they began to slacken their fire, and be in some confusion at the apparent danger which seemed to threaten them. When they saw that their darling, and so much boasted batteries, with which they have so long denounced the destruction of this place, would infallibly be soon on fire, and in a little time after, some of them on board, (nay I believe a great number) began to apprehend their growing danger, and before midnight, began seriously to think of their safety, and escape, by making many repeated signals of distress, and to call for their boats, from their fleet and shore, which immediately put off and came to their assistance, and to take away as many as danger, confusion, and time before daylight would allow of, but before the dawn of day, long, our 12 gun boats commanded by Brigadier Curtis, was alongside several of them, tho' then burning, and consequently at a great risk of himself and people, brought away the 340 prisoners, and the 9 officers, who I think, but for Commodore Curtis's enterprising humanity must have all been sacrificed, for while he was alongside of two of them on fire, they successively blew up he very narrowly escaping, his own coxswain being killed in the boat.

In the attack of the 13th, we lost Captain Reeves of the Royal Artillery Adjutant; two Sergeants, and 11 Privates killed. Wounded 5 Officers, 3 Sergeants, and 81 Privates. Officers wounded, Captain Groves and Seward, Royal Artillery, Captain McKenzie, 73rd, Lieut. Whitham 58th and Lieut. Godfrey, Royal Artillery.

Our Corps of Artillery I think, gained the greatest honour that day, and the effect of the power of our three new additional works, which to my astonishment, being the points they attacked, actually taking the bull by the horns, viz. The King's, The Prince of Orange's, and the Montagu Bastions, together with their intermediate curtins, was universally acknowledged to be very conspicuous and efficacious, particularly the King's Bastion, opposite to which the Spanish Admiral and commander of this Armada drew up. Between the 10th and 11th inst. a storm of wind arose, which proved very detrimental to the combined fleet then anchored in the bay and drove upon our coast the St. Michael Spanish man of war of 72 Guns which became our prize and is got off and the crew prisoners. Several were disabled and some drove on shore, had it lasted three hours longer I suppose 6 or 8 of the enemy's principal ships of their fleet would have been on shore and behold in the evening of the 11th comes our fleet and convoy under Lord Howe. The Enemy's fleet next day went out of this bay (42 of the Line) and we expected the next morning at farthest a general sea engagement from such a manifest superiority. But to what to attribute it to? I know not, there has been no engagement; the convoy is now (18th Octr.) coming in to the immortal honour of Lord Howe in my judgement who has never been out of sight of this Rock, the enemy's 44 having had the

weather gage of his Lordship's 34 but it would seem they did not choose to engage. Yours I have received of the 12th July, my sister's of July 22nd and August 26th, Mrs. Nicols of 17th July. Tell them all, the family and friends I am well but cannot write to them at present (18th Oct.). I approve of Charlotte's going to Mrs. Skinner's. God bless you, in the greatest of hurry farewell.

Yours most affectionately,
W. GREEN.

Finished 18th Octr., 1782.

You see my hurry in my conclusion. The Convoy come in, the Cork ships annihilated, Lord Howe master of the Gutt and Bay, and the British Colours flying upon this fortress.

THE DIARY OF TWO NOVICES IN NYASALAND.

By Lieut. T. Benskin, R.E.

Fish and I were two R.E. subalterns in South Africa, and with the usual pleasure-loving instincts of our kind had for long hoped to murder a few big animals in Central Africa. An opportunity at last arose, and Nyasaland was chosen for the trip, of which the following is a short account, which may prove useful to others fired with the same ambition.

There are no tales of mighty slaughter and of fearful danger, or news of strange and unknown plants and life to be read, only the truthful account of how two novice big game hunters spent a few weeks in peaceful and half-civilized Nyasaland.

In August, 1910, the two of us steamed in a Castle Liner from Delagoa Bay, travelled a few miles up the East Coast of Africa and disembarked at Chinde, by the mouth of the Zambezi. There is little to tell about the journey up the Zambezi and Shiré Rivers to Nyasaland, for it is a well-beaten track, and although far from dull there is nothing much out of the common for any traveller in it. Flat-bottomed stern-paddle boats, much like those on the Nile, take one up the Zambezi, and small house boats which draw some 10 in. or so are poled up the Shiré by about eight boys. When Port Herald is reached the rest of the journey to Blantyre is done by train. One sees a few hippo and crocodiles on the river, and any amount of duck and geese, but, save for a few casual shots at the latter, there is not much to be done. Seven days were spent on the journey from Chinde.

Our plans were at that time very vague, and, with the exception of our guns and cartridges and the usual soldier's camp kit, we had hardly any luggage or stores. Everything was to be arranged at Blantyre, and we hurriedly left the sandy desolation of Chinde. But we did one useful thing at Chinde, and that was to engage a servant to see us on the way—or rather I should give Fish the credit for that action. George was generously engaged as a servant by Fish, not for himself but for me. He seemed a curious creature and he called himself a cook, but it did not take long to find out the truth about him and to learn that he was in reality only a savage "Yao," who was posing as a servant in order to be taken home again up country. Still he had his good points, and when all other means failed George

could easily open a tin of hermetically sealed cartridges with a single bite of his ferocious teeth, and he washed clothes with a zeal which would certainly excel that of a Parisian laundress. In fact his cleanliness got the better of him for he continually washed clean clothes as well as dirty ones, and he had an unpleasant habit of thinking that it was also his duty to wash me. At times he reminded me of my garden boy at Pretoria who, when told to water the garden, commenced by watering the water-lilies in the fountain.

Anyhow everything on the journey went off very well, and at the end of August we found ourselves comfortably asleep in the African Lakes Boarding House at Blantyre.

Thursday, 1st September.—The town on first arrival seemed rather a jumble of a few scattered buildings amidst steep hills and trees of every kind. Blantyre is the civil centre of Nyasaland, but Zomba, chosen for the better climate and situation, is the head of the administration where the Government headquarters and troops are collected. In the morning a call on the District Resident at the Boma, and the presentation of a letter of introduction, resulted in our obtaining our licences—£30 each with a signed bond for £20 in case of infringement. In the afternoon we gave our lists of stores to the African Lakes Company where a companion on the Zambezi had given early warning of our arrival and needs. The Company have fixed their headquarters at Blantyre, and the outward appearance of the building resembles a fort rather than anything else. In early days I suppose that it was a fort, but its native name Mandala—meaning eyeglass—is more suggestive of peaceful old Scotchmen wearing spectacles, than of the ruthless hordes of natives bent on loot and the murder of those first inhabitants. Camp kit, tents, guns and cartridges had been brought with us, but everything that was likely to be wanted might easily have been bought or hired at Blantyre, and at a far cheaper cost than we had got them in the Transvaal. There are several excellent stores ; and, when men leave the country, sales at which good rifles and cameras can be picked up for a few shillings. We were advised to use grass-soled canvas shoes, at 2s. a pair, when hunting, instead of our imported heavy boots, particularly as we were going to bicycle whenever possible.

In the evening we all dined with the Resident in his very comfortable house, going to, and luckily fro, by rickshaw. Much valuable advice was given as regards both sport and natives, and our host said that he hoped to provide us with a good boss boy, or capitao, who knew some English. That evening it was settled that we would do without the nursing of any white man. For when at Chinde we had been sorely tempted to place ourselves in the hands of a professional hunter, but the idea of having some stranger as companion to run the party had never seemed pleasant, and such an arrangement would have

been far more expensive, and also destructive to all experience and much amusement. One can only learn by doing things oneself. We made up our minds to engage Mandala boys to take us quickly as far as Chikala—east of Zomba—and there to re-engage our own bearers, or tenga tenga, with a view to working north-east and awaiting events.

Friday, 2nd September.—In the morning the Capitao, John Mahommed, promised by the Resident arrived with some 10 followers and proceeded to take advantage of our innocence in every possible way. All of the party were picked boys, all of them experienced trackers, cooks, warriors, servants, and strong men, and all of them needless to say accustomed to receive double the normal wages of the land. John certainly did seem to fulfil his own description of himself, and he was not far wrong when he said that we should find him to be a most "intelligible" person; he spoke English fluently. Luckily it was evident that our eagerness to collect our staff was only equalled by their desire to be engaged, all questions of payment were airily postponed and the services of six of them provisionally accepted. John was to be taken as Capitao, James as Fish's personal servant, (I was already saddled with that curious individual George) and Wilfred as cook, with an assistant in charge of water, leaving Kokwana and Simbota, two normal natives who were to act as gun bearers. Thus we were only in need of two good hunters whom we hoped to obtain from Liwonde and to find waiting for us at Blantyre, in addition to the common carriers or tenga tenga. The Mandala would provide us with the latter as far as Chikala. Conversation when at dinner with the local Judge put us in the right direction as to wages, so John was severely spoken to, and the slightest reference to the magic word "Boma" (police court) was sufficient to make him sensible. Our loads were checked, a second bicycle bought (Fish had brought his old jumble of iron from South Africa) and we were ready to start at daybreak.

Every day one realized how much of interest was missed by failure to understand the Chinyanja language, and a good interpreter seemed essential. Natives are wonderful at picking up languages and George could already speak a few words of English and understand more. At moments he would break out into a long sentence, and whilst putting me to bed that night he suddenly with a loud laugh made two important announcements:—Firstly, that the Bwana (white man or master) ought to go to school, and secondly, that John had been making a fool of the Bwana. Perhaps in some respects it was lucky that we were so ignorant, but we bought a book of the language the next day.

Saturday, 3rd September.—From Blantyre to Zomba, a distance of 42 miles, the road was excellent and very pretty, amidst hills covered

with slender close-growing trees. It was being straightened and improved by good metalling when we made the journey and was fit for a motor car throughout. There are several motor bicycles and two or three motor cars in Nyasaland. Almost every white man has a bicycle, but the usual means of travel is in a Machila—a kind of hammock—carried by two or four trained boys with about twelve others in relief.

When in a Machila, the great tip for comfort is to have plenty of cushions under one's knees. Personally I found it the most uncomfortable means of locomotion that I had tried anywhere for a long journey. But on that occasion we bicycled, outpaced our bearers of course, thought we had lost them and were only rejoined at Namadzi, a distance of 22 miles from Blantyre. It was just getting dark and the boys did not know how to put our tents up, or where the food was, so we decided to try the hospitality of a neighbouring settler who owned an immense cotton estate close by at Magomera.

There seemed to be an unwritten law in Central Africa that hospitality is to be given by a resident to every passing white man whoever he may be. Certainly I have nowhere in this world found such a continuous open-handed welcome. It was difficult to feel that this hospitality was not being abused, for nowadays Central Africa is really well known and easy of access ; travelling and shooting parties stream through country which has only been opened up for a few years, and every novice sportsman with a string of questions in his mouth visits the unhappy settler, missionary, or civil servant, and receives a splendid meal with priceless wines and cigars. Also it must be remembered that Central Africa has its tramps like any other country, and one finds amazing men, known as D.B.S. (distressed British subjects), who have wandered as beggars with only a kaross and tin mug on their backs from village to village through the very heart of Northern Rhodesia. Certainly a visit from the outside world may be a thing to be valued by these generous gentlemen, but they must receive too many visitors, and the hospitality should to my mind be first offered by the pleasure seeker who can afford time and money for a big Ulendo of 60 boys with tents and stores. As usual we were given a splendid welcome, and beds which were on this occasion accepted with alacrity.

Sunday, 4th September.—The difficulties of the previous evening had taught us the necessity of passing a quiet afternoon playing with our tents and finding the way about our dozen boxes full of tin pots, stores and food. Camp was pitched at a pretty little spot called Ntonbwe, where a passing white man visited us. He had heard of our coming and brought news, good and bad; firstly that from Chikala we should get good sport, and secondly that the hunters, or elephant professors as he termed them, whom we were hoping to obtain from Liwonde were already engaged.

That afternoon we overhauled our guns and did a little target shooting, for there was no game in that part of the world. We each had double-barrelled ·470 cordite Express rifles, Fish a ·303 sporting carbine and myself a ·256 Mannlicher. The sound of the shooting alone was enough to attract several natives, and three boys volunteered to join us as porters straightway.

Monday and Tuesday, September 5th and 6th.—After an 11 miles ride we reached Zomba. An introduction to the Acting Governor resulted in our obtaining permission to shoot one bull buffalo and one bull eland apiece, animals which were already protected in Nyasaland although they abounded. We also obtained some quite good maps which did not however prove to be as useful as they might have been, being for the most part blank for the districts which we hoped to visit. As we had not come to Nyasaland to visit Zomba but to shoot, we disgusted our boys by pushing straight through the same day, and spent the night near a village named Niezi, 5 miles out of the town.

A 24 miles ride the next morning took us to the foot of Chikala Mountain, where on the side of the hill there stands the boma with its wonderful outlook over Lake Chilwa and across miles of burning bush and dambo, right up to the slopes of Mount Mlanje. The boma man and his charming wife had heard of our probable arrival and gave us the usual welcome, a hearty lunch and dinner and immediate assistance by collecting 45 boys for our loads. Within six hours we had dismissed our Mandala porters with cash payment and were ready to go on with our own private and personal tenga tenga. Each boy was registered at the boma to receive 4s. a month wages and 1s. as poso (money with which to buy his food), and the actual payment was to be made in limbo (drab-coloured cotton), coarse salt or cash according to our convenience. The climb up to the house had been very trying from the heat, and we were still very soft after the lazy time on the Zambezi, so much so that Fish got touched by the sun and we both found it necessary to add puggarees to our double Terai hats.

At Chikala the good track ceased, and that day for the first time we realized that we were approaching the haunts of game and nastier things; for on seeing a beautiful mauve-coloured flower with a curious furry red bean I had picked a pod with the hope that it might grow elsewhere. Old inhabitants know the dangers of the Mucuna bean, and so did our boys to judge by their grins. Within five seconds I was wildly scratching at hands, arms, face and everything in vain trying to rid myself of this wicked pest which causes the most maddening irritation, whilst the gentle Fish sat down and laughed and concocted plans of sending pods home to his country pals. Again, in the evening when departing in the dark to climb

down to camp, some mile or so away, we were calmly told that it might be advisable to take a gun, most certainly a lamp, with which to keep the lions away. As I had been scared out of my wits in broad daylight when close to the house by a huge baboon jumping up two yards away from me, this was not comforting. We performed the most silent night march ever walked by soldiers. Luckily for our fears the lions only "noised," as John termed it, at the next village.

Wednesday, 7th September.—From Chikala to Pankande was a short journey of only 12 miles, but sufficient for that day as we wished to get our string of strange boys under control. Being still without any proper "hunters," we were very glad when two most savage natives appeared to offer their services. Wyedi and Ndala were splendid-looking fellows with neat little beards and long slender agile bodies which made them appear fit for any work. We gave them each a hunting knife and sent them on ahead to look for game. Cheap hunting knives with leather sheaths and soft metal blades had been already given to the two gun-bearers and to John, who was also very superior in our gift of a new shirt and trousers of khaki. A funny little piccanini 4 ft. high was very eager to come with us, so he was christened Leetlejohn or Johnnylei and made carrier of the butterfly-net.

The Ulendo was a delightful sight and the novel joy of travelling in such fashion alone worth our long journey. Two boys chosen for fleetness of foot were detailed as Jinga (bicycle) carriers and were made to run in front of Fish and myself. Their work consisted of carrying the jinga on their heads when the track was too bad to permit of riding, and shouting out warning when some impossible twist in the path or a fallen tree was liable to destroy us; the warnings were usually forgotten. I suppose that they were useful in this latter duty, but we soon grew so used to taking headers into the bush that we never even paused to sympathize or comment on our falls. Native paths are like the native's mind and unable to lead direct to the point; they are narrow, and twist off in an entirely new and strange direction every few moments. With perseverance the object in view can be reached. The jinga tracks served as a great inspiration and beacon to the weary carriers behind us, but if any doubt were likely to arise at some cross paths the smallest hint, such as a couple of leaves or a small scratch in the dust, equivalent to our English signpost, seemed sufficient to keep the boys in the right direction. The two gun-bearers came behind the bicycles, keeping up as best they could and seldom outpaced. We soon gave up all thought of shooting while on the move and decided to reserve our energies until arrival in camp.

When leaving Blantyre we had feared that some of our loads

might hardly prove, from awkward shape or bulk, exactly convenient to be carried. However, we quickly learnt how groundless were our fears, for a native can balance anything from 30 to 50 lbs. weight upon his head. Leetlejohn always headed the bearer party brandishing his butterfly-net and with his own small sack of flour upon his little head. The sack had usually a small hole in it and Leetlejohn was a fearsome sight when turned from black to white. Next there came my priceless "tinbockus" containing all the money, books and medicine, but nearly always with a poor live nkuku (chicken) hanging by one hapless leg from the handle; and then the long stream of ever-chattering smiling jesting tenga tenga, ready to break into a run and curious bell-like tra-la-la-la cries at every sight of the bicycles. They were delightful people. A crowd of happy children; a smile and they would crow with joy—a frown and vanish in the bush.

The personal staff followed in rear as whippers-in; first James and George, the two valets; James, a sly obsequious young rogue with a little mission-taught knowledge of English and worse things; George, a natural enough villain of huge muscle and a fighting instinct which rather detracted from his value as a body servant. With his first wages he had bought a blue-and-white striped vest which shrank and only reached some 9 ins. below his shoulders. This and a pair of knotted legs protruding from a close girt loin cloth made George the most extraordinary spectacle conceivable. Our cook was moderately old and liked to wear a long blue toga; but when this cloth was tightly wrapped around his waist and legs, and Wilfred walked with a neat cane in his hand and a new grey felt hat on his wrinkled face, he then became a thing that was indeed strange and ludicrous. In his own language he was a great conversationalist; luckily he could not talk English sentences, but much wandering had taught him many oaths not understood, I hope. Having a nature that was inclined to explode into frantic excitement if even addressed, he made a splendid whip. He also proved to be an excellent cook, but one best left alone, for even a smile would make him suspect some interference with his power as autocrat of the kitchen table. We called him "Her" and "Mother" Wilfred. Last of all was John. Well, John was John, superior, quiet and reserved, a most "intelligible" person—but ready to break into bursts of suppressed savagery which were truly awful in their heartwhole sincerity.

Thursday, 8th September.—At Pankande we made our first attempt to kill big beasts, and on arrival spent the evening at a useless search for kudu. The grass had not been burnt and we only saw spoor; and that was all that we found in the morning as well, if one may omit the discovery of a huge flat beetle in my trousers. Bad water and

long grass made us decide to move early. Chinyanja, only seven miles ahead, was the next camp, and by 10 o'clock the tents were pitched close to a native plantation of casowa and castor-oil plants, both favourite foods of the kudu.

At Chinyanja there is a reedy lake, whose outlet flows into Lake Chiuta. Ibis and a few storks were visible on the water, no duck or geese. Kudu were said to be close at hand and we meant to go for them in the evening, but tales of mvu, (hippo) and of mvu on land, were brought to us so we started off at once. The hippo was by then in the middle of the lake where he had probably been the whole time, but very visible, so we dived into some reedy swamp up to our knees, till we reached the deep water's edge, during which time of course the hippo sank. For nearly an hour we only saw a few crocodiles' snouts close by—till suddenly on the far side 150 yards off two big hippo came through the rushes. We both fired our ·470 solids and each hit hard. The bull plunged head over heels into the reeds on the right where we heard the poor beast grunting in pain, the cow also tumbled right over and into the water where she disappeared. John promptly went off his head and all the savage burst out to be quickly repressed again. His heartfelt cry of "Oh! Bwana, Bwana,—plenty nyama to-night and plenty fat," proved incorrect, and after a long wait and rather timid search in the reeds where the water luckily got too deep, we went back to camp, thinking hippo shooting rather an unsporting amusement. One should not shoot unless certain of killing, and the hippos are nice pleasant old creatures, big friendly pigs, with no desire to hurt people except when protecting their young. They may perhaps eat up a few acres of native lands in a night, but the wise landowner will always scare them away by making his piccaninis shriek all night from the dubious safety of a slender shelter some 10 ft. high.

In places the lake was covered by a peculiar mat of broken-down reeds, which might just carry one's weight. It did not always, and Simbota just got me out of the water in time, whilst Fish hindered him by trying to take friendly photographs. The inhabitants were delighted at our wade into the water, a thing no other white man had been fool enough to do before, and that evening the Chief visited us with the usual "presenti" of a chicken for which he received a "presenti" of a "tikkey" in return.

Friday, 9th September.—We were beginning to consider ourselves to be rather failures as sportsmen. Every morning the two valets had overslept themselves and had been soundly abused for waking us up at about 6 o'clock. It was rather noticeable that Fish's chides were never disclosed before lunch time. That morning the servants avenged themselves by telling us at 2 o'clock in the night that Wilfred was cooking the breakfast, a mistake which Fish only found

out at some later hour, when sufficiently aroused for him to realize that most of his clothes were on and that I was again asleep. Those next two hours in bed were very pleasant.

That little episode made us realize that all of our boys were completely lost as to time as soon as the sun, their clock, had set. We had quite early on our journey understood that they never had the least idea of distance, and their abominable politeness was always the source of trouble in that respect. The answer to any question always consisted of the reply which to their minds might give the most immediate pleasure, and often did we wish that a wretched word "pafupi" meaning "near" had never been invented. The reputed skill of the natives as guides in the bush was disappointing, but opinion based on such slight experience as ours could hardly be considered. We found that it was certainly advisable to have a local villager with us, for he would always reach his destination somehow, and his presence gave one a sense of security, but seldom was our patience sufficient to silently undergo the usual exhibition of the homing pigeon tactics, or to view without comment a final cast taken in an obviously wrong direction in order that the continual twists might bring the leader right. We even began to suppose that this perverted bump of locality explained the nature of those extraordinary native paths which caused us so many a painful fall, and refused to accept the simpler reason that the first track naturally twisted to avoid fallen trees and clumps of thick bush. At night I certainly think that we had a better idea of guiding than the natives, for, as soon as it grew dark and the strange secret sounds of the bush commenced, the poor fellows became quite useless and their every thought was hushed to a quiet longing for bed in safe companionship or for the sham bravery of a moa-spattered tom-tom.

When we did at last get up and try to shoot, Fish was the person who proved to be most awake or who at least pretended to have been. John was sent on ahead with the Ulendo to fix up the camp at a place that owned the cheerful name of Mtalala, whilst we two sportsmen went in different directions, for after our early rouse a separation seemed particularly advisable. Having spent 3½ hours pleasant wander through pretty country where the young shoots were bursting up from the burnt grass and where one only saw the spoor of kudu and eland, I returned to meet Fish at Chinyanja. There he was found waiting for me, and his ill-concealed excitement and impatience made it very clear that something unusual had taken place. After a few casual remarks about the heat, his thirst and the general lack of game, he tried with rather exaggerated unconcern to break me the news and left me utterly fogged as to what had happened; but after cross-examining him with the same method that one would apply to a native, I managed to elicit some small amount

of truth about his achievement. Being annoyed with the previous day's amusement and with hippo in general, and also no doubt still half asleep, he had fired a shot with his ·303 at about 500 yards range and out of mere malice in the direction of a harmless creature whose eyes were just sticking out of the water. The hippo had as usual sunk; Fish had then wandered on into the bush where he of course failed to hit anything, returned to the lake to see if he could harm any more gentle mvu, and there to his surprise had found his target of the early morning floating upside down swollen to an amazing shape in the middle of the lake where it looked like nothing earthly. I promptly claimed the beast as mine and as the one which I had knocked into the pond the previous evening, but unfortunately the sex proved to be wrong. The whole affair was most unsporting. And it was thus that "we" killed our one and only hippo, which provided us with all the hide and teeth we wanted.

A boy was sent to recall John whilst we wondered if we could with safety salvage the beast before it burst, and it was decided that we could not, but that the friendly Chief who was surrounded by the entire male portion of his clan, might be able to do so. This caused intense excitement and about an hour's unintelligible conversation, during which all the women and children were collected to watch the operations and encourage their guardians. After considerable persuasion some twenty braves began to modestly unrobe and went into the water up to their knees, thought better of it and tore back to shore for further stimulation by singing a song for half an hour. At last they tried again and reached the dead animal which was only in about 5 ft. of water, and they there began to smack it. This also proved to be too much for them; they again rushed back to safety on land and began to smack each other. Things were growing tedious so we threatened to withdraw our promise of nyama, and at last to the sound of many a song and long-drawn cry of Mvu the dead beast was dragged on shore.

John only returned at about 3 o'clock when he was in a very bad temper and said that he and all our boys were Mohammedans and would never think of eating so foul a creature as a hippopotamus, that he thought it rather silly of Fish to have killed a docile hippo (I agreed), and, in addition to much other chat, that the person whom we had thought to be a chief was not a chief at all but only a pedlar of chickens. We offered to kill him another mvu in correct Mohammedan fashion by first cutting the throat but he would not be satisfied in any way, and continued to be so communicative on native and his own habits that we decided to keep him in a bad temper for all time. So we told him to distribute the meat to the villagers whilst we tactfully returned to our tents, where Wilfred was shrieking, and George met us with a swollen mouth and tales of John having been a wicked

man who had fought the Tenga-Tenga and personal staff for several hours on end.

Later in the evening Ndala suddenly appeared in the opening of the tent. Ndala was full of talk and other things, big tales of countless game to be found at Mtalala, a present of two chickens and some eggs which we were supposed to pay for, more chatter of the fight with the Tenga-Tenga which had taken place at his home, and worst of all—moa (native beer). The word "presenti" was becoming ominous, and it was dawning upon us that these savages were not the open-hearted generous gentlemen that we had at first been led to suppose them to be by their charming and hospitable manners; already our Ulendo was developing into a travelling menagerie of nkhuku, and the continual stream of such gifts appeared to suggest that our followers were not only avaricious but thought that chickens would be the sole creatures we could kill and eat.

Saturday, 10th September.—Most of the Mohammedans were ill. Also Fish, which made one wonder if he were a fit companion for a Christian sportsman, but he reassured me by asserting that the pain was confined to his foot. Anyhow we managed to get clear of camp at 5.30, at far too late an hour, and started off together in the direction of Mtalala, walking through endless villages and patches of cultivation.

A bearer behind us first saw game—a brief glimpse of a kudu—so we divided up with the idea of getting the animal in between us. After a little stealthy creeping, the two leaders, Ndala and a villager, who had joined us nominally as a guide and in reality because he was hungry, began to visibly stiffen and then carefully point into a clump of trees and long grass. A very steady and intent gaze in the same direction produced nothing out of the common, and after two minutes it seemed that some native jest was being attempted—but sure enough there slowly began to shape amongst the branches and grass the motionless head and curling horns of a buck. With great precision I aimed, fired, missed, and in one quick moment realized how untrained I was and how little I had seen in that bush, for at once and all around me the country seemed alive with brief flickering glimpses of startled kudu. Then began more quiet hunting and more flashes of movement ahead through the close trees, until one curious creature—a cow—calmly climbed on top of an ant-heap 120 yards off. This time I hit, knocked her over, rushed up to the ant-heap and there found nothing; but she was easy to spoor and a few minutes later with a grunting bark which frightened me so much that I forgot to shoot she got up 20 yards off and was again away. However, a running shot from on top of another high ant-heap again knocked her over; the savages gave a howl and dashed off in pursuit, easily outpacing me, and when 10 minutes later I joined them I found a fair-

sized group, which strange to say included Fish, gathered round my first real kill in Nyasaland.

Fish's congratulations were disappointing. It would have been useless for him to have made any claims on the animal, but it seemed an unnecessary action on his part to utter some remark about my always having a tendency for a lady, but doubtless he was feeling hurt at the manner in which this one had only troubled to go even near him when driven away by me and when dying. The hungry villager who had made some dozen death thrusts with his spear entreated us for a gift of nyama and great was his elation on being allowed to eat the head, which the Mohammedans had quite spoilt as a trophy by slitting the throat from ear to ear. One's boys should always be warned to only punch a hole in the base of the neck where it joins the body, thereby satisfying their religious scruples without damaging the skin which one might wish to have set up.

After a 9 miles' walk we reached Mtalala and, after hearing the reports of our scout Ndala, imagined that we were at last going to find ourselves in a place that could be termed quite rotten with game. The village was on the south-eastern side of the large dambo which lies between Lakes Chilwa and Chinta, and we stepped from the comparatively close forest of small trees on to an open plain. At that time of the year the grass was not all burnt, but the ground, which in the wet season must be mainly under water, was quite dry.

In the evening Ndala led us out to the prairie land where according to his tales buffalo and all kinds of game were to be found; but we only found some two days' old spoor and saw one or two hartebeest, and a few reedbuck who whistled at us from a distance. After some ineffectual shots at too long a range we retired to camp, accused Ndala of being a liar who had enticed us to his village home in order to get rid of the family chickens, decided to move on again the next morning instead of staying in the would-be paradise of sport for five days, and went to bed very tired and rather grieved with life.

Sunday, 11th September.—We were told that a place named Nabwasi, in the middle of the Dambo and 12 miles to the north, would be a suitable camp for that night. The Tenga-Tenga started off straight in that direction, whilst Fish branched across the Dambo with Wyedi and two bearers, and I went with John, Ndala who was still kept with us on trial, Simbota and one boy along the eastern edge.

For two hours we walked through the bush and only saw a few gwapi (small buck) and one hyæna, until at about 9 o'clock Ndala climbed a tree to scan the Dambo and said that nyama were in sight

far across the plain. The grass was fired and we at last came within reasonable distance of a big herd of zebra, wildebeest and hartebeest grazing where the grass was short. There was very little cover but, after a long stalk, a successful shot killed a good-sized hartebeest, who with the usual folly of his breed had let his curiosity get the better of him. After leaving two boys to bring in the nyama, the rest of the herd was then followed with the hope of getting a zebra, but there was no cover and the beasts were too wary. One found it very painful work when crawling over the burnt grass, and I gladly remembered the tip which had been given me at Blantyre, to stalk not on hands and knees, but on the part of one intended to be sat on and to suffer pain, whilst one worked forward with hands and feet with the rifle in one's lap. When thus sitting it is easy to quickly drop flat on one's back if sudden cover is required, the rifle does not get so fouled with dirt and ashes, and the game can always be kept easily in sight.

Presently the boys found some new buffalo spoor which they said was only two hours old, so of course we followed and I watched some delightful tracking. A glance at the broken grass made the age evident to them, and their estimate was subsequently confirmed by our finding some dung and even a praying-mantus, crushed by a hoof yet still alive. Ndala whilst gently following the tracks suddenly stopped and pointed out a fine sable bull looking square at us through the grass, but apparently it was quite unscared and only watching out of curiosity. Slowly the rifle was brought up to my shoulder and just as I pressed the trigger the beast vanished. A moment afterwards and all our Tenga-Tenga appeared round the bend of grass, shouting and singing under guidance of Mother Wilfred's terrible chatter of curses. It was a great chance lost, but anyhow the njati (buffalo) spoor was still there and ready to be followed with still greater zeal.

In about half an hour it led us to a belt of thick grass 8 ft. high into which we dived, John, Ndala, myself and then Simbota with the guns. Suddenly the two leading natives became wildly excited, the buffalo were within 500 yards they said—probably sleeping, so I bravely seized the 470, loaded the Mannlicher with solids for John, and much against my will went on ahead. Again we crept on through grass in which it seemed utterly impossible to find anything. Excitement grew greater—till John whispered that they were asleep and only 20 yards off. "Plenty njati, Bwana, plenty. Bwana will go on and kill them all, but first the biggest." That seemed pleasant for a novice who had never even seen a buffalo in his life. But hesitation was quickly settled by a rush of John straight past me and I was left to blindly lumber after him in a wild scramble for 300 yards, trying in vain to keep the bounding nigger

within 5 yards and in sight. I was gasping for breath when at last he stopped. The grass just there was a little less impenetrable and 30 yards ahead two shadowy forms were dimly seen to disappear. John was furious—with me I suppose—but I had the better of him for 20 yards on my right two more were visible and I quickly snapped at the biggest before John had noticed them. The heart shot was vaguely remembered and aim was taken through the grass at where the target might have been. With a howl John again dashed on and we were tearing after frothy blood spoor through the thickest grass yet seen till we came to a bare spot hardly 10 yards square, where I panted Pola-Pola—"gently"—to gain breath, and where even John also seemed for the moment willing to stop. Apparently it was "a plenty bad place," and "plenty njati were waiting" for me. But the wretched native with a return of breath once more saw red, all caution became lost in his mad desire to kill, nothing would stop him; and false shame alone made me follow till I found myself emptying both barrels at a huge body which seemed to rise on the right 3 yards off and just too late to reach us. He was a magnificent bull, and we were all wildly delighted. John, completely calm again, tersely summed up the situation by saying "Bwana has chance."

The whole scene was traced over again and spoor marks showed that the bull whom I had hit with the first shot just behind the heart had been one of a herd of 13. John disclosed the secret of what had seemed to me to be his wonderful knowledge of the beasts' movements by saying that he had seen above the grass not only the white tick birds who always accompany buffalo, but also some quite small dark birds who hovered immediately over the animals' backs and must have woken them up. The animal had turned round about 30 yards in his tracks before lying down and had been waiting for us. A knot was tied in the njati's tail to make sure, according to belief, that when eaten he would lie easy, and Ndala was left in charge. On the way home to the camp a herd of 15 sable was passed, but I failed to get the one good bull amongst them.

Nabwasi turned out to be a small rocky hill with a muddy pool at the foot, and from the summit there was a wonderful view over the prairie-like Dambo fringed in the far distance by trees and hills. Fish was already in camp waiting for us, and he produced as his share for the day's kill a fair reedbuck bull and a cow—no mean addition to our suddenly swollen larder. In the evening we had to comply with custom and superintend the cutting up and distribution of the nyama. Knock-kneed John crept up and down in the twilight purring like some foul ghoul over the piles of meat, whilst the 60 boys stood impatiently waiting for their shares. For the first time in my life I really heard human beings licking their chops. Some had

even been trying to steal huge chunks which they ate raw. Finally each boy having received his slice of meat, a few short words were given and all the mob rushed fighting for the few remaining scraps—gnawing and singing as they tore at the little bits. The camp was happy that evening, and all night long one heard sounds of gorging. Amidst such a shambles and with such a smell around one, even tinned fruit seemed unpalatable. Personally I had had my fill of excitement for the day, and went to bed most forcibly remembering the warnings given me by friends—never to follow a wounded buffalo into long grass.

Monday, 12th September.—That knot in the buffalo's tail did not appear to have been of much use. Powerful as the precaution may have been it could not make 30 lbs. of meat lie easy. Fully half of the boys were suffering and had a distinctly swollen appearance, but little John was the most extraordinary sight. He was perfectly fit and cheery, but looked exactly as if he had swallowed whole an entire water melon. The tin bockus was opened, the medicine chest produced, and every sufferer given an enormous dose of Epsom salts.

It was the first time that we had posed as doctors and as soon as the boys saw that we were prepared to cure their ailments we found ourselves faced by about a dozen patients of every sort. The medicine chest was rather a shabby affair but it contained the right things. Two kinds of pills, some tooth and eye mixtures, phenacetin, plenty of quinine, permanganate of potash and yards of bandages were kept in a biscuit tin. We also had a pocket syringe for injecting morphia and other drugs, a huge tin of Epsom salts, some boracic powder, a sharp knife and a pair of nippers. Most of their troubles were due to cuts in the feet, and there were some very nasty places, so we gave orders that every Tenga-Tenga was to make himself some hide sandals, and we applied the same cure to every case. Each boy had to produce some clean water; with a few mystic words some grains of permanganate were dropped into it and the water turned pink whereby the cure was already nearly complete. Then the wound was thoroughly cleaned—boracic powder rubbed right into it—if it hurt we said that it was because the pain was all getting used up, a bandage was put on to keep dirt out, and the patient who had previously shown no signs of lameness went off quite seriously with a powerful limp. A bandage seemed to be considered as an honourable decoration, and one boy who had no trace of hurt or pain asked for one.

It was much the same with a very bad case of toothache. Some cotton wool was soaked in the mixture and applied to the tooth, the boy was told that this medicine which had been given to me by a great white lady, was the finest in the world, and he never

complained again. He kept that wool in his face for quite five days and most probably has it still stowed away somewhere with his snuff pouch.

Fish also was ill on that morning, and again maintained that the pain was only in his foot, so we spent the whole day in camp as a rest day. There was not much rest about it as all our kits needed to be sorted out and the heads to be cleaned. The two doubtful hunters Ndala and Wyedi were sent out to locate game and we confined our sport to flinging out bits of meat to attract the marabou and potting at them with our rifles. I got one but he had poor tail feathers.

(To be continued).

AN ENGINEER OFFICER UNDER WELLINGTON IN THE PENINSULA.

(Continued).

(*Edited by* COMMANDER THE HON. HENRY N. SHORE, R.N., RETIRED).

Coimbra, Sept. 29, 1810. Went from Bolao to Fornas to find Col. Fletcher; dined there with Lord Wellington and Marshal Beresford; the former gave me a letter for the Col. which I took to Coimbra in the evening. Head Qrs. were at Coimbra on the 30th. Next morning,—"suddenly, obliged to leave Coimbra at about 8 o'clock; the roads crowded to excess with fugitives of all ranks, ages and sexes; Head Qrs. established at Condexa; soon after, ordered to proceed to Redinha, where we arrived by the evening."

Oct. 2. Leiria. Marched with Head Qrs. from Redinha; roads crowded with inhabitants from the country we retire from.

NOTE.—The enforced migration of the inhabitants entailed appalling distress and confusion, and, naturally, hampered the movements of the troops. The misery, indeed, caused by this exodus far exceeded anything witnessed in the course of Sir John Moore's retreat on Corunna; and, with the arrival of Wellington's troops at Coimbra a climax was reached. The sufferers, be it remembered, too, were peaceful citizens, who, the year before, had welcomed these very troops with frantic enthusiasm as their deliverers; but who now beheld them, flying before the victorious hosts of the great Napoleon. The horrors that were crowded into the next few weeks have, probably, never been exceeded. Even our own historians have felt compelled to gloss over the sickening tale. Nevertheless, we may obtain a fairly adequate notion of the scenes enacted along all the roads converging on Lisbon, by a search through the masses of long-forgotten war-literature, wherein, amidst much that is of purely antiquarian or professional interest, we, ever and anon light on descriptions which, for realistic power and gruesome interest, might vie with the word-paintings of some of our most accomplished "war correspondents" of the present day. A perusal of the pages of Napier, Lord Londonderry, Tomkinson, and others would prove a veritable revelation to those of our countrymen who are prone to regard the Peninsular War as a mere record of British military exploits, without attempting to realize the frightful sufferings that struggle entailed on the innocent inhabitants of the land.

Leiria. Oct. 3. The troops plundered this place dreadfully; some of those taken in the act, hung directly; the inhabitants having all fled.

NOTE.—These acts of plunder drew from Lord Wellington the following General Order:—"The Commander of the Forces is concerned to have been under the necessity of carrying into execution the determination which he has so long announced, of directing the immediate execution of any soldiers caught plundering. Two soldiers, a British and a Portuguese, have been hanged this day for plundering in the town of Leyria. He trusts that this example will deter others from these disgraceful practices in future. The troops are well fed and taken care of, and there is no excuse for plunder."—LEYRIA, *Oct.* 3, 1810.

Alcobaca. Oct. 5. Marched with Head Qrs. to this place; found the houses quite deserted; procured a good qrs. Light Division occupy Batalha.

NOTE.—As this was the last occasion, on which the monks of these two splendid Monasteries—Alcobaca being one of the richest in Europe—were able to dispense hospitality to British soldiers, before suffering destruction and shameful sacrilege at the hands of the invaders, the following quotation from Capt. J. Burgoyne's Diary will be acceptable:—

Oct. 3. "At Batalha is a very large and rich Convent of Monks. The whole British Regts. of this Division (Picton's) were quartered in it easily; as well as the Generals and many other officers. Several Divisions of the British Army had, at various times, passed thro. this place, and some remained several days, during all which time a dinner was prepared at the Convent for the whole of the officers. On this day (Oct. 3, 1810) it was done for the last time, at least for the present, for the greater part of the Friars had already left the Convent, and the remainder quitted it this evening. They had had a ship prepared at St. Martino, for some time before, to take them off with their plate and most valuable effects. They leave a quantity of hay, straw, vegetables, etc., which they beg the General to distribute, as if not, the French will have it."

Junot, and his soldiers—whom we conveyed back to France, in British ships, under the terms of the Convention of Cintra—had already skimmed the cream from the Church treasures of Portugal, and thus given a pretty plain inkling of the sort of treatment to be meted out to ecclesiastical property, in future.

Returning to the Diary:—

Oct. 6. Marched with Head Qrs. to this place (Rio Major). Delancy procured me a tolerable Qrs.

Oct. 7. Marched alone on a foggy morning; got a good Qrs. on the hill at Alemquer.

Oct. 8. Ordered to Arruda in the afternoon; a very wet march; my baggage pony left on the road.

Oct. 9. Very rainy; Lord Wellington went to Torres Vedras. Good Qrs. (Arruda) abundance of grapes and wine.

Oct. 10. San Quintana. This is the most miserable village we were ever quartered in. Rain continues.

NOTE.—The Allied troops were now taking up position behind the Lines; a few words of explanation with reference to this movement, and the state and condition of those great defensive works, may therefore prove acceptable. And first, it may be well to draw attention to the secrecy with which the labour on the Lines had been carried on,—over a great extent of country, and during a period of eleven months. True, silence with respect to the nature and extent of the works was strictly enjoined on all engaged; and, with the exception of a bare notification in certain English Newspapers, early in 1810, that men were employed in fortifying the position, no further information leaked out. Yet, as Southey justly remarks, the circumstance of works of such magnitude and importance having been commenced and perfected without attracting the slightest attention during their progress is without a parallel in history. To the present generation,—with its hordes of "Reporters"—intent on getting "copy" by fair means or by foul—the keeping of the secret must seem incomprehensible.

Napier tells us that "only vague rumours of their existence" reached the bulk of the English Army; and that neither the Portuguese Government, nor the British envoy, knew their nature; they imagined the entrenchments round Lisbon were the Lines. It is possible that, had Wellington's officers being better informed on the subject, there would have been less despondency with respect to the issue of the campaign. The works, when completed, consisted of three distinct lines of defence, of which the second was the most important and by far the strongest; the first being designed merely as a sort of advanced position to stem the tide of invasion while the Army was taking post on the second without hurry or confusion; while the third was a mere place of refuge, to cover the point of embarkation at the Tagus mouth. The determination to abide the attack in the first was an after-thought.

During the last few months, work on the Lines had been pushed on at high pressure; with the result that, on Oct. 6, just previous to the arrival of the advance-guard of the army, the Superintending Engineer (Capt. J. T. Jones, who had been left in charge of the works after Col. Fletcher joined Lord Wellington at Celorico) was able to report that "every preparation for an instant defence of the lines is now complete, and you need be under no apprehension for our credit, even if the enemy attack as the rear division enters the works . . . the powder is in the cases to load the mines, and the officers, each in his own district, is prepared to meet the divisions. . . . Now everything is in confusion; the people are all running away; and a string of men, women, and children in cars, on animals, and on foot,

are crowding every road to Lisbon. No one will believe that the army will halt till it reaches St. Julian's (at the Tagus mouth) and all authority and order is beginning to be lost."

The following saying had been current, for some time past :—"The Portuguese are for the land, the English for the sea!"

How suggestive is the concluding paragraph of Capt. Jones' report :—"When I heard of the Bussaco business, I began to be alarmed for the consequences of having done so much ; for if the lines had not come into play the expense would most likely have been cavilled at as unnecessary ; but now, of course, only the benefit derived from the strength of the works will be considered. I flatter myself you will be much pleased with the quantity of work of every nature done since your departure."

As the ground was strange to the several Divisions—the very existence of the Lines being unknown to the officers commanding—Lord Wellington, with his wonted foresight, had given instructions for the Engineer officers who had been engaged on the works to be told off as guides. Thus Col. Fletcher writes from Alcobaca, Oct. 5, to Capt. Jones ;—"Lord Wellington has directed me to write to you on the subject of guides for the different districts of our works," and after naming the officers for the duties and desiring that they might be at the Head Qrs. of the several districts, he adds that,—"Lord Wellington wishes that an officer of the ordenanzas, or any other respectable person well qualified from local knowledge, should be appointed, with about four men under him, also well qualified, to show the roads from the works along the positions, and those leading to them from the front. . . . The officers and a part of the men must be mounted. . . . I am sure you will make every arrangement for this service immediately. . . . I would recommend that the men should be constantly practised in acquiring every information about the roads of and bordering on the several districts. Every possible preparation is now of course necessary towards the defence of our works."

On the 8th Oct. amidst torrential rain—fit accompaniment of the pitiful scenes enacted along the lines of retreat, and which continued for several days, without intermission—the allied troops entered the positions prepared for them ; the several Divisions being shepherded by the guides into their respective stations ; nevertheless a good deal of confusion ensued in some parts, from unavoidable causes.

At this critical juncture, Lord Wellington's plans were suddenly altered to meet the exigencies of the situation. The army entered the Lines, with the expectation of taking up ground on the main, or second defensive position, in order to dispute—according to Sir John Jones, than whom no officer in the army was better informed of the Chief's intentions—the principal passes of Mafra, Montachique,

Bucellas, etc.* But the movements of the troops not being pressed by the enemy—and the soldiers of both nationalities being animated with an excellent spirit, in consequence of the victory at Bussaco—an embarrassment was felt about the positions entrenched at Torres Vedras and Monte Agraca, etc., along the first line. To have abandoned those formidable works without a shot being fired would have produced the worst possible effects, not on the populace alone, but upon the troops. Consequently, Lord Wellington, aware of the great strength these advanced positions had attained, decided to halt at Sobral, and there abide the attack.

Reverting to the Diary :—

San Quintana, Oct. 11. This morning we were turned out of our poor Qrs. : regained it again. Dined at Lord Wellington's.

NOTE.—It was from here, on this very day, that Lord Wellington wrote to General Craufurd :—"Sta. Quintina, near Sobral, half-past 11 a.m. I hope that your men are well put up in Arruda in this terrible weather . . ." And next day he writes to Mr. Stuart :—"No tents arrived yet; the troops are suffering everywhere for want of them." And to General Pack :—"In respect to tents, the Portuguese Government were to supply them, but they have failed in this, as they have in everything else."

Arranhol, Oct. 12. Head Qrs. moved here from St. Quintana. Sent from the fort of Sobral to mine a road below Zibreira, which occupied all night ;—the party from the Guards. *Oct.* 13. Met Lord Wellington on my way back this morning, after being relieved ; ordered back to see the mine exploded, and to get powder from the German Artillery.

Oct. 15. Head Qrs. moved to Enxara dos Cavaleiros. Our Qrs. robbed in the evening ; Chapman lost a portfolio with sketches, Col. Fletcher his dressing articles. Rode up to the Fort of Monte Agraça by daylight every morning, when both armies are under arms on their respective positions.

Oct. 17. *Pero Negro.* Arrived in this wretched village where it is said Head Qrs. are to be established. No good Qrs. except Lord Wellington's and the Adjt.-Genl.'s. Lived very well by sending to Lisbon for supplies, but much harassed by turning out before daylight every morning.

* The author of *Wellington's Lieutenants* could scarcely have been aware of this when he cast a slur on the professional reputation of a distinguished Engineer Officer, by stating that the Pass of Matos, "apparently had been unaccountably overlooked by Fletcher, who had superintended the fortifications" (page 152, General Craufurd). Had he consulted Sir John Jones' work on the Lines of Torres Vedras, he would have learned that the troops were employed continuously in completing and strengthening the position, which, 'at the last moment, Wellington had decided on holding.

NOTE.—From the date above-named, until Nov. 5th, when Jones was detached to Lisbon on other duties, there are no entries in the Diary. The blank may be fittingly filled in by a quotation from Sir John Jones' History :—"Every morning, two hours before daybreak, the troops stood to their arms at the point of assembly of their several cantonments, as did also the garrisons of the several works ; Lord Wellington, in person, being in the fort of Monte Agraça, in readiness to direct any general movement. The weather was generally wet, and the duty irksome ; still, all supported it with cheerfulness, in the full confidence of annihilating their opponent, whenever the threatened attack should take place ; but after a week had elapsed, expectation could no longer support itself, and the hope of an immediate and brilliant triumph subsided."

Lord Wellington, in a letter to the Earl of Liverpool, dated Oct. 27, 1810, wrote—"I am not quite certain that I ought not to attack the French . . . but I think the sure game, and that in which I am likely to lose the fewest men, the most consistent with my instructions and the intentions of the King's Government ; and I therefore prefer to await the attack."

The condition of the French *vis-à-vis* of the Lines was deplorable. Massena had followed leisurely in the wake of the allied army, without stores, and short of provisions, buoyed up with the prospects of enjoying the plunder of Lisbon, which wealthy city he reckoned as already within the grasp of his troops. When, therefore, he found his path blocked by the impregnable Lines of Torres Vedras—of whose very existence he had been unaware—he must have experienced a rude shock. As time went on, the situation of his troops becoming desperate, retreat was inevitable.

From this check in front of the Lines may be dated the decline of French power. As Sir J. Jones truly observes :—"It was the first and only instance of a military enterprise planned and matured by Napoleon, whilst in the plenitude of his power, being defeated by the steady perseverance and superior foresight of an opponent."

To return to the Diary :—

Nov. 5. Set out from Pero Negro this morning, being ordered to assist Capt. Goldfinch in reconnoitring the left bank of the Tagus opposite Lisbon and the Peninsula between Aldea Gallega and Setubal.

NOTE.—This expedition was connected with certain defensive works, rendered necessary by a report from the Admiral commanding in the Tagus to the effect that, owing to the increasing number of ships in the river, they would be liable to destruction from the fire of the enemy, in the event of his seizing the heights on the south side. Lord Wellington, in his reply to Admiral the Hon. G. Berkeley, wrote :—"It is quite clear to me that Portugal and England cannot afford a force to do more than defend one side of the river ; and if

the transports cannot remain in safety, the enemy being in possession of the left bank, the defence of the country ought not to be attempted. . . . I am perfectly aware of the strength of the ground on the left of the Tagus . . . and I have reports and plans for fortifying and occupying it, but I have never thought of carrying the plans into execution for the reasons I have above stated."

As matter of fact, certain defensive works, together with roads of communication, were subsequently constructed along the heights on the south bank, as shown on the plans attached to Sir John Jones' account of the Lines.

Messrs. Goldfinch and Jones having reconnoitred the ground, returned to Lisbon on Nov. 10th. *Lisbon, Nov. 15.* The French retired to Santarem last night. (During the next 3 weeks Jones remained in Lisbon; Col. Fletcher and various officers being engaged, from time to time, in superintending work on the south bank of the Tagus).

It may be of interest here to mention a circumstance which seems to have escaped the notice of historians namely, that Lord Cochrane, who was on board his yacht, the *Julie*—originally a small French warship which had been captured, and afterwards bought by this officer—in the Tagus, when the troops entered the Lines (Oct., 1810) with his accustomed zeal,—although on half-pay at the time, volunteered to go up the river and destroy all the French boats at Santarem.

From Capt. J. Burgoyne, Royal Engineers.

Cartaxo, 20*th Nov.*, 1810.

My Dear Jones,

I cannot do less than write you the news in return for the letters I received from you on your first joining the army. Head Qrs. have been here for these three days past; it was understood that the greater part of the French Army had crossed the Zezere, and that only 5 Regiments were left in Santarem; under that impression an attack was intended yesterday. The French force is posted in rear of the Causeway about two miles from Santarem; and they have their artillery posted to fire along that approach. It was therefore arranged that General Pack should turn their right, and the light brigade their left. General Pack's Division arrived in good time at the ford or causeway by which it was intended he should cross the valley; but the Artillery and Dragoons intended for his support mistook the road; the latter did not arrive until very late, and the former did not reach him during the day. General Pack having observed two Battalions posted with four Cannon on the opposite side to oppose his passage, deemed it proper to send to Lord W. to know if he should attempt it without his guns. All this created delay, and at 3 o'clock it was judged too late to attempt anything that day. It is said that in the evening His Lordship received information that the bulk of the French Army is on this side the Zezere, and in consequence determined to substitute a false attack for the real one, and to see if the enemy could be

frightened enough by it to give up the hill defending the causeway, and retire into Santarem. All the usual demonstrations were made this morning; the different columns were put into motion, and the light troops skirmished absolutely into the rear of the post; but devil a bit did a Frenchman move from his ground. It is therefore concluded that the enemy is in force at Santarem, and as we do not deem ourselves strong enough to carry a small advanced post, an attack upon Santarem itself cannot be for a moment expected. I therefore think we shall remain here until Massena is reinforced, when we shall again return to Pero Negro. I have made up my mind to a daily wetting. I will thank you to send the accompanying letter for Ross to the Portuguese Post Office. Saturday is Mafra post day.

Believe me, yours very faithfully,
J.B.

I am nearly out of Horse Shoe Nails; if you will send me up a few I shall be very thankful to you. Your horse is come quite round, and I expect will be in very fair riding order in ten days or a fortnight.

Dec. 16. After inspecting the Bridge of Mealhada, (Ponte de Rio Georgo) with Col. Fletcher, consisting of 3 small arches over the Rio Mayor, began a mine, with a party of the Guards. *Dec.* 25. Completed the Mine and loaded it with a Barrel and a half of powder. Returned to dinner (Xmas Day) and just sitting down to it with the Brigade Major, when the Col. came from Lord Wellington's where he was to dine, to desire the bridge in the Causeway leading to Santarem to be mined immediately. Sent the mules with some intrenching tools, eat my dinner and set out for the Bridge. Waited from half-past 8 till 10 o'clock for a party, during which time I rode to Genl. Craufurd's Qrs. who was dining out. Procured a few men from the inlying picket commanded by Capt. Jones of the 52nd Regt. Began about midnight; although close to the abattis that separated our sentries from the French, and the noise reverberated on the arch, the enemy gave us little interruption. Brig.-Major Jones relieved me at 4 o'clock, and completed the mine soon after light.

Cartaxo. Dec. 26. Sent to the left of our position on the Rio Major, and mined a small bridge of one arch; could obtain only 9 in. in depth. Loaded it with 60 Six-pounder Cartridges. Lost my way in the darkness and intricate by-roads, with a dragoon that accompanied me, till daylight.

Dec. 30. At Major Sturgeon's suggestion an attempt was made to dam the Rio Major, by filling the arches of Ponte St. Anna with wine casks.

THE WINTER OF 1810–11.

Behind the Lines.—The influx of such a host of destitute and starving creatures—almost the entire population of a province and the principal inhabitants of Coimbra and other towns,—raised the gravest

apprehensions in Lisbon. The number of refugees that had to be cared for during the winter of 1810—1811, was estimated at three hundred thousand, irrespective of about one hundred and twenty thousand troops. And the task of providing food and shelter for this immense multitude was a gigantic one. Yet it was accomplished. All classes united in the endeavour to mitigate the sufferings of the poor creatures to the utmost of their power;—"everything which prudence and humanity could suggest," wrote an eye-witness, "was done by the inhabitants of Lisbon to alleviate the public misfortune. Charitable institutions were set on foot, and food was daily distributed to such of the fugitives as were necessitous and helpless, while labour was provided for the others." Nor was the British nation backward in showing sympathy for its "ancient ally." The officers of Lord Wellington's army contributed liberally out of their private means; while at home, the House of Commons voted for the relief of the poor sufferers a sum of one hundred thousand pounds; a sum at least equal to this being raised by voluntary subscription; and the money was very judiciously employed in the purchase and freightage of such things in Great Britain as the Portuguese were most immediately in want of.

"The misery and wretchedness of the refugees is beyond description," wrote Capt. Dickson (Sir A. Dickson) of the Portuguese Artillery, (Feb. 28, 1811); "numbers are perishing from disease and want. A very handsome subscription was made by the British Division for the poor at Chamesca, but, alas, it is all gone, and the streets (in Chemesca) are as full of misery as ever. It is quite melancholy to see the state of the poor people; women are to be seen in all directions gathering herbs which they cook and nearly live on."

Later on, after the expulsion of the invaders, a large additional sum of money was sent from England, with a view to resettling the peasantry on their derelict farms; and a joint commission, partly British and partly Portuguese, was engaged for several months in examining claims and apportioning the awards.

And so Lisbon was saved, and with it the cause of European freedom. But at what frightful cost the world will never know. Great Britain still bears the burden of that tremendous contest in her National Debt.

And how did the inhabitants of the Portuguese metropolis bear themselves under the strain of that terrible winter? After the first few weeks a reaction set in; the people as it were, became intoxicated with a strong feeling of security:—"There never was a period," wrote an eye-witness, "when this city was crowded with more objects of misery; yet at no time had their theatres been better filled, their societies more gay and brilliant, than when seventy thousand vindictive enemies lay within sixteen miles of the city, panting for the plunder of it."

The following statement might seem incredible were it not made on the authority of General Cockburn, who wrote :—"Last winter, when there was great distress in Lisbon, and men were absolutely starving, public offers were made of rations and 6d. a day to any man who would work on the Lines ; yet the majority preferred an existence on casual charity, and basking in the sun, to the above wages and work. The French," he adds, "took a much shorter and better plan ; they gave no money and forced them to work."

Before the Lines.—The condition of the French Army, during this terrible winter, was unspeakably wretched ; but no amount of suffering could palliate their savage treatment of the innocent inhabitants of a country they had, avowedly, entered to protect.

Perhaps the most realistic and terrible description of the barbarities practiced by Massena's troops during this awful period, is that touched on by Southey, in his History of the War. With a profounder knowledge of Portuguese history than any foreigner, and excellent source of information at command, he takes us behind the scenes, and affords us glimpses of what was taking place in the rear of the French position. One or two extracts from this little-studied work will enable the reader to realize in some faint degree the sufferings of the unfortunate Portuguese during this most terrible crisis. Describing the French marauding parties, Southey tells us that "they were soon left to take their course, without the slightest attempt at restraint. . . . In excuse for this, the French officers observe, and truly, that the army must otherwise have perished.

"The skill which some of these marauders acquired in their search for food, resembled the sagacity with which savages track their prey. That they should detect with unerring certainty any place of concealment in a dwelling or an out-house, might have been expected ; but when they were questing in woods, or among rocks, or in the open country, a new sense seemed to be developed in them. There were men in every company who could discover a depôt of provisions by scent far off.

The conditions under which Massena's troops found themselves, during that terrible winter, were doubtless responsible, to a great extent, for their conduct."

Very apposite are the reflections of an officer on the staff of Marshal Beresford :—"How little does the independent, happy English peasant know how to value the peace and security in which he lives!"—wrote Capt. Warre to his father, during the retreat,—"And how would those miscreants who preach discontent and faction through the country, giving them ideas of wants and liberties which are incompatible with society and government—how would they blush if they were to witness the sufferings and oppression which these poor people undergo."

The following order from Lord Wellington was intended to check the writing of alarmist letters by officers and men of the British Army :—

CELORICO, *Aug.* 10, 1810.

The Commander of the Forces publishes to the army the extract of a letter, conveying enclosures from the Vice Consul at Oporto, and of British officers of rank in the army, exciting alarm in that city.

The Commander of the Forces will not make any enquiry to discover the writer of the letters which have occasioned this unnecessary alarm, in a quarter in which it was most desirable it should not be created. He has frequently lamented the ignorance which has appeared in the opinions communicated in letters written from the army, and the indiscretion with which those letters are published. It is impossible that many officers of the army can have a knowledge of facts to enable them to form opinions of the probable events of the campaign; but their opinions, however erroneous, must have mischievous effects.

The communication of that of which all officers have a knowledge, viz. the number and disposition of the different divisions of the army, and of its magazines, is still more mischievous than the communication of opinions; as must be obvious to those who reflect that the army has been for months in the same position: and it is a fact, come to the knowledge of the Commander of the Forces, that the plans of the enemy have been founded on information of this description, extracted from English newspapers; which information must have been obtained through private letters from the officers of the army.

Although the difficulties, inseparable from the situation of every army engaged in operations in the field, particularly in those of a defensive nature, are much aggravated by communications of this description, the Commander of the Forces only requests that the officers will, for the sake of their own reputations, avoid to give opinions upon which they cannot have a knowledge to enable them to form any: and that if they chose to communicate facts to their correspondents, regarding the positions of the army, its numbers, formations of its magazines, preparations for breaking bridges, etc., they will urge their correspondents not to publish their letters in the newspapers, until it shall be certain that the publication of the intelligence will not be injurious to the army or to the public service.

1811. Early in January, Jones obtained a short leave to visit Lisbon on business, and put up at the "Lion d'Or." For a description of the principal Lisbon Hotel, we must turn to the narrative of another officer, who is more explicit on the subject, than our Diarist. "Not an inn," he writes, "is to be found in which you could pass the night without undergoing the tortures of hell, almost as bad to me as flames and brimstone. I made an attempt to lodge in one (Lion d'Or); but had I been destined to pass my nocturnal hours in the most wretched hovel in England, or to have put up in this place, I should have preferred the former. It would be impossible to find in all Great Britain a habitation so ruinous, so ill-furnished, so filthy, and so infested with vermin as this; and yet this was the Lion d'Or, the chief hotel in the city."

CARTAXO, *Jan.* 8, 1811.

MY DEAR FATHER,

. . . Our Head Qrs. continue in this town and the outposts are situated as I described in my last; and the peace which then appeared to reign between the two hostiles remains uninterrupted. I fancy the French have received the expected reinforcements under General Devoust, but I do not believe they will attempt anything until they get still larger reinforcements.

My friend Capt. Chapman left us about a fortnight ago; I spoke to him previous to his departure respecting the Adjutancy, and I am sure he will do everything in his power for me; but I fear he will arrive too late to profit by Lord Mulgrave's friendship. . . . You know best whether Sir W. is at all disposed to forward my views in life; if he is, I need hardly remind you that the only way an officer of our Corps can get on at all, is by getting something out of the immediate Regimental duty, if possible still under the Ordnance. . . .

You will see by the impression that I have been obliged to get a new seal; my old one was stolen, with (what I regret infinitely more) the watch Sir Watkin was good enough to give me, from the table in my Quarters, which, from the depredations of the French, is without locks and almost without doors.

Your very dutiful and loving son,

RICE JONES.

Later on in January, he paid a visit to his friend Goldfinch, at Almada, on the south side of the Tagus, putting up at his Quinta, and the following day "rode with him along the works he is constructing, and then got him to return to Lisbon with me; met Burgoyne, Ross, etc., and dined together."

Jan. 20. Received an order to take charge of part of the works at Almada whilst waiting for the arrival of the Artificers, (from England); crossed with my horses to Cosilhos (Casilhas or Almada), and from thence went to Nossa Senhora Da Monte, as arranged with Goldfinch, on the right of his line of works; got a good Qrs. and agreed to live with Thomson during my stay.

Jan. 23. From Monday morning (21) to this, employed in getting acquainted with the duty at Almada. In the middle of the day Goldfinch gave me a letter ordering my return to Head Qrs. Crossed over to Lisbon immediately. Heard of the death of the Marquis de la Romana at Cartaxo last night; also of the appearance of a party of French under Junot at Rio Major, on the 19th inst. Junot received a severe wound and they retired during the night.

On Jan. 25th, Jones rejoined Head Qrs.; next day—"rode with Capt. Jones to Alcoentre, and received from him directions for carrying on the works to be erected here. Maj.-Genl. Colville, who commanded here, made me an offer of his house and table during my stay.

Jan. 27. The party finished felling the fir wood. Laid out the embrasures in the Battery above the town.

Jan. 28. Commenced a Fascine manufactory; weather very fine but hot.

Jan. 29. Received at night an order to form 2 abattis, cut Olive-trees, and form a dam.

Feb. 6. Rejoined Head Qrs. Hear that the French broke ground before Badajoz on the 3rd inst.

Cartaxo, Feb. 7. Feeling unwell applied to Dr. Gunning for medicine and advice. Everything continuing quiet; mornings regularly occupied waiting for orders at the Adjt.-Genl.'s; the remainder of the time disposed of by Col. Fletcher, with whom and the Brig.-Major I mess and live very comfortably.

CARTAXO, *Feb.* 9, 1811.

MY DEAR FATHER,

. . . . . .

Nothing of consequence has occurred between the hostile armies since my last. The French entered Rio Major on the 20th Ult., but withdrew from thence the same night, and Junot was severely wounded whilst reconnoitring near that place by one of our videttes. The Marquis de la Romana died in this town a day or two after. I am very glad to tell you that the Spanish Army of 8 or 10,000 men, . . . have returned towards the Spanish frontier, near Badajoz, which Fortress has been completely invested by Mortier's Corps, who broke ground before it on the 3rd Inst.

I have been attached to the left Division (M.-Genl. Picton's) ever since the appearance of the enemy in that direction on the 20th Inst. and have been throwing up a few batteries, cutting down trees, forming abattis, etc.; I was attached to the Honble. M.-Genl. Colville during the time; he was very civil, and I lived at his table constantly; I returned from thence yesterday. The appointment of Brigade Major makes little or no difference to me, as Adjutant; he is, I believe, much my friend, and in every way a sterling character, both as a man and an officer. . . . If I get it (the home appointment), I shall now have the satisfaction of knowing that I do not owe it to any application, or importunity of my own; and if I do not, I shall only have to remain contented, and without feeling particular obligation to any of my friends in office. . . . I fancy the augmentation will be out, and everything arranged before you receive this.

I remain, my dear Father,

Your very affectionate son,

RICE JONES.

March 6. Heard the French had begun to retreat from Santarem last night.

NOTE.—The retreat of the French from Portugal was the inevitable sequel to the events of the past five months. Massena, early in Oct.,

1810, finding his progress blocked by the Lines of Torres Vedras, after fretting in front of them for a month, not daring to assault, and too proud to confess failure, by retreat, placed his troops in winter quarters about Santarem. Thus situated, his army greatly deteriorated—the fruit of indiscipline, want of provisions and supplies of all sorts, to say nothing of despondency, the natural outcome of baffled hopes. Had Wellington possessed the highly-tempered weapon which was subsequently forged, he would assuredly have fallen, tooth and nail, on to the enemy, and driven them a disorganized rabble, across the frontier. But with his heterogeneous army of four different nationalities, it would have been folly to risk the momentous interests at stake on the issue of a general action. He had no alternative, therefore, but to bide his time. Meanwhile "General Starvation" was working ruin amongst the enemy, whose long-delayed retreat was marked by the most ruthless devastation. Suffice to state that the track of the retreating army was a desert for long after, littered with smoking ruins, amidst which lay the charred corpses of their late occupants—the peasantry of Portugal.*

Massena re-crossed the frontier on the 5th of April. He had entered Portugal, nine months previously, with nearly 70,000 men—veterans who had beaten the best soldiers of the Continent, and who anticipated an easy conquest of Portugal, together with the expulsion of the "English leopard." He repassed the frontier with 45,000—which included 10,000 reinforcements. The campaign had, therefore, cost the French 30,000 men—to say nothing of the enormous loss of reputation resulting from such a calamitous failure. No French army ever again entered Portugal.

The following extract from a Diary is in the handwriting of Rice Jones, and describes Massena's retreat from Portugal.

HEAD QRS., LOUCAO, *Saturday*, 16 *March*.

About 1½ Leagues in front of Miranda do Corvo.

Monday, 11*th*. The enemy being still posted in front of Pombal all the troops were brought to that point; by noon they were driven out of the town, having first set it on fire. They then retired to a position in rear of the town and appeared to be from 20 to 25,000 in number; every preparation was made to attack them, but it became so very late before the rear Divisions could be brought up, and most of the men having marched six leagues, the attack was deferred until the morning.

Tuesday, 12*th*. The enemy retired in the night and we did not overtake them till within ¾ of a league of Redinha. They were posted on a height

* "When they looked on these scenes of desolation," wrote an eye-witness, "and considered the desecration of everything, whether sacred or profane, their hearts grew sick within them, and they thought of the happy isle which they had left behind, where such horrors are unknown—unknown to the mercantile citizens, who grudge so much the pittance received by the poor soldier."

at the extremity of a heath, having a view of their front of two miles. The country we were marching through was very close and intersected; on their right was a woody hill. Our Light Division were ordered to drive them out of it, whilst our columns were coming up, and which they did in great style. Our columns then deployed into two lines and a Reserve, (35,000 men) and advanced across the heath (being under a considerable cannonade), our guns as usual in front. It was a beautiful sight, every man could be seen at the same time. The enemy could not resist, and were driven down the hills, through Redinha, the guns cutting them up famously. Redinha they burned.

Wednesday, 13*th*. The enemy had marched all night, and we saw nothing of them till we came within two miles of Condeixa, where we found their army. Whilst our troops were bringing up, they marched off by the road to Miranda do Corvo, having first burned Condeixa.

Thursday, 14*th*. This was a day of incessant fighting; our advanced guard had not moved half a mile when the skirmishing began, and it continued for 2 leagues, until we came upon the entire of their army; as usual, whilst our troops were coming up they moved off.

Friday, 15*th*. A thick fog till 10 o'clock gave the enemy 4 hours start of us, and it was the evening before we came up with them; they were then discovered posted about the Alva. By a very brisk and skilful attack they were driven from some ground they held on this side the Alva, but it became dark before it could be ascertained whether they were all driven across the river.

Saturday Morning, 16*th*. The enemy is now posted close to the Alva, and I think it probable His Lordship will attack them there. Massena has ordered every town and village to be burned as they quit it, and too faithfully is the order obeyed—scarcely a house escapes. We take very few prisoners, their retreat being conducted in the most skilful manner; and was not Massena such a horrid monster of cruelty, I would praise his military skill. His Lordship, on his part, has shown himself an able General.

P.S.—Since I closed this, I have been to the advanced posts and find that the enemy is filing off without any apparent intention of making a stand at the Murcella position. They have their rear-guard strongly posted above the bridge which they have destroyed over the Alva. We have therefore come to a halt for the day, as we cannot repair the bridge whilst their rear-guard remains.

On March 29th, 1811, Jones set out from Lisbon to rejoin the army. "ALCOBACA, *April 3rd*—reached this place, once so exceedingly beautiful; lodged ourselves in the remains of an elegant house appertaining to the factory, which, with the whole town, and the venerable Convent is reduced to ashes by a party of French sent for the express purpose, and who left in the stables, that are alone undestroyed, green fodder that sufficed for our horses.

April 4. Before we left Alcobaca this morning, Ross and myself visited the Chapel, etc., found one solitary monk repairing the Royal

Tombs that had all been opened and broken. The body of Inez de Castro being exposed. The Library and Archives are preserved in an extraordinary manner, fire having evidently been lighted to consume them, etc. Sick and disgusted at scenes so depraved, and degrading to human nature, we went to Batalha,* which, being nearer the Great Road taken by the enemy has suffered considerably more than Alcobaca. Not a room in the Convent is left standing. The embalmed body of King John ('The Great'—the Founder of the Abbey, who, with his English wife, Philippa of Lancaster, had reposed here undisturbed, in a superb Mausoleum, for the space of four centuries) lay on the pavement in the middle of the Church; the bones scattered and mixed with others, designedly; and the Tombs rifled and defaced in the most wanton manner. Here, and at Alcobaca, all the organs were burnt to cinders."

To this brief account of malicious vandalism might be appended the narratives of other British officers—many of whom—like the author of the Diary, had often, on previous occasions, partaken of the generous and kindly hospitality of the monks of these two magnificent Convents.

Passing on, they—"found Leyria destroyed so much that we could with difficulty procure a quarter for the night." And thence to Condeixa—"formerly so famed for the beauty of its situation, etc.; with surprise and grief, found it burnt to the ground; not even a single house remaining; except those detached at a little distance in the valley below, where we took possession of a large house uninhabited."

All this was familiar ground, having been occupied by the British Army less than a year previously. The two officers now branched off the line of retreat, reaching Villa Pouca, April 7th—"where we were hospitably entertained by the principal proprietor, a well-informed old man who retained the country manners most completely." Thence onwards, they—"saw with regret the ruins of the large house at Cea, as well as many others we remembered." April 12th, they rejoined Head Qrs., meeting there Col. Fletcher and several other brother-officers.

VILLA FORMOSA, *April* 14, 1811.

MY DEAR FATHER,

. . . I was obliged to remain at Lisbon to receive and distribute the Detacht. of Officers and men from England, there being no officer of our Corps in that city, and have consequently missed all the affairs our army have been engaged in during Massena's retreat. The Newspapers will

* For a detailed description of this noble building, the reader is referred to the sumptuous work of James Murphy:—*Plans, Elevations, and Views of the Royal Monastery of Batalha* (published in 1793). For the completion of this work, the author, who was an architect, resided for three months in the Monastery.

give you much better accounts of them than I can; they have invariably been successful and brilliant; but it is a question whether we have made the most of the opportunities so often afforded us of completing their rout and disorder. They are now however clear off to Ciudad Rodrigo and Salamanca, having left a garrison in Almeida, which fortress is completely surrounded by our troops; but I believe we are not to commence any active operations against them, but content ourselves with merely blockading the place.

I was not able to settle everything and quit Lisbon until the 30th; from that day to the 12th of the month I have been endeavouring to rejoin Head Qrs., and at length, after a march of nearly 300 miles through the country exhausted by the hostile armies, the towns and villages burnt, and the roads hardly passable, I have once more found them at this little village, about half a mile from the Spanish frontier, and 1½ or 2 leagues South of Almeida. I never experienced so many difficulties to impede one's progress as in this march; only once or twice was I able to get any corn for my horses—never either hay or straw, and seldom any grass. My large horse was so very ill (in fact quite done up) that I was obliged to leave him behind me at Lisbon; and my baggage pony being perfectly unable to get over the vile roads, with little or no food, I was obliged to exchange him on the road for a stronger baggage animal, giving an exorbitant price with him. It rained every day but the two last; and notwithstanding all my purchases on the way, I had some trouble to get up with the army. To complete the business I am now ordered to join the troops in the Alemtejo, under Marshal Beresford, at Elvas or its vicinity, Lord Wellington having it in contemplation to besiege Badajoz has ordered all our officers that can be spared from other services, together with every requisite store for a siege, to be sent immediately to Elvas. Ross and 11 or 12 other officers are on their way there, and I shall set off the moment my stud is able to proceed. We do not as yet know whether Col. Fletcher will be allowed to go there himself, or indeed whether Lord Wellington may not take a trip in that direction; should they not, Capt. Squire will be the senior, and have charge of the siege. For my own part I am not quite clear that it will ever be undertaken, and indeed I shall not be surprised if when we arrive at Elvas, and everything is ready, that we were all to be ordered back again. It is as yet a secret in the army.

Your very affectionate son,

RICE JONES.

"*April* 15. Set out for the Alemtejo this morning; Lord Wellington taking with him none of his baggage, and but few attendants. Passed thro. Frenada, etc., to this town (Sabugal) which is nearly in the same ruinous state the French left it in, when they were driven out above a month since."

Next day's march to Pedrogoa Grande was—"principally over mountains covered with odoriferous shrubs; the day very fine, and everything freshened by last night's rain;—through Penamacor,

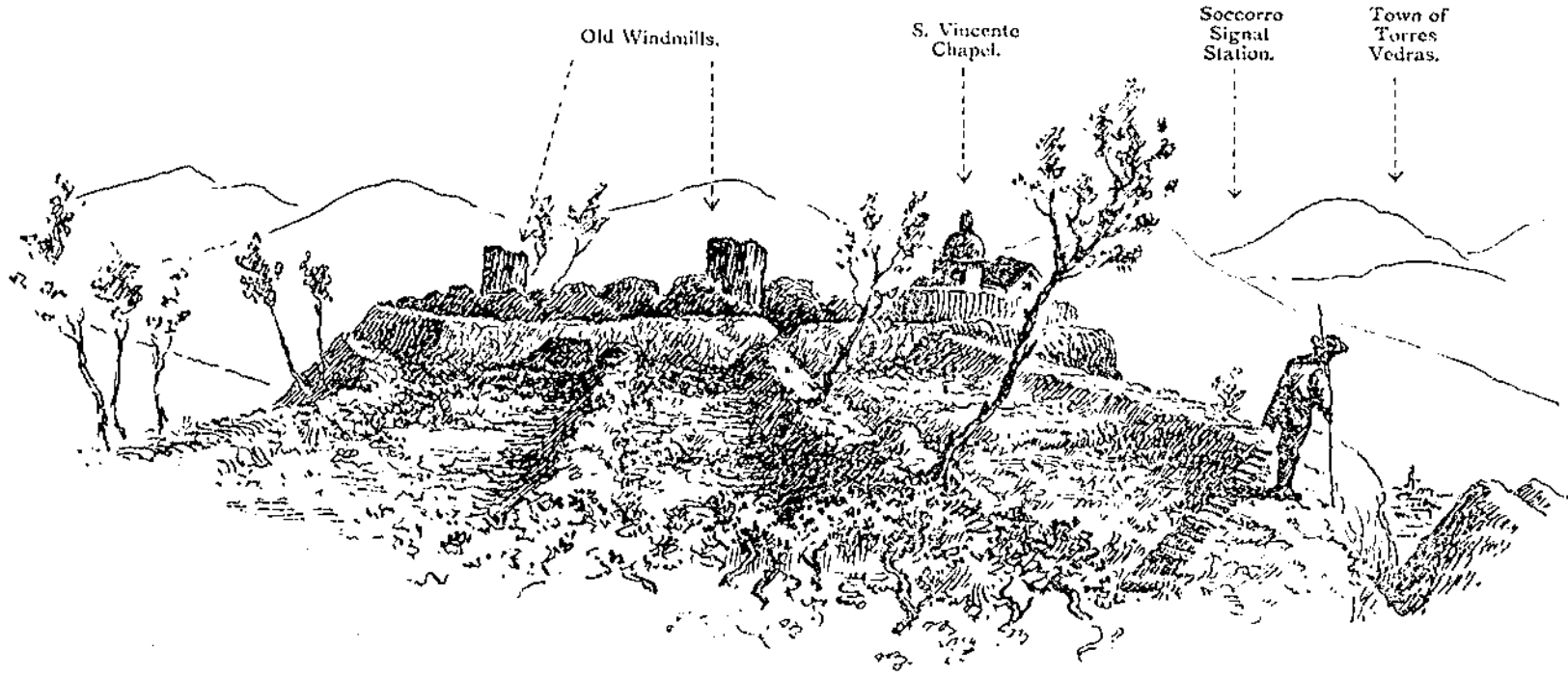
an ancient fortress upon the steep slopes of a mountain. This is a good-sized village, little the worse for the French." At Castello Branco, the next halting place "Lord Wellington occupied the Bishop's Palace." And so on, through Nisa, to Portalegre, where the Qrs. "were very good and provisions plentiful; the situation and scenery very fine," to Elvas, where Head Qrs. were established while Lord Wellington arranged with Marshal Beresford the course of future operations.

Matters had not been going well in the south of Portugal where Beresford was in command; hence, says Napier, "The presence of the general-in-chief was agreeable to the troops; they had seen great masses put in motion without any adequate results." Wellington's instructions to Beresford had been to throw a bridge over the Guadiana at Jerumenha, push back the French under Mortier, and invest Olivenca and Badajoz. Beresford, however,—"preferred halting for the means to cross at Jerumenha, and thus commenced in error those bloody operations which marred Wellington's great conceptions for carrying the war into Spain, and detained the army more than a year on the frontiers of Portugal."

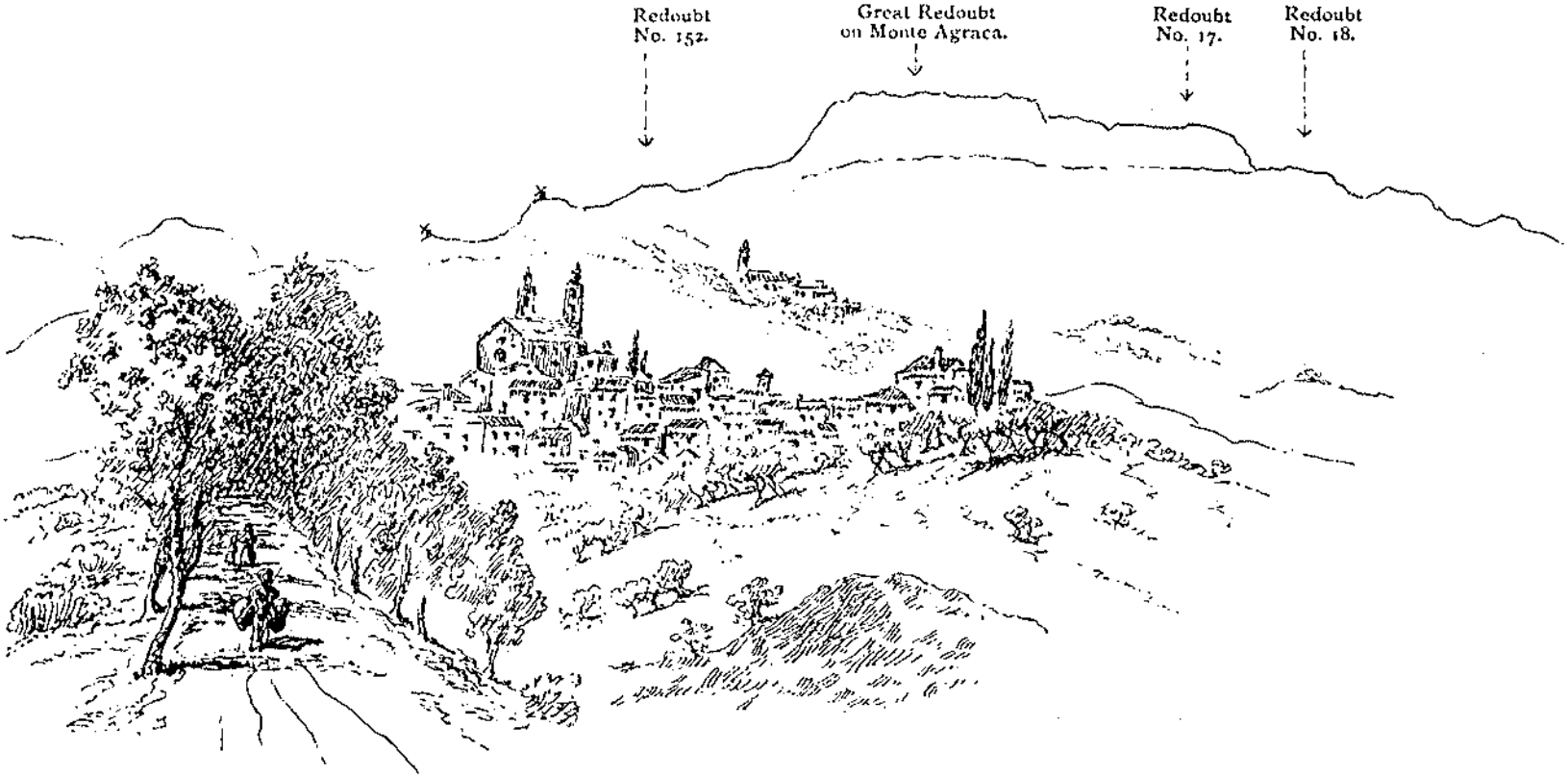
Olivenca had surrendered on the 15th April—the day on which Wellington had set out for the Alemtejo; but the governor of Badajoz had been allowed to repair the works and bring in materials and stores, unchecked.

(To be continued).

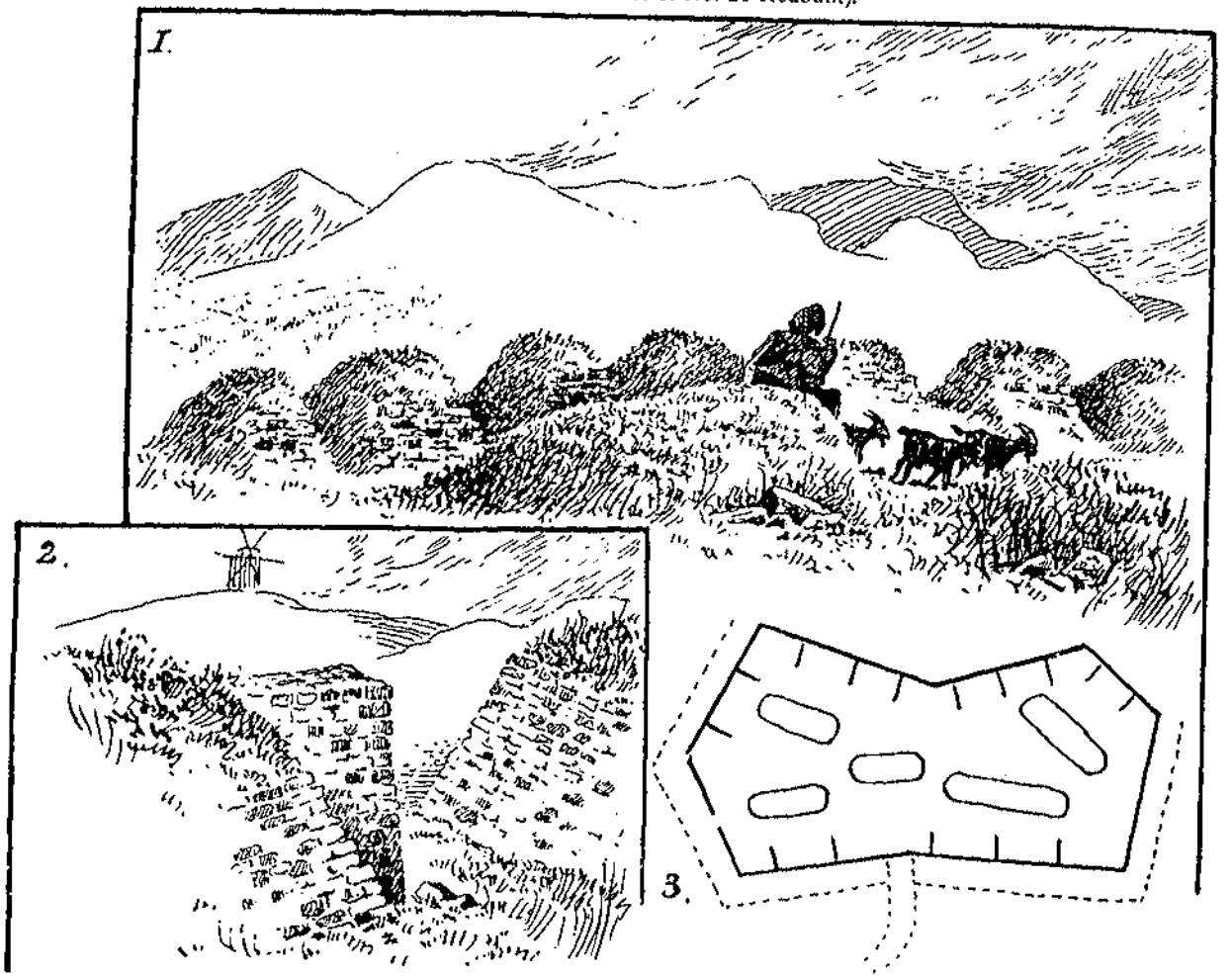
Interior of the Great Redoubt at Torres Vedras which mounted 33 guns and required a garrison of 1,720 men. Now a vineyard.



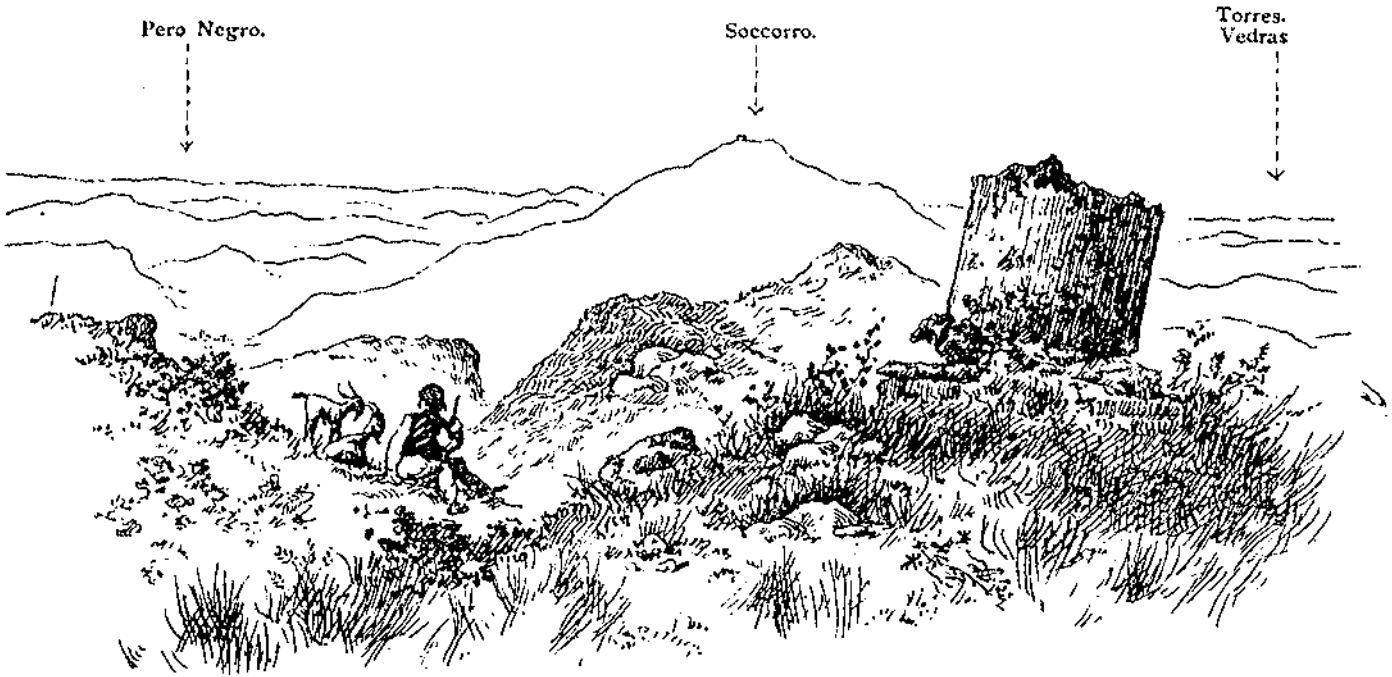
Sobral and the Monte Agraça from the Torres Vedras road. This was the only place where any fighting took place; the French seized the town.



1. Interior of Redoubt No. 149, near Torres Vedras. 2. The dry ditch and approach. 3. Ground plan.
(Note.—The windmill marks the site of No. 26 Redoubt).



In the Great Redoubt on Monte Agraça, looking west. The stone pedestal is the base of the signal-pole (most probably). This redoubt was the central and loftiest point of the Lines; it required a garrison of 1,000 men, and was armed with 25 guns. The dependent works mounted 19 guns, and required 1,000 men for their defence.



"Every morning, two hours before daybreak," says Sir J. Jones, "the troops stood to their arms at the point of assembly, as did also the garrisons of the several works; Lord Wellington, in person, being in the fort of Monte Agraça, in readiness to direct any general movement. . . . The weather was generally wet, and the duty irksome; still, all supported it with cheerfulness, in the full confidence of annihilating their opponent."

REVIEW.

A BRIEF HISTORY OF THE KING'S ROYAL RIFLE CORPS.

No regiments in the British Service take a greater pride in their past history and achievements than the two famous Rifle Regiments whose recruits are trained at Winchester. Regimental history is an important part of recruit training at the Rifle Depôt, and a short history both of the 60th and of the Rifle Brigade forms a prelude to the Standing Orders of both regiments.

A History of the King's Royal Rifles is now under preparation by Capt. Lewis Butler. It will be some time however before this history will be completed, and in the meantime the History Committee of the regiment under the chairmanship of Sir Edward Hutton, one of the Colonels Commandant, has brought out the small volume of 52 pages now under review. The object aimed at by the History Committee has been "to narrate in a concise and popular form the origin, history, and world-wide services of the several battalions, so that every Rifleman may be able to learn at least the outlines of the history of his regiment—a corps whose battle honours are unequalled in number, and whose reputation for discipline and courage is unsurpassed in the annals of the British Army."

The committee may be congratulated on having succeeded admirably. The story, although concise, is not wanting in life and colour, and the four maps illustrating campaigns in Europe, Asia, Africa, and America, are good examples of clear printing, and contain no irrelevant names. Altogether the book is a model of what a short regimental history should be.

A portrait of the King as Colonel-in-Chief of the regiment forms the frontispiece, and the volume is well got up in every way. The binding is of green cloth with a red edging and contains an excellent representation of the regimental badge in silver.

NOTICE OF MAGAZINE.

REVUE MILITAIRE SUISSE.

October, 1912.

OBJECT OF THE ORGANIZATION OF THE SWISS SCOUTS.—A summary of General Baden-Powell's Boy Scout scheme.

MILITARY AVIATION.—A description of some of the exhibits at the Aeronautical Exhibition in Berlin, 1912. This exhibition included only aeroplanes—the dirigible was excluded—and showed to what degree of perfection the Germans have arrived in aviation. The proportion of monoplanes to biplanes was 2 to 1. Two good photographs and descriptions of Albatros biplanes are given, also of monoplanes by Goedecker, by Rumpler, and by the Sociétés Automobil et Aviatik.

THE MANŒUVRES OF THE 3RD CORPS D'ARMÉE IN 1912.—The 5th and 6th Divisions have recently been reorganized, and brigade commanders and troops had not made each other's acquaintance. The organization of the artillery and engineers had also been modified. Companies of cyclists, and divisional telegraph companies were employed for the first time, also sanitary detachments. The tactics, and not the strategy, are criticized. Observations are made on each day's manœuvres and are decidedly instructive. It is noteworthy that the artillery of this corps has not yet been provided with sights for indirect laying.

November, 1912.

THE BALKAN WAR.—The article begins with a short summary of the causes of the war, and then proceeds with a description of the organization, composition and strength and armament of the army of each of the combatants. The theatre of war is then discussed at some length. A further article is to follow.

SOME REFLECTIONS ON THE ARMY MANŒUVRES OF 1912 IN FRANCE.—This is not a connected study of the operations, but only a few remarks on their conception and execution. The greatest secrecy was imposed, no communications were to be made to the press, and the greatest latitude was to be allowed to the opposing commanders. In spite of this it was well known some days before the manœuvres began where and on what days certain sections of railway would be crossed, and sketches were issued showing the zones forbidden to motorists unprovided with passes.

It was observed however that many harmless sight-seers were excluded whilst others who had an interest in seeing what was passing, and who had better have been excluded, found ready admittance. The good will with which the civil population accepted delays in trains, and in the delivery of telegrams and letters and other inconveniences, was worthy of all praise, and shows how little the spirit of anti-militarism can have penetrated. The construction of certain boat bridges also indicated probable lines of advance, and limited the latitude allowed to commanders. A discussion then follows on the employment of umpires, or whether they should be allowed at all, also as to whether operations should cease for the night, or be continuous, and on the extent to which the Directing Staff should interfere, when unexpected situations arise, so that the operations should proceed as far as possible in harmony with the Director's scheme. The conclusion is that all are necessary.

The Director of the Manœuvres in his general idea omitted to say whether the inhabitants of the country were friendly or hostile, and the physical and moral states of the opposing troops. These are most important particulars and should always be mentioned. The general idea was issued some days in advance, a method that should always be followed. Orders for the day should not however issue from the headquarters of the Director, but from the headquarters of the fictitious Generals-in-Chief of whose armies the opposing forces are fractions. It is observed that the reports sent to the Director bear no resemblance to the reports and requests that would be addressed to the Generals-in-Chief, but no solution of this difficulty is suggested. The writer seems to consider that tactical exercises, based on a different special idea each day, would be of more practical use than manœuvres, so called continuous, which are really of necessity disconnected to some extent.

Details of Manœuvres.—A short criticism to be added to the report in the *Revue Militaire* of the manœuvres of the 3rd Corps, such as absence of intercommunication in some instances, insufficient reconnaissance during the battle, sections in the firing line omitting to support by their fire those advancing, failure to make use of cover, etc., with some observations and suggestions on the training of non-commissioned officers.

A. R. Reynolds.

CORRESPONDENCE.

ECONOMY IN CONSTRUCTION.

DEAR SIR,

The article on "Economy in Construction" that appeared in the December number of the *R.E. Journal* appears to call for some remarks in so far as the paragraphs on "Factors of Safety" and "Moving Loads" are concerned.

In discussing the question of the deflection of bridges under a rapidly moving load has not the writer overlooked the element of time? In deflecting a girder, work has to be done, and the question of time and the inertia of the girder have to be considered. For instance between the coldest night in winter and the hottest day in summer we may assume that a certain girder expands 2 in. in length. It is evident that the question of time affects very largely the temperature stresses, for if an expansion or contraction of only half this amount were to take place in five seconds it is probable that the girder would fail under the forces applied to it.

Time is required to enable the molecules of any structure that is stressed to rearrange themselves and establish a state of equilibrium, and under a rapidly moving load the measure of the strain is not necessarily the measure of the stress. As regards impact the writer does not seem to distinguish clearly between "live" loads pure and simple, and live loads applied with impact. In the first case the multiplying factor to ascertain the *maximum* stresses (which will be *momentary*) ranges from 1 up to 2, according to the suddenness of the application of the live load; 2 being the mathematical factor for a load applied *instantaneously without impact*. Where impact is involved it is obvious that the necessary factor (*ceteris paribus*) will be higher than in the first case, and will vary under varying conditions, *e.g.* (1) a well-laid railway track, (2) a badly maintained macadam road carrying motor transport. Velocities being the same.

In the matter of Factors of Safety, (which is connected with the above,) it is stated that the Amir's engineer used a factor of safety of $1\frac{1}{2}$ "in calculating the strengths of road bridge girders" whenever he worried about one at all. On the face of it this appears to mean that he calculated on $18\frac{2}{3}$—$21\frac{1}{3}$ tons per square inch as his *working* stress for steel (the ultimate strength being 28—32 tons per square inch). If so, and his calculated loads come upon those bridges with any frequency, one may predict with some confidence heavy expenditure in maintenance.

Perhaps however the engineer meant that $1\frac{1}{2}$ was his factor of safety, applied to live loads, whenever he worried about one at all; and under the circumstances this would be justifiable, *vide* Part III., Sec. 2, para. 12, *Military Engineering*.

Yours truly,

H. BIDDULPH,
Major, R.E.

The Editor, *R.E. Journal.*

Notes for Officers Proceeding to India.

By Major A. T. MOORE, R.E., 1904.

REVISED

By Major E. C. OGILVIE, R.E., 1912.

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