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8 - Effort of Tarpetta

HIGH WIRE ENTANGLEMENTS AND ABATIS

DESTRUCTION AND CROSSING OF HIGH WIRE ENTANGLEMENTS AND ABATIS.

By MAJOR R. N. HARVEY, D.S.O., R.E.

THE following is a description of some experiments in the destruction and crossing of high wire entanglements and abatis, which were conducted recently at Chatham. It is not claimed that the methods tried are the only ones and the best. On the contrary some of them are of very doubtful practical value. The study of the destruction or surmounting of obstacles is one which must be of great interest to all R.E. officers, and it is hoped that experiments will be carried out by all units, so that when the R.E. are actually called upon to take up the duty there may be some definite knowledge to work on.

HIGH WIRE ENTANGLEMENT.

The high wire entanglement was 58 yards long and 8 yards deep and of the irregular type as shown in M.F.E., Plate 22.

1. Demolition by a Dynamite Torpedo.—The torpedo consisted of a tin tube 24 ft. long with an interior diameter of $2\frac{1}{2}$ in., sufficient to take four 2-oz. dynamite cartridges tied together in a bundle. These 8-oz. bundles were pushed into the tube by a long wooden rammer. The bottom end of the tube was closed by a pointed wooden plug with handle. This plug was grooved to take a 2-oz. cartridge, detonator and safety fuze (the total charge 36 lbs). The torpedo was then deliberately placed through the entanglement about halfway from the ground as described in the R.E. Journal of January, 1913; the charge was successfully detonated and made a clearance of an average width of 20 ft. (Photo 1).

2. Guncotton Rope.—This rope consisted of the I-oz. conical G.C. primers threaded on a tracing line without their cardboard cases. The rope was 26 ft. long with 250 primers. An extra primer was attached to the other primers at the near end with a piece of tape through the hole to allow of the insertion of detonator when rope was thrown. One man doubled up with the rope already coiled at about 100 yards from the entanglement, and threw it

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over it. The detonator No. 8D and fuze was then inserted and fired. The charge successfully detonated, but beyond a clearing of about 6 ft. in the shape of a diamond at the last bay, very little other damage was done.

3. Graphel (Thrown).—The graphel was laid in position 100 yards from entanglement, and one N.C. officer and three men doubled up behind the covering party (which occupied a crater of a mine previously fired) and threw the graphel over the entanglement. It was then hauled on by 30 men and part of entanglement pulled away; it was thrown the second time and again hauled on, and the result of both pulls was a clearing of 12 ft. wide for a depth of 18 ft., a depth of 6 ft. on the enemy's side being only slightly damaged.

4. Graphel (Crawling).—The graphel was attached to a short length of 2-in. steel wire rope about 35 ft. long, with a shackle "A" at the other end. One man (No. I) crawled under the entanglement taking with him the shackle end of the rope, and when through a line ($1\frac{1}{2}$ -in. lashing) was thrown to him which was attached to an eye splice (B) at the end of a 2-in. steel wire rope. No. I next hauled the eye splice to himself and connected it with the shackle "A." The graphel was then hooked on to the wire rope. 30 men hauled on the wire rope. A clearing 12 ft. wide on the far side to 18 ft. wide on the near side was made in the entanglement.

Passage of High Wire Entanglement by Various Devices.—1. Planks (Fig. 1).—Sixteen of these double planks were used, each carried by one man. Time taken to place the planks 140 seconds. The infantry crossing party, 17 men, took 60 seconds to cross. Weight 32 lbs.



Fig. 1.

2. Ladders (Fig. 2 and Photo 2).—These ladders were 12 ft. long and 18 in. wide with 9 rungs. Weight 32 lbs. Ten were used, each carried by one man. Time taken to place ten ladders 145 seconds. The infantry crossing party, 17 men, crossed over in 65 seconds. 1913.]



3. Canvas Mats (Fig. 3).—These mats were made of Willesden canvas stuffed with straw, 8 ft. long by 3 ft. 6 ins. wide, and weighed 40 lbs. Sixteen were used and each carried by one man. Time taken to place the mats 95 seconds. The infantry crossing party, 17 men, crossed over in 45 seconds. These mats are too bulky for one man if the distance they are to be carried exceeds 100 yards. Two sides and one end are stitched with spun yarn, turned inside out, filled with straw, and the remaining end is sewn.



4. Wire Mats (Fig. 4 and Photos 3 and 4).--Made of wire netting: 4-in. by 5-in. mesh, 3 ft. wide, cut off into lengths of 8 ft. with about 3 in. of straw between. Weight 20 lbs. Sixteen were used, each carried by one man. Time taken to lay the mats 90 seconds. Theinfantry crossing party, 17, took 65 seconds to cross. The sidesand ends of the mats were bound with wire, studded about six. places.



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5. Wire Cutters.—Eight men in two ranks, each with cutters and gloves, took 95 seconds to cut the wires to make a passage about 6 ft. wide.

DESTRUCTION OF ABATIS BY A DYNAMITE TORPEDO SAME AS USED FOR HIGH WIRE ENTANGLEMENT (*Pholos* 5 and 6).

The abatis was 10 yards long, 8 yards deep, and consisted of four rows with barbed wire interlaced. The torpedo was placed in the centre of the abatis, and the result of the demolition was to make a clearing of about 12 ft. wide.

ROYAL ENGINEER INSPECTIONS.

By COLONEL W. BAKER BROWN.

PRIOR to the issue of the 1910 edition of the *Regulations for Engineer* Scrvices, the principal inspection of buildings and works made by Engineer officers was that known as the "Quarterly Inspection." At this inspection every part of every barrack or building was visited by an officer, the list of fixtures was checked, the state of repair examined, drains and water supply inspected, and fire engines worked. After the inspection requisitions were prepared in the R.E. Office and sent for signature by the O.C.'s of units who frequently contested their accuracy, especially when damages were assessed against the unit.

There were many objections to this system, while the interval between inspections was both too long and too short. It was too long for the execution of minor repairs and replacement of damages, while it was too short for a real inspection by the Division Officer of the condition of the barracks, which certainly did not want to be checked in detail four times a year.

The result of the first was that all officers commanding, unable to wait for the next quarterly, used to send in intermediate requisitions for any repair required as soon as it was brought to their notice, using for this purpose the "urgent" form of requisition A.F. K 1306. Correspondence then arose as to whether the work was really urgent or not, frequently resulting in a shortness of temper on both sides and an abuse of the R.E. and all their ways.

Again, from the contractor's point of view, the interval was too long. A contractor has to engage a regular staff and employ them throughout the year without a break. He must therefore arrange to distribute all work ordered over the year, and is compelled in his own interests, on receipt of a quarterly requisition, to spread the work at least over a quarter. Thus as much as six months may elapse from the time a service is noted as required by a unit till its execution. Further as no quarterly can be completed within its own quarter, and the final bill cannot be prepared until all the work on a requisition is finished, the completion and billing of work is delayed, the contractor is kept waiting for his money and various irregularities are likely to creep in, especially if any change of *personnel*, such as a foreman of works, takes place during the six months. Also it was nearly always necessary to carry over the bills for the last quarter to the next financial year, which again gave an opening for irregularity.

In the new edition of Engineer Services, para. 438, advantage has been taken of the monthly inspection of buildings ordered by King's Regulations, 992, to allow the O.C. of each unit to send in monthly an ordinary requisition for repairs on A.F. K 1308. This procedure is obviously in accord with the principle which underlies the whole of the new Engineer services that the relation between the R.E. and the troops are those between a landlord (or more properly the landlord's agent) and a tenant. A noteworthy example of this is the procedure in para. 485, under which the O.C. unit makes his own arrangements for the repair of damages (except in certain cases) either by his regimental workmen, or direct with the T.C. This saves much work in the R.E. Office and gives the O.C. much more interest in the condition of his barracks.

Now if this monthly procedure is properly carried out, the work of the quarterly inspection is much simplified, as there will be no longer a long list of repairs to be noted by the R.E.; the D.O. can then check generally the work actually done since his last inspection and can give his attention to the more important questions, such as the larger repairs of floors and roofs and the maintenance of drainage and water supply.

King's Regulations, 992, retains a proviso, that in the months in which the quarterly inspection is made by the R.E. the O.C. unit need not make his monthly inspection. But, as he is still responsible for sending in his monthly requisition on A.F. K 1308 (Engineer Services, Sec. 438), if arrangements can be made with him to do so without waiting for the quarterly inspection, it will tend to the repair work proceeding regularly throughout the year. If this is done, the services noted at the quarterly will be reduced to those special to the R.E. These include, usually, some minor repairs larger than are dealt with by the O.C. unit, occasionally a minor new service of a "trivial" nature under Engineer Services, para. 637, and the services enumerated in Engineer Services, 132.

It should, I think, be laid down as a standing rule that none of these services should be carried out on requisition. A requisition is strictly a request from someone outside the R.E. for the execution of R.E. work, and is meaningless if signed by the D.O. The use of the requisition form dates from the time when the only funds at the disposal of the D.O. were those of the incidental item. It was thus much easier for him to include items on a requisition than to ask the C.R.E. for a special allotment of funds. Also a little trouble and clerical work is saved by including several repair items on one requisition, but on the other hand there is a relaxation of financial control and as I have already pointed out considerable delay in completing the billing. The use of the requisition system lends itself to abuse, in the addition to requisitions of extra services which are often ill-digested and extravagant.

A very frequent and flagrant abuse is the inclusion in a requisition of a partial repair, such as a bit of a concrete floor or the pointing of a wall, the total service being spread over several quarterlies. In this way a service much exceeding the limits laid down in Table H, *Engineer Services*, can be executed by a D.O. without exceeding the letter of the Regulations. To stop this, I directed that no trivial service exceeding f_5 , and no maintenance service exceeding f_{10} should be dealt with on requisition. The services enumerated in para. 132 should not be dealt with on requisition, but should be treated as periodical services and brought forward for consideration at fixed times of each year.

If the above procedure is enforced, the question arises whether four formal inspections a year by the D.O. are necessary. Of course no D.O. will have limited his inspections and visits to works to four occasions only, but he will have had frequent occasions to visit every part of his division in connection with the execution of the larger services, measurements, etc. But such visits are made without reference to units, and therefore differ from the formal inspections which are made in company with an officer of the unit. Now it is probable that the inspection in the last quarter of the year is of little use. There should be very little money left at this period and if there is, the contractor can only get the work done within the financial year by extra pressure and often at extra expense. On the other hand the R.E. Staff is always very busy at this period. Similarly in the second quarter of the year at home stations the troops are especially busy with training.

I suggest that, provided the system of monthly inspections by units and monthly requisitions for repairs is carried out throughout the year, it would be sufficient to have two formal D.O.'s inspections each year, one in the first quarter as soon as the maintenance allotments have been made for the year, and one in the third quarter after the training season and when the amount of probable savings on authorized services should be known approximately.

This will free the R.E. Staff in the second quarter for the work connected with the Estimates for the following year, while in the last quarter I propose, as explained below, to carry out the annual inspection by C.E. or C.R.E.

Reference must be made to the inspection of R.E. fixtures which used to be done at quarterly inspections. These fixtures are detailed on inventory boards and really form a large and valuable store account for which the R.E. are responsible. As the stores are struck off ledger charge when fixed and there is no subsequent audit, it is an obvious duty of the Division Officer to see that these fixtures exist and that the records are up to date. But a good deal of clerical

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work is involved in keeping these records corrected to date, and when there is a pressure of work (and pressure is almost the normal condition in all R.E. Offices) records are always one of the first things to get in arrears. It is thus very essential to have a formal check, and this check should be primarily carried out at marching in and out inspections on change of unit, at which time the incoming unit sign the inventory boards and assume responsibility for the fixtures. In many corps, however, relief takes place by details, while individuals are always constantly changing. It would seem desirable therefore to arrange for an annual inspection of all R.E. fixtures, except where a change of units has occurred within the previous six months. This inspection might be spread over any convenient part of the year, preferably in the leave season.

It should be made jointly by an R.E. officer and an officer of the unit, and both officers should initial and date the inventory boards in token that they have found everything correct. It would be a convenience if columns for this purpose were provided on the forms.

There remains to consider the formal inspection by the C.E. or C.R.E. under para. 996, King's Regulations. This para. lays down that "the C.E. or his representative will inspect the barracks annually" and Engineer Services, para. 126, explains that the officer making the inspection will usually be the C.R.E. and adds that the inspection is to include all W.D. buildings and all fortifications. This inspection of fortifications is very important and might well be referred to in the King's Regulations.

Of course the C.R.E. will not limit his inspections to one annual visit, but will have frequently visited all parts of his district, especially in connection with the execution of the larger services for whose designs he is responsible under Table H, *Engineer Services*. Similarly the C.E. will have visited all parts of a command.

The value of the annual inspection, as in the case of the D.O.'s inspections, lies in the fact that the unit must be officially represented by a senior officer. King's Regulations lays down that an officer not under the rank of captain should attend the inspection, but whenever possible the O.C. unit himself, or at least his second in command, should be persuaded to attend. It is very desirable also that the sanitary officer of the command, or at least the medical officer in charge of the barracks, should also attend the inspection.

In accordance with King's Regulations the inspecting officer has to make a report of his inspection which is forwarded through the C.E. to the G.O.C.-in-C. But this inspection can also be used for a discussion on the spot, with the officer of the unit and the sanitary officer, of any new services in connection with the barracks which have been brought to notice under para. 266, Engincer Services, and have been placed on the Estimate Book, or any large repairs which have been noted by D.O. under para. 270. Such discussion is most valuable, not only in getting the views of O.C. unit at first hand, but in giving an opportunity for explaining the system of Engineer Estimates and the details of financial control which have to be complied with before a service can be commenced. The O.C. unit then realizes that an effort is being made to attend to the health and comfort of himself and his men, while the practical suggestions he is able to make are often of great use. Of course in a new barracks there will be little work to do in the way of improvements, though even then the views of the troops on the modern arrangements and fittings, should prove a useful guide in future designs.

As regards the time of year for this inspection, I suggest the month of January. By this time the estimates for the following financial year will have passed the War Office and some notification will have been received at the station as to probable allotments. any case the C.R.E. will know which major services have been recommended by the station and will know the probable average allotment for minor services. The D.O. will have made his last inspection in October or November, and will have had time to digest his Estimate Book and make up his mind as to which repairs or renewals are The C.R.E. is therefore in a position to select the most urgent. minor services he proposes to execute in the following financial year to the extent (say) of three-quarters of his probable allotments, and will have time before the end of the financial year to complete the designs and estimates for the selected services and, if abroad, to send home demands for the stores required.

SUMMARY OF RECOMMENDATIONS.

It will be convenient to conclude by a summary of the above recommendations and suggestions.

These are that the regular inspections made in connection with Engineer services in buildings and fortifications should be :---

I. Monthly inspections by the unit or corps in occupation followed by requisitions on R.E. for repairs which cannot be dealt with as damages by the unit concerned.

2. Half-yearly inspections by Division Officers in first and third quarters accompanied by an officer of the unit, followed by orders by D.O. for any large repairs found necessary.

NOTE.—If any small repairs are noted which have been overlooked, they can be included by the unit in the next monthly inspection requisition.

3. Annual inspection of R.E. fixtures during the leave scason unless a marching-in inspection has been held in the previous six months.

4. Annual inspection by C.R.E. (for C.E.) in January followed by preparation of the minor services for following financial year.

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To above must be added

5. Technical inspections of boilers and machinery annually, under *Engineer Services*, 127.

6. Inspection of lightning conductors, biennially, *Engineer Services*, 128.

7. Perambulation of boundaries, annually, *Engineer Services*, 149. Also where electric light is installed in barracks, a periodical test should be made of the condition of all mains and circuits. All these should be carried out at a time when they interfere least with military training.

It is perhaps hardly necessary to add that the object of the above suggestions is not to add to the labours of R.E. officers, but to encourage a systematic study of procedure and so to simplify and reduce work and avoid unnecessary repetition.

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THE WORK OF SIGNAL UNITS IN WAR.

A Lecture delivered to No. 3 Senior Officers' Class, S.M.E., by COLONEL R. S. CURTIS, C.M.G., D.S.O.

Scope of the Lecture.—I have been asked to give a lecture on the work of the signal units in war; but must preface my remarks by saying that I shall confine myself to the work which would be carried out by the signal units of the Expeditionary Force serving abroad, and I will not touch upon the work of signal units when engaged on home defence.

THE NEW ARMY SIGNAL SERVICE.

Until recently—as ycu all know—the service of inter-communication in our army was practically carried out by the following branches, working more or less separately :—

- (a) Telegraphy and telephony by the Royal Engineers Telegraph Companies.
- (b) Visual signalling by regimental and battalion signallers.
- (c) Orderlies, provided as required.
- (d) Postal Service.

Army Order of April 1st, 1912, introduced a system by which the first three branches have been combined into what is now called the "Army Signal Service." The Army Postal Service remains a separate branch, and should invariably be used for the transmission of all correspondence not of an urgent nature. Though the Army Signal Service and the Army Postal Service are separately organized, it is essential that they should work in close co-operation, rendering each other such mutual assistance as may be possible.

The Units of the Army Signal Service.—The Army Signal Service units, now laid down for the expeditionary force (which consists of a cavalry division, six divisions, two mounted brigades, and army troops and lines of communications) is :—

I signal squadron for the cavalry division.

4 signal troops-one for each cavalry brigade.

2 signal troops-one for each mounted brigade.

6 signal companies-one for each division.

2 signal companies, air line

2 signal companies, cable { for army troops.

1 signal company, wireless

I signal company for line of communication.

Functions of the Various Signal Units.-I will now take each of these various units and describe what are their normal duties.

The signal squadron carries out the inter-communication between the cavalry divisional headquarters and the cavalry brigades; and also with reconnoitring detachments, when required. In addition, it can keep touch with general headquarters by wireless telegraphy. For these purposes the signal squadron is organized in four troops, viz.:—

"A" Troop.—Which has two wireless (wagon) detachments that communicate with general headquarters.

"B" Troop.—Which has two cable detachments, with 28 miles cable, and eight vibrator offices, that are intended to keep cavalry divisional headquarters in touch with the wireless stations of the squadron, or to connect up the permanent telegraph system. They can also be used for internal communications of the division.

"C" Troop.—Which has one wireless (wagon) detachment and three wireless (pack) detachments. These are intended for communication between divisional headquarters and brigades or reconnoitring detachments, and

"D" Troop.—Which has 12 mounted men, 28 cyclists, six motor cyclists with two motor cars. This troop is intended to carry out visual signalling, or despatch riding in conjunction with or in lieu of other means of inter-communication within the division.

Signal Troops.—The signal troop with each cavalry brigade consists of II mounted men, six bicyclists, three motor cyclists, and has in addition an equipment of $7\frac{1}{2}$ miles of cable with eight telephones. This unit is intended to carry out the inter-communication within the brigade.

Signal Troops with Mounted Brigades.—The signal troop with mounted brigade is similar to that with the cavalry brigade; but has, in addition, two wireless pack detachments which would communicate with the wireless stations of the cavalry division or of general headquarters, as found necessary.

Signal Company with a Division.—The signal company with a division is organized with a headquarters and four sections, and is intended—primarily—for intercommunication within the division. The headquarters and No. r Section—which has three cable detachments with 30 miles of cable and nine vibrator offices, also four mounted men, eight bicyclists, nine motor cyclists—carries out communication between divisional headquarters and the brigades. The other three sections are allotted—one to each infantry brigade for its internal communication. Each section has two telephone detachments carrying in all 8 miles of cable and ten portable telephones; it has also eight bicyclists for visual signalling or despatch riding.

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Signal Companies (Cable).--Two cable companies form part of the army troops, and carry out inter-communication between general headquarters and army, or divisional headquarters. Each cable company has nine detachments in all (four sections of two detachments, and one extra detachment), each with 10 miles of cable and three vibrator offices, with 13 motor cyclists.

Signal Companies (Air-Line).—The two air-line companies also form part of the army troops, and carry out inter-communication between general or army headquarters and the advance base, or as required. Each air-line company has three sections of two detachments each, *i.e.*, six air-line detachments in all, with 10 miles of air-line and two second-class offices—also 24 miles of cable with six vibrator offices.

Signal Company (Wireless).—The wireless signal company also forms part of the army troops, and carries out inter-communication between army headquarters and cavalry divisional headquarters or mounted brigades. It has three wagon stations and 13 motor cyclists.

Signal Company (Line of Communications).—The line of communication company carries out inter-communication on the line of communication, and for this purpose is equipped normally with 100 miles of air-line and 10 offices with nine motor cyclists—it also provides *personnel* for working telegraph offices and maintaining lines on the railway system in use. These *personnel* are under the orders of the Director of Railway Transport.

Necessity of Sometimes Altering Allotment of Signal Units.—You will notice from the above that the signal units are allotted so as to suit the normal organization of the expeditionary force; but it must be understood that such allotment may be altered at any time, and the whole or part of a signal unit may be withdrawn for employment elsewhere. Further, for instance, although the cable company usually would keep up communication between general headquarters and an army headquarters, it would often be preferable to employ air line. Again, although the line of communication ceases at the advanced base, it would usually be advisable for the line of communication to carry out and maintain all inter-communication in rear of general headquarters.

Having described the organization of the Army Signal Service, so far as the units are concerned, I will now explain the system of administration.

Administration of the Army Signal Service.

The whole of the Army Signal Service is administered by the Director of Army Signal, who has representatives at the following headquarters :---

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- At the headquarters of the Inspector-General of Communications: A Deputy Director of Army Signals.
- At headquarters of an army : An efficer i/c army signals.
- At headquarters of the cavalry division : The officer commanding the signal squadron.
- At headquarters of a division : The officer commanding signal company.
- At headquarters of a mounted brigade : The officer commanding signal troop.

The Director of Army Signals is authorized to communicate direct with his representatives on all matters of an administrative and technical detail connected with the Army Signal Service, and his representatives are similarly authorized to communicate with one another on such matters.

The duties of an officer in charge of army signals with headquarters of an army are :---

- (i.). To act as the technical adviser of his commander in matters pertaining to Army Signal Service, receiving his instructions as regards its employment through the General Staff.
- (ii.). Under the orders and within the limits of command of his commander, to be responsible for the general organization, maintenance, and efficiency of the service of inter-communication, other than the postal services.

The commanders of signal squadrons, signal troops, companies and sections are in their respective degrees charged with analogous powers and responsibilities.

Description of the Means Taken to Provide Inter-communication in the Field.—Having explained the organization and system of administration I will now endeavour to describe the means employed by signal units to provide and maintain communication.

To begin with—we will suppose the Expeditionary Force is to be employed in a friendly civilized country overseas, with a view to operating against an enemy in an adjacent territory. Arrangements would probably be made between our government and that of the friendly country for the use of a submarine cable and of the telegraphic and telephonic systems. A portion of the line of communication signal company would be sent to take over certain permanent lines and offices, and, if necessary, to supplement them by air lines, etc. On the arrival of the expeditionary force it would be the duty of the signal service to join up the various larger units, either by employing the permanent telegraph system or by temporary connections. As the force moved forward it might be impracticable to continue the use of the permanent systems, in which case field methods would have to be employed. Diagram I. shows the communication which would possibly be made on the arrival of the Expeditionary Force, prior to its move forward. You will notice that general headquarters is connected with the advanced base by two permanent lines borrowed from our friends, and that on one are working Wheatstone automatic instruments, which can send 200 to 400 words a minute, and on the other line the work is carried on by sounders at about 30 words a minute. In this case the line of communication company would maintain and work these two lines under the Deputy Director Army Signals.

From general headquarters to the cavalry division a permanent line has been used for a portion of the way and the remainder made up by cable. It is necessary to use vibrators on this connection as sounders will not work through such a long length of cable (over 12 miles) as this is supposed to be. From general headquarters to the 1st Army a permanent line with sounders inserted is in use. An air line has been erected with sounders between general headquarters and 2nd army headquarters.

A cable with vibrator connects to the reserve (6th) division, and the 2nd mounted brigade is kept in touch by despatch riders or visual signalling. Taking the internal communication of the 1st and 2nd armies, the 1st and 2nd divisions are connected to 1st army headquarters by cable and the 1st mounted brigade by despatch riders. The 3rd and 5th divisions are connected to 2nd army headquarters by cable, and the 4th division by despatch rider.

All the above connections from general headquarters to the various units would be carried out by the army troops signal units, *i.e.*, two air-line and two cable companies. In addition, within the divisions would be further connections between divisional head-quarters and brigades which would be carried out by the signal squadron, or by the divisional signal company concerned with such means as the local officer in charge of signals considered most desirable.

The Director of Army Signals on receiving from the Commanderin-Chief, through the General Staff, information as to the organization of the army and its probable place of concentration, would no doubt have distributed the two air-line and two cable companies accordingly.

In this case we will suppose that he has allotted to the 1st Army two cable sections, the 2nd Army three cable sections, leaving three cable sections with two extra detachments for work at general headquarters, as well as the two air-line companies. In addition, a small proportion of motor cyclists would be allotted to the 1st and 2nd Army Headquarters.

The Director of Army Signals would have detailed the senior officer of the air-line and cable companies as the officer in charge of Army

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Signals at general headquarters. His duties would be to keep up communication with the two armies, the cavalry division, the reserve (6th) division and the detached mounted brigades. He would also arrange with the Deputy Director of Army Signals (lines of communication) and any details as to the internal organization of offices where the two jurisdictions might meet. The Director of Army Signals would further detail from the air-line, and cable companies officers to act as officers in charge of army signals at the rst and 2nd army headquarters. These officers would be responsible for keeping up communication between their army headquarters and the divisions, etc., of the army concerned, with the *personnel* and equipment (in this case cable sections and motor cyclists) allotted to them.

We will now suppose the army has advanced and is disposed as shown on Diagram II. These diagrams are of course not intended to represent any actual organization, or movement, but simply to illustrate the working of the signal service.

I will now describe the system as it has now developed, and in doing so I will explain it by taking the zone of each officer in charge of signals in turn.

The Director of Army Signals having received early information from the Commander-in-Chief, through the General Staff, of the intended advance instructs the officer in charge signals general headquarters to push his air line on, and also warns the D.D.A.S. of the probable requirements, including the insertion of a sounder in the line to the advanced base to afford communication with the reserve 6th division. He also arranges with the officer in charge signals cavalry division as to the wireless communication required.

The officer in charge signals general headquarters pushes his air line forward so that when the Commander-in-Chief moves on, a portion of the signal office accompanies him and communication is established on arrival at the new site. He also arranges all technical details with the D.D.A.S. about the insertion of an office for the reserve 6th division for communication from that office to the reserve division. Also for the transfer of Wheatstone automatic apparatus forward. He arranges for communication to be maintained with the 1st and and armies and the detached mounted brigades, and also for the wireless or other communication with the cavalry division. Similarly the officer in charge signals with the 1st and 2nd armies arranges for communication with their component units. The officer in charge signals cavalry division arranges for communication with general headquarters, by wireless, or despatch riders. He also arranges to keep in touch with the cavalry brigades. For exampleto the 1st cavalry brigade by wireless, 2nd and 3rd cavalry brigades by despatch rider or visual signalling, 4th cavalry brigade by cable.

The D.D.A.S. in addition to arranging for the insertion of the

office for the reserve (6th) division has made arrangements to take over early maintenance of air line behind general headquarters, to have ready additional air-line material to forward when required, and also for the organization of a clearing house. I will not go into the working of the smaller units as the principle throughout is the same, namely, that every officer in charge of signals should arrange such means of communication as are available from the *personnel* at his disposal.

Description of the Various Methods and Equipment used for Intercommunication.—I hope the preceding explanations will have given you a clear insight into the general working of the signal service and I now propose to mention some details of the equipment.

Air Line.—Field air line which consists of a bare wire erected on light poles can be crected at the rate of about 5 miles a day by a detachment of 12 non-commissioned officers and men—Rate, half to 2 miles per hour.

Field Cable.—Field cable is an insulated wire laid on the ground, at a rate of x to 6 miles per hour (average 3) by a detachment of eight N.C.O.'s and men—Artillery and infantry use a lighter cable.

Wireless Equipment.—Wireless equipment at present consists of (a) wagon stations, (b), pack stations.

(a). The wagon stations consist of a limbered vehicle which carries the apparatus and the mast with antennæ, and a light wagon carrying spare stores, baggage, etc. A wagon station can maintain communication with a similar station up to about 80 miles.

(b). A pack station, which is usually carried in a limbered G.S. wagon, can also be quickly transferred to four pack horses which are led by four men on riding horses who form the working detachments. Pack stations can work to each other up to about 20 or 30 miles.

Wagon stations can work to pack or *vice versâ*. The limit of transmission being about 80 miles from "wagon" to "pack," and 20 to 30 miles from "pack" to "wagon." Stations take 15 to 30 minutes to erect.

All these distances vary considerably with the conditions of the country, weather, and time of day or night.

The great problem of wireless telegraphy is to overcome interference or overhearing. It is possible to overcome the former to a certain extent by what is called "tuning." The latter can be overcome by sending messages in cypher—but in any case wireless traffic in the field wants very careful handling at present.

Necessity for Periodic Work when Scveral Stations are in the Field.— When more than two stations are at work in order to minimize interference from one's own stations—leaving hostile interruptions out of the question—very careful procedure has to be adopted.

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Taking a case as is shown in Diagram III., which is extracted from Diagram II. The two stations at general headquarters, or cavalry division headquarters, must send at the same time. It is at present impracticable where two stations are close together for one to send and the other to receive at the same time. Period working, combined with "tuning" is therefore necessary. Thus—G.H.Q. works from five to ten minutes in each quarters of an hour to C.D.H.Q. and 2nd mounted brigade on the 3,000 and 2,300-ft. waves respectively. Cavalry division to 1st cavalry brigade, and general headquarters on the 1,700 and 3,000-ft. waves respectively, during the o-5 period, and so forth.

In case of an important reconnaissance accompanied by a wireless detachment, it may be necessary to close down all sending at other stations, and instruct them all to listen to signals from the reconnoitring party.

Aircraft Wireless Apparatus.—Aircraft have recently been fitted with wireless apparatus, and from the experience with the airships good results may be expected. There is much difficulty in receiving on aircraft owing to the noise of the propellers drowning the signals in the telephone receivers.

Visual Signalling.—You are all well acquainted with the various methods of visual signalling, and its advantages in some countries and its disadvantages in others. Heliographs are limited only by range of vision. Flags may be read from 3 to 7 miles. Limelight lamp 10 to 15 miles. Begbie lamp 5 to 8 miles. Dietz discs are now under trial, as are also various forms of oxy-acetylene, and electric lamps.

Despatch Riding.—The other method of inter-communication is by despatch riding; for which horse, bicycles, motor cycles and motor cars are used. Their pace depends upon the nature and state of the country, the amount of traffic on the roads, etc. During the recent manœuvres motor cyclists did very valuable service. All despatch riders must have a detailed knowledge of organization of the army, and also be quick map readers.

Description of the Transmission of a Message.—I will now describe what happens to a message, and will take, as an instance, one sent in from the 1st cavalry brigade in Diagram II. containing information which requires to be forwarded to general headquarters, and thence to England.

The General Staff Officer concerned having written the message in triplicate, as it is of an important nature, hands two copies to the officer in charge signals, with the brigade, the latter being advised at the same time that it would be better to send it by more than one route. The officer in charge signals hands copies to the clerk in charge of the signal office who, having coded and registered the message, sends one copy for despatch by wireless telegraph. The other copy he hands to a despatch rider to take to the signal officer at the cavalry division headquarters, and notes name of rider and time of starting. We will suppose that the wireless message arrives at the wireless station cavalry division headquarters. It is checked and passed to signal office from where it is sent by orderly to the cavalry division headquarters. The despatch rider arrives later with his copy at the signal office, and it being noted that another copy of the message has already been received, it is delivered and the despatch rider with his receipt is sent back to the rst cavalry brigade signal office.

Meanwhile, the cavalry division headquarters has prepared another message in triplicate, containing the information received, and send it to the signal office for transmission. The same procedure follows as before, and the message is delivered at general headquarters.

In towns, it is usually impossible to collect near the general headquarters the various means of transmission. For instance—the only site suitable for a wireless station may be half a mile from the buildings selected for headquarters. Similarly the telegraph offices may be scattered according to the locality, and visual signalling may only be possible from a hill outside the town.

Signal Office.—A signal office is therefore established near the headquarters, where all messages are dealt with on arrival, or just before delivery; and near it are collected the despatch riders, also the messengers for conveying to and fro the messages between the various centres of transmission and the orderlies for delivery of messages.

We will suppose the message from the cavalry division headquarters arrives by wireless, the receiving stations being half a mile from general headquarters. After checking, it is sent by messenger to the signal office, where, after registration, it is passed by orderly to the headquarter staff.

The general headquarters now prepare a message for transmission to the War Office in England. It is sent by orderly to the signal office, where it is registered and then sent by messenger to the telegraph office from whence it is despatched to the advanced base, and so on, through the submarine cable, to England.

The signal office at general headquarters, with its component parts, viz. :--Telegraph, wireless, visual signalling, despatch riders, clorks, etc., requires careful organization, and it must work in reliefs, all the staff being highly trained, and it must be divisible.

When the general headquarters moves to another place the officer in charge general headquarters signals has to arrange to send a portion of his staff on, so that communication is at once established on arrival at headquarters. The same principle applies in lesser degree to signal offices at army, division, and other headquarters. Now, gentlemen, I have endeavoured to explain to you the working of the signal service and how it is designed to assist the army in the vital requirements of intercommunication. Officers of the signal service have a very arduous time, and require quick decision and a rapid grasp of situations; but they can be enormously helped by those using the signal service, if their difficulties are comprehended and, as far as possible, eased. The first desideratum is that the various officers in charge of signals should receive early information of any projected move, so that they may organize the means at their disposal. Other desiderata are, to adhere to the instructions laid down for writing messages; to send nothing by signal service which could equally well be transmitted by the postal service; and finally to remember that the signal service is human, and when delays occurto postpone criticism until the cause is discovered.

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FORTRESS DEFENCE.

CONVENTIONS OPPOSED TO THE OFFENSIVE SPIRIT.

By MAJOR J. W. S. SEWELL, R.E.

In the August number of the *R.E. Journal*, Major Matheson takes up my criticisms on the apparent lack of the offensive spirit in the writings of Continental Engineers on the subject of permanent fortification.

He appears to be a little hurt that I should have taken his paper as a basis for my remarks—may I take this opportunity of pointing out that this was done in no spirit of contradiction to himself. His paper is, for the most part, an able summary of the ideas prevalent in Europe, as evidenced by the numerous works and articles on this subject which have been published in recent years. From such a summary it is easier to deduce the general trend of thought, which, as I attempted to indicate, does not yet appear to have progressed in consonance with the offensive spirit dominating the manuals and text books devoted to action in the field.

It will perhaps reveal more clearly those points on which we differ, if I take Major Matheson's remarks seriatim.

It would appear that he agrees with my main contention that the offensive spirit is only nascent at present in fortress design; but he waives this aside with the remark that it is not a matter for surprise. Perhaps not; but that does not or should not prevent it from being a subject for criticism.

Then we come to the vexed question of the intervals between the main groups of works (*feste*). I think it will be accepted as an axiom, that these should be neither greater nor less than is necessary to prevent an attack, which would involve the fall of the fortress, being launched between two such *feste* without the necessity of first capturing at least one of the *feste*.

Engineers will differ as to what such interval should be; and the nature of the terrain must ever be the decisive factor. I have perhaps been too mathematical in attempting to indicate a probable interval; but an examination of the plans of fortresses, from the days of Vauban up to recent times, would appear to indicate that

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the engineers of the past have in general fixed on twelve as an approximate number for the main key points of a fortress situated on an open terrain, that is to say on a terrain which is not very greatly accidented. Major Matheson says that the fewer the key points the greater will be the mobile force and, therefore, the greater will be the garrison. I put it somewhat differently, viz :- for a given garrison, the fewer the key points, the greater will be the mobile, that is, the offensive force. It appears to me that Major Matheson contends that we should construct works in the intervals to repulse the enemy's attack. My contention is that our fundamental idea should be to get him into such a position that we can destroy the attacking force. In this connection I have received letters from an officer whose opinion I hold in great respect, in which he joins issue with me on the ground that I take too optimistic a view of the quality of troops likely to form a fortress garrison. He argues that all but the fortresses covering the preliminary strategic concentration will perforce be garrisoned by what he aptly describes as "n-th line" troops, who from lack of training will be totally unable to take offensive action. Well, in such cases, by all means let us cover our fortress with 2nd line works, keeps, retrenchments, obstacles, et hoc genus omne; but do not let us assume this to be the ideal of fortress design. Personally, I think he is too pessimistic ; before such fortresses come into action, the Commandant will have had some chance of training his troops; and, moreover, it seems probable that the Government will have sued for peace on the principle of cutting its losses.

As to works in the intervals Major Matheson says "Offensive movements few trenches and obstacles to cover unseen ground, and to force the enemy into areas where he can be attacked with advantage." I am in entire concurrence. My own words were ". . . in . . . there will be ground which is such intervals . . . It will probably invisible to the flanking artillery be necessary to cover such ground or points with small closed infantry works. These should, however, only be of a nature to check an attack until the reserve can come up and drive back the assailants." On the whole, I prefer Major Matheson's expression.

He then objects, naturally, to my criticism of his choice of an example (*Plate XVIII., R.E. Papers IV., 3*). Most readers of the *R.E. Journal* will recognize the site. We may waive any contention as to this site being inexorably determined for a group of works; but I cannot admit that it is typical, it is a difficult site at best, for reasons given in my previous article. I agree that it would be a good site to choose were one seeking to ascertain how to adapt

agreed principles to a difficult site; but I still think that an easier site would afford better opportunity for a reader to understand the principles which Major Matheson seeks to inculcate. On the site selected the necessary adaptation of details to the ground obscures the governing principles. It certainly has already led me to misunderstand the function of Major Matheson's "fort-nucleus," a subject to which I will refer later.

Major Matheson says " It is somewhat difficult to see very much difference between the organization of Major Sewell's group and that which I put forward." As regards the group, we are, I fear, distinctly at variance, notably as regards the "fort-nucleus," but from the remainder of the paragraph I gather that he refers to the infantry works which constitute the key points of my group. Ŧ think we have both recapitulated the current ideas of the school in which we were both trained and are thus naturally in agreement. But if this implies a charge of plagiarism, I would observe that I read Major Matheson's paper to advocate a "cut-and-cover" work, whilst I ventured to suggest that a " mined " or " tunnelled " work, on a similar plan, might, under certain conditions of ground, time, and engineering economics, provide a work more bombproof and less visible. I regret that I did therein unconsciously plagiarize the idea of Capt. Holt Wilson, who suggested this system for a fieldwork in the R.E. Journal, August, IQII.

As regards the geometric trace, Major Matheson entirely misses my point. It is not a question of lines being "straight or wavy," neither of which adjectives adequately conveys in fact an impression of Nature's contours (imagine telling a woman that her figure was either straight or wavy). It is not even chiefly a matter of invisibility to the enemy's artillery. It is a matter of getting the best position for each rifle. In fact the fire trench must be designed in situ, and afterwards recorded on a paper plan, on which may be added all accessory works. The geometric trace is the outcome of the attempt to draw a paper plan first, and then make the ground fit it.

I admit the great skill which has rendered invisible the two small redoubts to which Major Matheson alludes. These redoubts, however, contain practically none of the accessory constructions required for our infantry work, and—which makes a great difference—have no escarp. Their neighbours can hardly be called invisible by their most devoted admirers. In general the forts of the last half-century can by no means be classed as invisible. The southern front of Antwerp presents to the view, over a wide area, forts which are the dominant features of the landscape. Many continental forts, it is true, are at present invisible, but it is impossible to say

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that they will remain so, when their defenders are themselves enabled to see their enemy, by the clearing of the concealing groves of trees.

On the matter of retrenchments, Major Matheson adopts a double standpoint. On the one hand he regards a retrenchment as an advanced shelter for the reserve. If this is what he means by " a retrenchment" I concur at once, such cover close up for the reserve will most certainly be required towards the end. But the usual interpretation of that word is a trench, or trenches, into which the defenders of the front line may retire, and Major Matheson takes a second standpoint, when he argues that such works may delay for a day or two the fall of the fortress. That, I fear, must remain a matter of opinion. There are those of us who hold that whilst retrenchments may be held for a day or two, their existence will almost certainly cause the front line to be abandoned two or three days earlier than would be the case were the retrenchments nonexistent.

It appears that we are in agreement that a "group should not be a closed work," though I am not prepared to be so dogmatic on this point. With the exception of the original advocate of groups of works, viz. :--" Un pionnier" (*R.E. Papers* IV., 3, *Plate* XIV.), all continental authors appear to design closed-in groups (*cp. R.E. Papers* IV., 3, *Plate* XVI.).

So far it would appear that the differences between Major Matheson and myself lie in forms of expression, or in the less important details, but when we come to the arrangement of the group, 1 fear that I cannot understand his ideas. To some extent we appear to be speaking in different languages, and require a mutual interpreter. In the first place he speaks of the key point of a group. Now, according to my understanding of the word "key point," a group has several key points, viz., the various infantry redoubts of the front line (e.g. all the works lettered "C" in Plate XIV. of R.E. Paper IV., 3). In every "position" there is usually one work or locality, whose fall, more certainly than that of any other work, involves the loss of the whole position, such a work or locality is usually alluded to as "the key" of the position. Is this what Major Matheson means by the key point? Or does the use of the definite article imply that his conception of a group only includes one infantry work? In that case what are the five groups of trenches shown in advance of his " fort-nucleus " in his Plate XVIII. ? Are they outpost trenches, advanced posts, or the main line of defence?

Major Matheson now makes it clear that his "fort-nucleus" is not a keep, and that *Plate* XVIII. is only diagrammatic, but I am no nearer to understanding its true function. At first I imagined the fort-nucleus to be intended to enact the rôle of the batterie traditore ; in containing flanking guns it does do so, but as sited in Plate XVIII. it does not fire into or between the fire trenches. Moreover the batteric traditore is essentially a battery with a small infantry garrison as escort to the guns (a waste of infantry apparently). But it would appear that Major Matheson regards it as also his main infantry work. Now unless Plate XVIII. is very misleading, the fort-nucleus cannot assist to repel a frontal attack on the fire trenches in advance. Then what is the rôle of its garrison whilst their comrades in the trenches are endeavouring to repel an attack? What, on the other hand, becomes of the garrison of the trenches, after the enemy have captured the trenches, and at last come under fire from the fortnucleus ? A still further and closer perusal of pp. 39 and 40 of Major Matheson's original paper inclines me to regard it as excusable that I should consider that his proposal was to have two lines of is it not better to withdraw the defence : cp. " Still the foreground forts from the front line . must be covered with fire. This can be done from trenches in the front line ology. Let us agree that the fort-nucleus in such a case does not constitute a "second line." Anyway the proposal appears to be to have a front line of fire trenches with their accessories, and a line of fort-nuclei 300 to 600 yards behind it. If the front-line trenches and the fort-nuclei be on the same plateau or slope this would merely amount to a double ticr of fire. But why, if the fire-trench groups are to be held, should they not be provided with that " most efficient obstacle," a ditch ? On the other hand, if the forts be in such a position as to fire over the same ground as the fire trenches, the object of their withdrawal, viz. to escape artillery fire, would be lost. If, as shown in Plate XVIII., they are withdrawn to the reverse slope, whilst the fire-trench groups be left on the forward slope, this is most assuredly asking for defeat in detail.

Of course there must be something in Major Matheson's proposal which has escaped me, but it would appear to require further elucidation.

To me it would appear that the central retired point which Major Matheson regards as a *tactical* pivot, should form the *administrative* centre and command post. From it radiate the communications along which pass orders, reinforcements, ammunition, supplies, and stores.

Finally, I must confess that the officer to whose criticisms I have alluded above, quite rightly hauls me over the coals for not giving recognition to the necessity for providing an inner work, akin in siting and construction to a keep, but not provided with any intention of holding it as a second line. He observes with truth that to build up the mobile offensive force to a maximum, it will be necessary to deplete the garrisons of works on the unattacked fronts, until these may be reduced to practically mere picquets. Such is indeed the essential principle of the offensive-defensive. For such "picquets," works on a scale proportionate to their strength must be provided of such a nature, and in such a position, that they dominate the group, or sufficiently dominate it to enable the picquet to resist an attempt to capture the group by a night attack or other sudden assault.

NOTES ON WIND PRESSURES.

By CAPT. J. E. E. CRASTER, R.E.

THE following notes were taken by the writer during a typhoon at Hong Kong on the 17th August, 1913.

The wind attained a velocity of 105 miles an hour at the Observatory, and on the Peak, where the writer's house is situated, the velocity reached 120 miles an hour; but as the house is sheltered to some extent by high ground at the back, it is probable that the actual maximum velocity during the observations was not more than 100 miles an hour. The wind came in gusts, separated by comparatively calm intervals, during which the velocity dropped to 20 miles per hour, or less. Before each gust, the aneroid in the house fell rapidly, often dropping r_0 of an inch in two or three seconds, and the lowest point was generally reached just before it struck During the gust the aneroid rose again, till at the end the house. of it it was a little above its normal level. The house, though shut up, was by no means air-tight, and it is probable that the aneroid gave a fair indication of the variations of pressure that occurred in the open air.

From the behaviour of the aneroid it seems clear that each gust was caused by air rushing in to fill a partial and local vacuum caused, perhaps, by a huge bubble of warm air rising through a comparatively cold atmosphere. As soon as this partial vacuum had been filled, the gust ceased. In any house that is comparatively air-tight, the sudden formation of a partial vacuum in the surrounding air must produce a very appreciable outward pressure on the walls, roof, windows, and doors. This is a static pressure (which is entirely independent of the dynamic pressures and suctions caused by wind).

The amount of the static pressure caused by a fall of 1_0^1 of an inch on the aneroid would be about 7 lbs. per square foot. This alone would be enough to lift any light roofing material, and to break any large sheets of thin glass. This was well illustrated during the typhoon in question. A large pane of glass had become loose, owing to the putty having fallen away, and the wind whistled out through the surrounding space. The pane was secured and the space all round it filled in with rags. When this was done the room was comparatively air-tight, and, as a consequence, directly the aneroid began one of its periodic falls the whole pane was sucked bodily out

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of the window. After this pane had gone, the strain on the other windows visibly decreased, and no more damage was done. Had the broken window been boarded up as was originally intended, there is no doubt that other windows would have been broken.

In the R.E. Journal for December, 1912, Lieut. Satterthwaite quoted a formula for ascertaining the pressure and suction caused by wind on roofs of various angles, the figures given being based on experiments made by Dr. T. E. Stanton, at the National Physical Laboratory at Teddington. On a roof supported by stanchions the leeward pressure, or suction, was negligible, whereas on the roof of an ordinary building, the leeward pressures were large-larger in fact than the windward pressures. This implies that the whole of the leeward pressure on the roof of a closed house is due to the air enclosed in it. For a roof with a slope of 60 degrees, and a wind blowing at the rate of 100 miles an hour, the leeward pressure is given as 32 lbs. per square foot. This is surely too great, for it implies a difference of 0.45 in. in the height of the barometer inside and outside the house, an almost inconceivable state If such large pressures do occur, they can only be of affairs. exerted over a very small area, and it seems quite unnecessary to design roof trusses to resist such pressures over the whole leeward expanse of the roof.

Probably the best way to ensure the safety of buildings against heavy winds, would be to provide ventilators over each door and window, and in the centre of each side of the roof; so that no great difference of pressure could be set up between the external and internal air at any point in the building. Such ventilators should be provided with louvres on the outside, and small-meshed wire gauze inside to keep out rain and mosquitos. In buildings of two or more storeys, ventilators might also be provided to connect the rooms on various floors; otherwise wooden floors lift and fall, in rather an alarming way, and the wind blowing up through joints in the boards fills the rooms with dust.

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EARLY INDIAN CAMPAIGNS AND THE DECORATIONS AWARDED FOR THEM.

(Continued).

By MAJOR H. BIDDULPH, R.E.

Afghanistan, 1839-42.

Medal for Ghuznee, 1839.

1.5-in. diameter, silver.

Obverse.-The gateway of Ghuznee, "GHUZNEE."

Reverse.—A mural crown within a laurel wreath, and the date, " 23^{D} July 1839"

Ribbon.—Yellow and green, or crimson and green in equal halves, 11 in. wide.

Mounting .--- A straight silver bar, pivoted.

THE FIRST AFGHAN WAR, 1839-42.

Practically none of the medal rolls for this campaign are extant, either in England or in India, but it is possible by means of collateral official documents to verify nearly all the medals issued to the Queen's troops, and a fair proportion of those issued to Europeans in the Company's service.

The exact number of medals struck for the capture of Ghuznee, 23rd July, 1839, is not known, but the total number of men entitled to it, including the Bengal, Bombay and Shah Shujah's troops was about 11,700. They were issued at first unengraved, but in 1844 the Court of Directors gave instructions that arrangements should be made in future for engraving all medals before issue; and as will be seen later this was done with practically all the medals granted for the 1842 campaign, with the exception of the first Jellalabad medals.

From various records it is evident that very great delay occurred in issuing the Ghuznee 1839 medals to the troops in the Company's service, if not to the Queen's troops, and it is probable that a number were issued officially engraved. The medals were not struck till toward the end of 1842.

No papers are extant showing the particulars of the change of the ribbon from yellow and green to crimson and green; but the reason was (in all probability) to introduce the colours of the ribbon of the Star of the Durani Empire, an order constituted by Shah Shujah after his reinstatement by the British. Sir T. Willshire's medal with the original yellow and green ribbon is to be seen in the museum of the Royal United Service Institution, Whitehall; but owing to the delay in issuing the medal it is improbable that this ribbon was extensively worn.

The design of the medal was settled by a committee of officers, and it is pretty certain that the obverse depicting the Cabul gate of the fortress, which was blown in, is taken from a drawing executed by Lieut. H. M. Durand, of the Bengal Engineers, the officer who blew in the gate.

Several European firms were invited to submit dies and proofs to the Calcutta Mint, the cost being defrayed by the Government, and it is not at all unlikely that the Ghuznee medals met with occasionally, which differ slightly from the authorized design, are faked proofs from the rejected dies. The striking of the medals from the approved dies was done at the Calcutta Mint, and the dies are still in custody there.

The invasion of Afghanistan was undertaken for the purpose of dethroning Dost Mahomed, and reinstating the exiled Shah Shujah. The Army of the Indus was composed of two corps under the command of Sir H. Fane, C.-in-C. in India. The Bengal column concentrated at Ferozepore in December, 1838, and was to form a junction with the Bombay column, under Sir John Keane, on the Indus.

The raising of the Siege of Herat led to a reduction of the invading army, the 3rd Infantry Brigade of the Bengal column was left at Ferozepore, and Sir H. Fane relinquished the command to Sir J. Keane.

The Indus was crossed at Bhakkar, which fortress was taken possession of, and the army commenced its painful march through the Bolan Pass to Quetta. The losses in baggage, transport and followers from marauders were enormous, the troops were half starved, and the immense army of followers almost entirely so, as they were put on quarter rations. At Quetta the 2nd Infantry Brigade (Major-General W. Nott) was left in garrison and the march resumed to Candahar.

The 37th B.N.I., a detachment of Shah Shujah's force, and all the battering train were left at this latter place, as it was understood that Ghuznee, which lay between the army and its objective, Cabul, was an insignificant fort.

On arrival at Ghuznee, the C.-in-C. found to his dismay a formidable fortress. The Chief Engineer gave his opinion that the proper course was to mask the fortress and continue the march on Cabul. Sir J. Keane made the disconcerting answer that this course was impossible as the army had provisions for *two days only*. Capt. Thomson thereupon stated that the only course open was to attempt to seize the fortress by a *coup de main*.
Making a very careful reconnaissance on the 21st July, he ascertained that the Cabul gate was the only one which had not been built up, and he laid before the General a scheme for blowing this gate open and seizing the fortress by assault. The General approved the plan (none other was possible), which was to be carried into execution at 3 a.m. on 23rd July. Cavalry and artillery were posted in suitable positions while the storming column made its desperate venture.

The advance explosion party consisted of Capt. A. C. Peat, Bombay Engineers; Lieut. H. M. Durand, Bengal Engineers; Lieut. N. C. Macleod, Bengal Engineers; and 3 sergeants, and 18 sappers carrying 300 lbs. of powder, with 6 men of the 13th L.I. Their escort consisted of 300 men of the 13th L.I. who extended and kept up a fire on the parapets.

Then came the advance party of the light companies of the 2nd Foot, 17th Foot, and Bengal European Regiments and one company 13th L.I., guided by Lieut. J. L. D. Sturt, Bengal Engineers, and commanded by Colonel Dennie, of the 13th L.I.

Next followed the storming column, guided by Capt. Thomson, the Chief Engineer, and commanded by Brigadier Sale, consisting of the remainder of the 2nd, 13th, 17th and Bengal European Regiments; while lastly there was a native reserve under Brigadier Roberts composed of the 16th, 35th and 48th Bengal N.I. The whole of the European infantry of the army was thus thrown into the storming column.

Durand laid and fired the charge, and he himself has told the story of how nearly the whole scheme failed through the chances of night operations and stray casualties. Fortunately the "almost" failure turned into a "complete" success, and Ghuznee fell.

The fall of Ghuznee was a staggering blow to Dost Mahomed. Cabul was occupied without opposition, Shah Shujah was installed on the throne, and after some desultory fighting Dost Mahomed surrendered himself and was deported to India.

GHUZNEE.

Investment, 21st July; Assault, 23rd July, 1839.

Troops present on these dates, and entitled to the medal :---

Lieut.-General Sir J. Keane, Commander-in-Chief.

Major-General J. Thackwell, Commanding Cavalry Division.

Bengal Column.--Major-General Sir W. Cotton.

Cavalry :-Brigadier R. Arnold, 16th Lancers.

H.M. 16th Lancers.

2nd Bengal Light Cavalry.

3rd Bengal Light Cavalry.

4th Local Horse (Skinner's), detachment.

Artillery :- Licut.-Colonel P. L. Pew.

2-2nd Brigade Bengal Horse Artillery.

2-6th Brigade Bengal Foot Artillery.

Engineers :---Capt. G. Thomson, Chief Engineer.

Infantry :—

1st Brigade :—Brigadier R. H. Sale, 13th Foot. H.M. 13th Foot.

16th B.N.I. and 48th B.N.I.

4th Brigade :-Brigadier A. Roberts,* European Regiment. 1st Bengal European Regiment. 35th B.N.I.

Bombay Column.-Major-General T. Willshire.

Cavalry :—Brigadier J. Scott, 4th Light Dragoons. H.M. 4th Light Dragoons (2 squadrons). Ist Bombay Light Cavalry. Poona Horse (detachment 300 strong).

Artillery :-Brigadier T. Stevenson (in chief command). 3rd and 4th Troops Bombay Horse Artillery. 2-2nd Battn. Bombay Foot Artillery. 1st Co. Golundaz Battalion.

Engineers :---Capt. A. C. Peat.

Infantry :—Brigadier J. G. Baumgardt, 2nd Queen's. H.M. 2nd Queen's Regiment. H.M. 17th Foot. 19th Bombay N.I.

Note.—The 2nd Bengal Light Cavalry was disbanded for cowardice at Parwandara, 2nd November, 1840.

The 2nd Infantry Brigade (Major-General W. Nott), consisting of the 31st, 42nd, and 43rd Bengal N.I., had been left at Quetta and elsewhere.

The 3rd Infantry Brigade never advanced beyond Ferozepore.

The 37th Bengal N.I. from the 4th Brigade was left at Candahar with the 4-2nd Battn. Bengal Artillery; and other units and details not mentioned here were left behind at Quetta, in Scinde or elsewhere.

Casualtics.—The total casualties on the 21st and 23rd July amounted to 18 men killed, 20 British officers and 153 other ranks wounded, 2 men missing.

A large portion of Shah Shujah's Force under the command of Major-General E. H. Simpson was present also and received the medal.

This force was raised in India, officered by British officers (assisted by a sprinkling of British N. C. officers), and paid by the Indian Government; it was intended to form the nucleus of the Shah's future army.

* Father of F.M. Lord Roberts.

²nd and 3rd Cos., Bengal Sappers and Miners.

On 23rd July, 1839, the British *personnel* and units of the force were as follows :---

Shah Shi	ijah's Force, 23. 7. 1839.				
Major-General E. H. Simpson, 19th B.N.I., Commanding.					
Capt. J. Griffin, 24th B.N.I., A.D.C.					
Capt. T. McSherry, 30	oth B.N.I., Brigade-Major.				
Horse Artillery	Capt. W. Anderson, Ben. Art.				
5	Lieut. G. L. Cooper, " "				
	Lieut, F. Turner,				
ıst Cavalry	Capt. J. Christie, 3rd Ben. L. C.				
2nd Cavalry	Lieut. W. Anderson, 59th B.N.I.				
-	Lieut. D. Gaussen, 42nd B.N.I.				
1st Infantry	Capt. J. D. D. Bean, 23rd B.N.I.				
·	Lieut. P. Nicholson, 28th B.N.I.				
	SergtMajor W. Mathews.				
2nd Infantry	Capt. C. G. Macan, 16th B.N.I.				
-	Lieut. J. Hoppe, 16th B.N.I.				
	SergtMajor T. Smith.				
3rd Infantry	Capt. J. H. Craigie, 20th B.N.I.				
	Lieut. R. McKean, 17th B.N.I.				
	SergiMajor N. McDoudd.				
4th Infantry (Ghoorkas)	Capt. I. H. Handscomb, 26th B.N.I.				
	Lieut. T. E. Moorhouse, 35th B.N.I.				
	SergtMajor R. Young.				
5th Infantry	Capt. J. Woodburne, 44th B.N.I.				
	Lieut. J. K. Spense, 20th B.N.I.				
	SergtMajor W. Fitch.				
Commissariat Agent	Capt. H. Johnson, 26th B.N.I.				
Medical Establishment	Surgeon J. Forsyth, Ben. Med. Est.				
	Asst. Surgeon G. Rae.				
	,, ,, C. Mackinnon.				
	,, ,, H. Baddeley.				
The force was increased	to a total strength of				
2 troops H	lorse Artillery.				
-	*				

Mountain Train.

A corps of Shah's Own Artillery.

A battalion of Sappers & Miners.

2 regiments of Cavalry.

6 battalions of Infantry.

The British *personnel* of officers and N.C. officers was increased also. The fate of the contingent was as follows :--

The 4th Infantry was destroyed at Charikar in November, 1841, particulars of which are given below.

The 6th Infantry was destroyed in the retreat from Cabul, together with half the corps of Sappers & Miners, half the Mountain Train, , and the small corps of Shah's Own Artillery.

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The 3rd Infantry was taken on to the strength of the Bengal Army.

The 5th Troop, 1st Brigade, Bengal Horse Artillery, was formed from the Shah's Horse Artillery, and the 7th and 8th Companies, Bengal Sappers & Miners, from the remnants of the Shah's Sappers & Miners in 1842. The remaining corps were disbanded.

The commanding officers of the force at the end of 1841 were as follows :---

Brigadier T. J. Anquetil, Commanding.
Horse Artillery.—Capt. W. Anderson.
rst Cavalry.—Capt. J. Christie.
and Cavalry.—Capt. W. Anderson.
Mountain Train.—Capt. J. B. Backhouse.
Shah's Own Artillery.—Lieut. R. Warburton.
Sappers & Miners.—Capt. G. Broadfoot.
rst Infantry.—Capt. J. Griffin.
and Infantry.—Capt. J. H. Craigie.
4th Infantry.—Capt. J. Woodburne.
6th Infantry.—Capt. P. Hopkins.

No medal was given for the assault and capture of Khelat (Baluchistan) on 13th November, 1839, although it is borne as a distinction on the colours of the regiments engaged; and occasionally an unofficial bar engraved "Khelat" is found on a Ghuznee medal.

The troops detached for this service (under the command of Major-General T. Willshire) were :---

2 guns 3rd Troop, Bombay Horse Artillery. 4 guns 1st Troop, Shah's Horse Artillery. Detachment Bombay Engineers & Sappers. 2 rissalas 4th Local Horse (Skinner's). H.M. 2nd and 17th Foot (343 and 400 strong). 31st Bengal N.I.

Casualties .-- 31 killed and 107 wounded.

After the surrender of Dost Mahomed the Army of Occupation was largely reduced, the returning corps marching back to India through the Khyber Pass which had now been opened. The remaining garrison was scattered throughout Afghanistan, at Candahar, Khelat-i-Ghilzie, Ghuznee, Cabul, and Charikar.

Continual desultory fighting had continued throughout 1840–1, but the garrison was being further reduced by the marching of Sale's brigade from Cabul toward India, when the storm burst in October, 1841, sweeping away the garrisons of Cabul, Charikar and Ghuznee, and driving Sale's brigade to take refuge in Jellalabad. In Southern Afghanistan Khelat-i-Ghilzic held out, and at Candahar Nott kept the field the whole winter, though all communications with India were cut.

The story of the unfortunate results of the first attempts to relieve Jellalabad by Brigadier Wild, and to reinforce Nott at Candahar by Major-General England are well known, as also the second successful efforts by Pollock and England respectively. Jellalabad was relieved by Pollock on 16th April, 1842, nine days after the famous sortie of 7th April, and England reached Candahar on the 10th May. After three months of indecision the Government of India approved Pollock's plans for an advance on Cabul and for Nott's " retirement " to India viâ Cabul and the Khyber Pass. The subsequent operations of both Generals were entirely successful; and it only remains to enumerate the various corps who took part in the first disasters and subsequent successes.

Troops Destroyed at Charikar, November, 1841.

- The 4th Shah's (Ghoorka) Infantry, under Capt. C. Codrington, and a detachment of the Shah's Own Artillery.
- Only the Political Officer (Major E. Pottinger), one officer of the 4th Shah's Infantry (Ensign J. C. Haughton) and one Ghoorka, succeeded in escaping to Cabul; one or two other natives escaped independently and 165 Ghoorkas were rescued in 1842 by Haughton, after Pollock's advance to Cabul.

Troops Destroyed near Cabul, January, 1842, under Major-General W. G. K. Elphinstone.

The numbers given below are the approximate strengths of the corps on commencing the retreat from Cabul, 6th January, 1842.

- 1-1st Brigade Bengal Horse Artillery (90 men, 6 guns), Capt. T. Nicholl.
- Half Shah's Mountain Train (3 guns, 30 men), Lieut. C. A. Greene, Bengal Artillery.
- Shah's Own Artillery, Lieut. R. Warburton,* Bengal Artillery.

Half Shah's Sappers (240 men), Lieut. W. Bird, 30th Mad. N.I.

Detachment Bengal Sappers & Miners (20 men) attached to the A.O.M.G.

2nd Shah's Cavalry (500 men), Capt. W. Anderson, 59th B.N.I.

5th Bengal L. Cavalry (260 men), Lieut.-Colonel R. E. Chambers.

Det. 1st Irregular Cavalry } Skinner's Horse (140 men).

- The late Envoy's Escort (70 sabres).

H.M. 44th Foot (600 men), Major W. B. Scott.

5th Bengal N.I. (700 men), Major S. Swayne.

37th " " (600 men), Major C. Griffiths.

54th (650 men), Major W. Ewart. ,, ,,

6th Shah's Infantry (600 men), Capt. P. Hopkins, 27th B.N.I., and details of other corps.

* Father of Colonel Sir R. Warburton, K.C.I.E., Political Officer, Khyber Pass, 1879—1897.

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Colonel J. Shelton, 44th Foot, was acting as Brigadier, and Brigadier T. J. Anquetil commanded Shah Shujah's force.

The casualties during the three months preceding the retreat had been very heavy; 101 British officers were killed in and near Cabul between 12th October, 1841, and 14th January, 1842.

Major-General Elphinstone died in captivity.

N.B.—Pollock recovered in September, 1842, 34 British officers, 12 ladies, 22 children, 1 warrant officer, 7 men of the 13th Foot, 38 men of the 44th Foot, 6 Europeans of the Bengal Horse Artillery, 2 European clerks, and many hundreds of Sepoys and followers.

Troops Destroyed at Ghuznee, March, 1842.

27th Bengal N.I., Lieut.-Colonel T. Palmer.

Six British officers of this regiment (including the future hero, John Nicholson) were recovered by Pollock, and 327 Sepoys by Nott in September near Ghuznee.

From the above it may be seen that the popular statements of the British losses are greatly exaggerated. The total number of the troops (British and Native) destroyed in Afghanistan during this period may be reckoned at 900 Europeans and 4,500 Natives at the outside, of whom nearly all the Europeans and 3,600 Sepoys were killed at Cabul and in the retreat towards Jellalabad. These numbers do not, of course, include the followers of the army, large numbers of whom perished or were taken prisoners and sold into slavery.

JELLALABAD.

Defence under Sir R. Sale, 12th November, 1841, to 16th April, 1842 :---

Garrison :----

H.M. 13th Foot.

5th Bengal Light Cavalry (1 squadron).

and Shah's Cavalry (I rissala).

2-6th Battn. Bengal Artillery.

Two men of the I-Ist Brigade Bengal Horse Artillery.

Half the Shah's Mountain Train.

Half the Shah's Sappers (Broadfoot's).

35th Bengal N.I.

- Detachment 6th Shah's Infantry (doing duty with Mountain Train).
- Sergt.-Major of 37th B.N.I. (who escaped from Cabul), and details.

Followers-682 armed, 630 unarmed.

Casualties, 22nd February, 1842, to 7th April, 1842 :---

I British officer and 35 men killed.

7 ,, officers and 141 other ranks wounded.

Four guns were recaptured in the sortie of the 7th April.

For their gallantry during the war in Ava, 1824-6, and in the defence of Jellalabad, the 13th Foot were given the title of "Prince Albert's "Light Infantry, and their facings changed from yellow to blue.

A large number of the Native officers of the 35th B.N.I. were recommended for the Orders of Merit, and British India for their gallantry.

Jellalabad.—Medals were issued to the surviving members of the garrison on December 14th, 1842, prior to their triumphal entry into Ferozepore. All these medals were unnamed. The dies are at the Calcutta Mint and are now cracked. An "unofficial" die has been made by some unknown person; but the difference can be easily detected.

In his order dated 17th December, 1842, Lord Ellenborough stated that medals would be sent in due course to the relatives of soldiers of the garrison who had deceased on or after April 7th, 1842; and as in his letter to the Court of Directors dated 19th October, 1842, he had asked for a new medal to be struck, it is almost certain that the relatives of deceased soldiers received the second or "Flying Victory" medal, as it is called. A considerably larger number of "Flying Victory" medals were issued than is generally supposed.

Medals seem to have been struck off and impressed for most of the officers of the garrison, although some never applied to have their original medals exchanged. The 13th Foot sailed from India for England in December, 1844, leaving behind 446 men who had exchanged into other regiments serving in the country. Some time after their arrival home a return was sent in giving the names of those men still in the regiment who had not *yet* exchanged their medals. This list comprises nearly 200 men, and medals were struck and impressed for all of them, mounted with the China 1842 suspender. About 50 of these men are noted as having exchanged their medals *after* the date of this return, and 139 were sold to a Mr. Nash in 1860 by the India Office.

Many men of the 13th Foot wore the 2nd Jellalabad medal with a parti-coloured crimson and blue ribbon, but the authority for this is not known.

The actual number of men entitled to receive the Jellalabad medal was 2,596. The exact distribution of this number is not available, but the following is a very close approximation :---

H.M. 13th Foot			••	780
5th Bengal L. Cavalry .	•		••	160
2nd Shah's Cavalry				100
2-6th Battn. Bengal Artillery			••	150
Shah's Mountain Train		••		65
Shah's Sappers (Broadfoot's)			• •	400
35th Bengal N. Infantry .	•	••		900
Details				41

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A few "Flying Victory" medals exist with the obverse of the China 1842 medal, bearing the legend "Victoria Regina" instead of "Victoria Vindex." It can be stated *definitely* from the examination of records that in some cases such medals were late re-issues, and it is probable that all were; and this remark applies to the few similar medals given for Cabul, Candahar, etc.

With regard to the "Candahar" medal it is to be noted that the dies are kept in India. This fact seems to have been unknown at the Royal Mint, for to meet the demand for two re-issues in later years (one an officer's and the other a private's medal) two medals were struck from the "Candahar, Ghuznee, Cabul" die, and the words "Ghuznee, Cabul," erased. I am not aware that either of these medals have been met with by collectors. No other re-issues of "Candahar" medals appear to have been made in England.

At least two dies were used for the "Candahar" medals, as minute differences can be seen by a careful observer.

CABUL, 1842.

Troops that formed " The Avenging Army " under Major-General G. Pollock's Command.

Cavalry :-Brigadier M. White, 3rd L. Dragoons.

H.M. 3rd Light Dragoons.

1st and 10th Bengal Light Cavalry.

3rd (Tait's) Irregular Cavalry.

Artillery :---Major H. Delafosse, Bengal Artillery.

3-1st Brigade and 3-2nd Brigade Bengal Horse Artillery.

2-2nd Battn, and 4-6th Battn. Bengal Artillery.

Mountain Train (2 guns).

" E " Co. Syce Drivers.

Engineers:—Capt. F. Abbott, Bengal Engineers, Chief Engineer.

5th Co. Bengal Sappers & Miners.

A corps of Pioneers (Lieut. F. Mackeson).

Infantry Division :---Major-General J. McCaskill, 9th Foot.

*2nd Brigade :-Brigadier J. Tulloch.

H.M. 9th Foot.

26th and 60th Bengal N.I.

5th Co. Bengal Sappers & Miners.

- 3rd Brigade :-Brigadier C. F. Wild.
 - 30th, 53rd, 64th Bengal N.I.
- 4th Brigade :-Brigadier T. Monteath, 35th B.N.I. H.M. 31st Foot.
 - 6th and 33rd Bengal N.I.

• For 1st Brigade see below.

A Sikh contingent with Capt. H. M. Lawrence,* Ben. Art., and Capt. J. Ferris' Afghan Jezailchis co-operated.

N.B.—(a). The Brigadier of the 4th Brigade was commanding his regiment, 35th N.I., in Jellalabad. (b). The 31st Foot arrived a good deal later than the 9th Foot, and did not share in the forcing of the Khyber Pass and Relief of Jellalabad in April. (c). Only the 3rd Company of the 6th B.N.I. received the medal; while of the 33rd B.N.I. only two companies were at the forcing of the Khyber Pass and Relief of Jellalabad.

After the Relief of Jellalabad on 16th April, the garrison was amalgamated with Pollock's force, and H.M. 13th Foot, the 35th B.N.I., Broadfoot's Sappers, and the Khyber Rangers (Capt. H. P. Burn, 1st B.N.I.) formed the 1st Brigade under Sir R. Sale's command.

The only unit of the Jellalabad garrison that did not advance with Pollock (other than details) was the remnant of the 2nd Shah's Cavalry. This corps did not receive the Cabul medal; nor was it granted to the friendly Afghan levies that accompanied Pollock, or to Mackeson's semi-civil corps of pioneers: only the British officers of these corps received the medal.

Troops at CANDAHAR, January, 1842, under Major-General W. Nott.

1st (Bengal) Irregular Cavalry (Skinner's).

ist Shah's Cavalry.

1st and 2nd Troops Shah's Horse Artillery.

Half 4-2nd Battn. Bengal Artillery.

3-1st Battn. Bombay Artillery.

H.M. 40th Foot.

2nd, 16th, 38th, 42nd, and 43rd (six companies only) Bengal N.I.

1st, 2nd, and 5th Shah's Infantry.

Garrison of KHELAT-I-GHILZIE, under Capt. J. H. Craigie, 3rd Shah's Infantry.

Half 4-2nd Battn. Bengal Artillery.

Det. Bengal Sappers and Miners (from the 2nd and 3rd Companies).

3 companies 43rd Bengal N.I.

3rd Shah's Infantry.

Nott relieved the garrison of Khelat-i-Ghilzie on May 26th and brought it back to Candahar.

^o Later Sir Henry Lawrence, K.C.B., killed at Lucknow.

Reinforcements from INDIA, under Major-General R. England, which arrived at Candahar on 10th May, 1842.

1st Troop Bombay Horse Artillery.

3-2nd Battn. Bengal Artillery.

Half C Co., Madras Sappers and Miners. .

3rd Bombay Light Cavalry.

Poona Irregular Horse (one rissala).

H.M. 41st Foot.

25th Bombay N.I.

Bombay L. Infantry Battalion (probably formed from the light companies of the battalions stationed in Upper Scinde, viz. :--6th, 8th, 20th, 21st and 25th Bombay N.I.).

N.B.—105 men of H.M. 41st Foot and details did not arrive at Candahar till 27th June, 1842.

Troops that returned to India, viâ Quetta, under Major-General R. England, on 10th August, 1842.

1st Troop Shah's Horse Artillery.
Half the 4-2nd Battn. Bengal Artillery.
1st Shah's Cavalry (2 rissalas).
Poona Irregular Horse (1 rissala).
1st, 2nd, and 5th Shah's Infantry.
25th Bombay N.I.
Bombay Light Infantry Battn.
Sick and details of other corps.

Troops that Marched from CANDAHAR on GHUZNEE and CABUL, with Major-General W. Nott, 10th August, 1842.

Artillery :--Major F. S. Sotheby, Ben. Art., Commanding. 1st Troop Bombay Horse Artillery. 2nd Troop Shah's Horse Artillery. 3-2nd Battn. Bengal Artillery. Det. 4-2nd Battn. Bengal Artillery doing duty with the 3-2nd Battalion. 3-1st Battn. Bombay Artillery.
Engineers :--Major E. Sanders, Bengal Engineers, Chief Engineer.

Det. Bengal Sappers & Miners (from the 2nd and 3rd Cos.). Half C Co., Madras Sappers & Miners.

Cavalry:—Capt. C. H. Delamain, 3rd Bombay Light Cavalry, Commanding.

1st (Bengal) Irregular Cavalry.

3rd Bombay Light Cavalry.

1st Shah's Cavalry (less 2 rissalas).

Infantry :---

Ist Brigade :—Brigadier G. P. Wymer, 38th B.N.I. H.M. 40th Foot.
16th and 38th Bengal N.I. 3rd Shah's Infantry.
2nd Brigade :—Brigadier L. R. Stacy, 43rd B.N.I. H.M. 41st Foot.
2nd, 42nd, 43rd Bengal N.I.

N.B.—In the cavalry action at Oosman-Khan-ki-karcz, on 28th August, 1842, the Subadar-Major of the 3rd Bombay L. Cavalry, "who wore the medal for Seringapatam," was killed.

On his march from Candahar to Cabul, Nott captured ten guns, and recovered 327 men of the 27th Bengal N.I., many of whom did duty with other corps thenceforward.

The casualties in action sustained by Nott's force, between 1st January, 1842, and the 17th September, the date of his arrival at Cabul, were some 70 killed (including 3 British officers) and 330 wounded.

For their gallantry in this campaign the 2nd and 16th Bengal N.I. were made Grenadicrs, and the 38th, 42nd and 43rd Bengal N.I. were constituted Light Infantry.

For their share in the defence of Khelat-i-Ghilzie the 3rd Shah's Infantry was brought on to the strength of the Bengal Army as "The Regiment of Khelat-i-Ghilzie," and still exists as the 12th Khelat-i-Ghilzie Regiment.

Jellalabad, 1842.—First Medal.

1.5-in. diameter, silver.

Obverse.--A mural crown, " JELLALABAD."

Reverse.-The date " VII. April 1842."

Mounting.—A straight silver brooch with a loop in the centre engaging a small silver ring from which the medal is suspended.

N.B.—This original mounting, being rather weak, is not often seen.

Second Medal.

1.4-in. diameter, silver.

Obverse .-- Crowned head of Queen Victoria.

Legend " Victoria Vindex."

Reverse.--Victory flying over the fort of Jellalabad.

Inscription, " JELLALABAD VII April MDCCCXLII."

Mounting.—German silver bar, secured to the medal by two concealed pins.

N.B.—This also is a weak mounting, and not often seen.

Khclat-i-Ghilzie, 1842.

1'4-in. diameter, silver.

Obverse.—A shield inscribed "KHELAT-I-GHILZIE," surrounded by a laurel wreath, and surmounted by a crown.

Reverse.—A military trophy, "INVICTA MDCCCXLII." Mounting.—A steel bar and clip.

Candahar, Ghuznee, Cabul, 1842.

Four medals, 1'4-in. diameter, silver.

Obverse.—As for the 2nd Jellalabad medal.

Reverse.—(a). "CANDAHAR 1842" within a wreath, surmounted by a crown.

- (b). "CABUL 1842" within a wreath, surmounted by a crown.
- (c). "CANDAHAR GHUZNEE CABUL 1842" within a wreath surmounted by a crown.
- (d). "GHUZNEE" "CABUL" each within a wreath: a crown above; "1842" below.

Mounting.—Steel bar and clip.

The ribbon for all these medals, including the Jellalabad and Khelat-i-Ghilzie medals, is the military ribbon of India, I_4^n in. wide. This ribbon was designed by Lord Dalhousie for the Jellalabad medal, crimson shading into yellow, and yellow into blue. It was intended to be the "military" ribbon of India, just as the crimson ribbon with blue edges was the "military" ribbon of Great Britain; and as such was worn with the Scinde and Gwalior medals of 1843. It was revived as the ribbon for the bronze star granted for the march from Cabul to Candahar, 1880, but in a narrower width. Many men of the 13th Foot wore a parti-coloured crimson and blue ribbon with the second Jellalabad medal, but the authority for this is not known.

Khelat-i-Ghilzie.

932 medals in all were struck, as follows :-Staff and details ... 7
4-2nd Battn. Bengal Artillery..86 (of whom 1 officer and 43 men 194 were Europeans).
Bengal Sappers and Miners 23 (Details from Nos. 2 and 3 Companies).
43rd Bengal N. Infantry ... 247 (3 companies).
3rd Shah's Infantry ... 569

With few exceptions most of the above received the "Ghuznee-Cabul" medal as well.

The following list gives the number of medals struck for Major-General Nott's force :---

				Ca G	ndahar, huznee,	Ghuznee,	
				1	Cabul,	Cabul.	Candahar.
Staff a	nd det:	ails	••	••	23	3	5
H.M. 4	oth Fo	ot	••	••	669	3	64
H.M. 4	ist Fo	ot	• •	••	494	105	26
ist Tro	oop, Bo	ombay H	. Artil	lery		138	
3-1st B	attn.]	Bombay	Artille	ery	91	25	2
3-2nd]	Battn.	Bengal A	Artiller	y	17	87	I
4-2nd]	Battn.	Bengal A	Artiller	y.,	10	38	28
Ist Tro	op, Sh	ah's H.	Artille	ry			127
2nd Tr	oop, S	hah's H.	Artille	ery	121		I
Bengal	Sap	pers and	d Mir	iers			
(deta	ails 2nd	i and 3rd	Cos.)		3	24	
Madras	s Sapp	ers & Mi	ners, C	Co.	I	28	
3rd Bo	mbay	Light Ca	valry			354	
Ist Ber	ngal Ir	regular (Cavalry	y	282	17	17
rst Sha	aĥ's Ca	valry	••	••	469	I	198
and Be	engal N	N.I.	••		893	4	65
16th	-				795	4	3 1
38th	,,	**	••	••	854	5	107
42nd	,,	,,			852	I	79
43rd	,,	,,			637	169	37
Ist Sh	ah's In	fantry		• •			640
2nd				••			592
3rd	,,	,,		• •		521	<u> </u>
5th	**	,,	••	••		·	595
		Totals		-	6.211	1.527	2.615
			•••		-,	-,,,-,	

It is to be noted that this list does not include the "Candahar" medals to which detachments from the Poona Irregular Horse, 25th Bombay N.I. and the Bombay Light Infantry Battalion were entitled. The omission seems to have been accidental, owing to their not having come under Nott's direct personal command, and correspondence ensued on this subject. The actual number of "Candahar" medals issued to them later on is not discoverable, but the claim was allowed.

A "Candahar" medal was issued later on to Sir R. England, who scarcely came within the terms of Lord Ellenborough's order of 4th October, 1842, authorizing the medal; and his first application for it seems to have been rejected.

Of the 64 "Candahar" medals struck for the 40th Foot, 42 were for the relatives of deceased officers and soldiers, and 22 for sick, etc., who returned to India from "Candahar" via Quetta. In the same way most of the "Candahar" medals struck for the 41st Foot were for the relatives of deceased soldiers.

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The 105 men of that regiment who received the "Ghuznee-Cabul" medal arrived in Candahar late in June, some seven weeks after the main body: as also did the two officers and one man (three in all) of the 40th Foot who received the "Ghuznee-Cabul" medal. The late Field Marshal Sir N. B. Chamberlain and his brother, General Sir C. T. Chamberlain, served as subalterns with the 1st Shah's Cavalry, one brother receiving the "Candahar-Ghuznee-Cabul" medal, and the other that for "Candahar."

The distribution of the "Cabul " medals struck is given below :---

Staff, etc.	•• ••	••			38
3-1st Brigade	Bengal H. Art	illery	• •		129
3-2nd ,, ,	, , ,	•	••		139
2-2nd Battn. I	Bengal Artiller	у		•••	97
2-6th "	,, ,,		••	۰.	123
4-6th ,,	,, ,,		••	• •	109
Mountain Trai	n	••	••	۰.	56
E Company Sy	ce Drivers	••		••	153
H.M. 3rd Ligh	t Dragoons	••	••		489
1st Bengal Lig	ht Cavalry	••	••	••	453
5th ,, ,,		••	••	۰.	142
10th ,, ,,	*1	••	••	••	498
3rd Tait's) Ir	regular Cavalr	у	••		739
H.M. 9th Foot	••	••	••	• •	831
H.M. 13th Foo	ot	••	••	• •	745
H.M. 31st Foo	t	••		••	826
6th Bengal N.I	I. (3rd Co. onl	y)	••		112
26th " "	••	• •	••	••	1,004
30th ,, ,,	••	• •	••	۰.	920
33rd ,, "		••	••	••	947
35th ,, ,,		• •	••	• •	837
53rd ,, ,,		• •			915
60th " "	••	••			1,012
64th ,, ,,	••	• •	••	• •	927
5th Company,	Bengal Sapper	's and	Miners	•••	125
Shah's Sappers	(Broadfoot's)				375

Total

.. 12,741

The numbers of medals struck (especially "Candahar" medals) may surprise a good many collectors, but the comparative rarity is to be gauged by the number of *European* recipients, which may be estimated approximately as follows :---

Khelat-i-Ghilzie		••		55
Candahar	• •	••		130
Ghuznee-Cabul		••		360
Jellalabad		••		800
Candahar-Ghuz	nee—	Cabul		I,400
Cabul	••		• •	3,500

All the medals for this campaign (except the 1st Jellalabad medals) were engraved before issue, with the exception of many of those given to the Shah's troops, and many officers' medals.

The total number of medals was therefore approximately 27,000, viz. :--

Jellalabad	••	••	••	2,596
Khelat-i-Ghilzie	••	• •	••	932
Cabul	••	• •	•••	12,741
Candahar	••	••	••	2,615
Ghuznee, Cabul		••	• •	1,527
Candahar, Ghuzr	nec, C	abul		6,211
			-	
	Tot	al		26,622,

some later claims. The amount of ribbon ordered was 14,000 yards, from which it

appears that half a yard was issued with each medal.

There are few medals that repay careful study in a greater degree than those given for this campaign or to which so much interest is attached.

Engineer Officers who served in Afghanistan, 1839-42.

(a). 1839.

- G. Capt. G. B. Thomson, Bengal Engineers, Chief Engineer.
- G. Lieut, J. Anderson, Bengal Engineers, Surveyor.
- G. " H. M. Durand, Bengal Engineers, Surveyor.
- _____, J. Laughton, Bengal Engineers, Field Engineer (left at Bhukkur as Garrison Engineer).
- Capt. E. Sanders, Bengal Engineers, Sappers and Miners (sent from Candahar on mission to Herat).
- G. Lieut. J. L. D. Sturt, Bengal Engineers, Sappers & Miners.
- G. " N. C. Macleod, Bengal Engineers, Sappers & Miners.
- G. " R. Pigou, Bengal Engineers, Sappers & Miners.
- G. , J. S. Broadfoot, Bengal Engineers, Sappers & Miners.
- G.K. Capt. A. C. Peat, Bombay Engineers (wounded).
- Lieut. C. F. North, Bombay Engineers, Field Engineer (to Herat with Sanders).
 - G. Lieut. W. F. Marriott, Bombay Engineers, Field Engineer (wounded).
- G.K. Lieut. F. Wemyss (Senior), Bombay Sappers & Miners.
 - J. D. Cunningham, Bengal Engineers, Political Assistant with Colonel C. M. Wade (to Cabul viâ Khyber Pass in 1839).

G. denotes presence at the Storm of Ghuznee, 23rd July, 1839.

K. denotes presence at the Storm of Khelat, 13th November, 1839.

1913.]

exclusive of

(b). 1840-42.

- Lieut. J. S. Broadfoot, Bengal Engineers, killed at Purwandara, 2. II. 40.
 - R. Pigou, Bengal Engineers, killed by explosion at fort gate ,, in Nazian Valley, 24. 2. 41.
 - J. L. D. Sturt, Bengal Engineers, killed in retreat from · ,, Cabul, q. 1. 42.

Defence of Khelat-i-Ghilzic, 1842.

Licut. (Major) R. Lecch, Bombay Engineers, Political Officer, and another Bombay Engineer who was Executive Engineer.

With Major-General Nott, " Candahar, Ghuznee, and Cabul, 1842."

- Major E. Sanders, Bengal Engineers, Chief Engineer.
- Lieut. C. F. North, Bengal Engineers.
 - (Major) R. Leech, Bombay Engineers, Political Officer.
 - T. Studdert, Bombay Engineers. ...

With Major-General Pollock, " Cabul, 1842."

Capt. F. Abbott, Bengal Engineers, Chief Engineer.

.,

- Lieut. J. W. Robertson, Bengal Engineers.
 - A. G. Goodwyn, ,,
 - J. R. Becher, ,, ,,,
 - ,, J.S. Alexander, Bengal Engineers, with Brigadier Wild at the ,, first attempt to relieve Jellalabad (with Pollock later (?)).

Plates.

Ghuznee, 1839, obverse and reverse.

1st Jellalabad, 1842, obverse and reverse.

2nd Jellalabad, 1842, obverse and reverse.

Khelat-i-Ghilzie, 1842, obverse and reverse.

Afghanistan, 1842, 4 reverses, "Cabul," "Candahar—Ghuznec— Cabul," " Ghuznee-Cabul," " Candahar." (Obverse similar to 2nd Jellalabad medal).

(To be continued).



MEDALS



General Sir Edward Pemberton Leach VC KCB KCVO

MEMOIR.

GENERAL SIR EDWARD PEMBERTON LEACH, V.C., K.C.B., K.C.V.O.

EDWARD PEMBERTON LEACH was the second son of the late Lieut.-Colonel Sir George Archibald Leach, K.C.B., R.E.

He was born in Londonderry on the 2nd April, 1847, and was educated at Sir Roger Cholmeley's school at Highgate, passing direct from there into the Royal Military Academy—8th out of a batch of 34—just after having reached the qualifying age of 16. He passed out 5th, obtaining a commission in the Royal Engineers in April 1866.

His life at Chatham was that of most other young R.E. officers who are fond of games, society, dancing and other amusements, and although he did not play cricket for the Corps, he played a good deal for the S.M.E., and while there was elected a member of the M.C.C.

He left Chatham in September, 1868, and embarked for India in the following November, proceeding to join the Bengal Sappers and Miners, who at that time were employed in roadmaking in the hills below Chakrata.

In March, 1869, he was sent to command one of the detached companies at Rawal Pindi, where he remained for a year, employing his spare time in learning the language, sketching and schooling his ponies over a "jump" course which he had made in the compound of the bungalow he shared with some artillery friends. He was fortunate in purchasing a very good arab, which later on won him several races.

Having applied to be appointed to the P.W.D. he was sent from Rawal Pindi to Morar, where large barracks were being constructed for British troops, and worked there for a year or so, but he found the barrack work monotonous and was glad to accept an appointment on the Survey offered him by Colonel Thuillier, the Surveyor-General.

Almost immediately on being gazetted, he joined the Survey party detailed for the Cachar Column, under General Bouchier, R.A., about to be sent to punish the Lushais—who had been raiding the tea plantations, R. G. Woodthorpe being the other assistant. From a purely Survey point of view the expedition was not so successful as had been hoped.

The Lushais gave more trouble than was expected. Consequently the range of Survey operations was much restricted. However the output of work was considered very creditable under the circumstances and he received the thanks of the Secretary of State for India and also of the Government of India, together with the Frontier Medal and Clasp.

By the 28th April, 1877, he and his friend Woodthorpe were back in Shillong.

From there after two months at Mussoorie he proceeded to join the Survey party under Holdich in Central India.

The following story told by Holdich is typical :----

" Edward Leach was with me as assistant in Central India, 1872-73. Being naturally gifted with great energy and boundless activity he was almost an ideal assistant. He would have quite reached that ideal but for his passion for sport and the temptation which beset him on all sides in such a country as Central India. We had a good time there and it is with reference to that good time that I am tempted to tell just one ' tiger ' story because it stamped in my mind once and for all both the character and quality of Edward Leach. I had arranged a tiger beat and had called in Leach from a distant camp to join me. The scene of the beat was a line of jungle fringing a river. We took it turn and turn about for one to watch the exit at certain partially cleared spaces on the river bank while the other came through with the two elephants and beaters to prevent any break back. It was Leach's turn to watch the exit-mine to manœuvre the elephants. Soon I heard two shots ahead-just two and no more. Hurrying up I came upon Leach seated in a most insecure position, his face beaming with delight as he exclaimed ' I've shot two tigers.' It was now my business to find those two tigers. One presented no difficulty. There was a rush and a skirmish and a large tigress rolled over into the river, where I left her. Number two gave the trouble. I searched till I was sick of it. At last I ventured to suggest to Leach that he must have seen the same tiger twice. This was too much for him. His language was explosive and he remarked that if I did not believe him he would never come shooting with me again. As he had come at my invitation and had been let off a day's work with the theodolite, I naturally felt a bit hurt and suggested that as he was so certain about it he had better show me where he had last seen the tiger. It was a foolish challenge which he accepted at once. He bounced down, crawled under a thick bush, and exclaimed "This is whereabouts he was and by God here he is still." What was I to do? The bush was too thick to see into from the howdah. Nothing was to be seen of Leach except his two legs sticking out. To have fired at random into the middle

of the bush would have been sheer madness, for, as it happened, the tiger was quite alive, not much damaged by the first shot and crouched with his head about a yard or so from Leach's. Just one extension of his great big paw and he could have smashed Leach's head in like a nutshell. There is not much doubt that he would have done it too had Leach backed out an inch. Soon a voice came up from the bush 'What shall I do now?' I said 'Pull up your rifle and shoot him.' Slowly—slowly, inch by inch, Leach pulled his rifle up by his side till he got it to the tiger's head and he then literally blew his brains out whilst they were still staring into each other's eyes. Then he backed out and with his face expanding with a broad smile he remarked "I told you he was there." "

On completion of their camp work the party returned to Mussoorie and civilization for the hot weather.

He had one more cold weather in Central India with Charles Strahan, an ardent sportsman, and then took a run home on three months' leave. On his return he joined a party in Rajputana under George Strahan, paying a visit to Roorkee *en route* to see old friends and have a day's pig-sticking.

During that cold weather he met Oliver St. John, R.E., whom he was destined to see agreat deal of later on at Kandahar. April, 1875, found him in Simla, where he was most successful with his "stable" at the horse show, taking the first prize in the classes for arabs and ponies, the Viceroy being second in the one case and the Commander-in-Chief in the other. From 1875—1877 he alternated between Rajputana and Simla, taking furlough home in November of the latter year.

He remained at home until October, 1878, and then returned as Private Secretary to the late Sir James Caird, who was deputed from the Land Office as Famine Commissioner.

The second Afghan War, however, now broke out, and resigning his appointment with Sir James Caird, he joined Tanner's Survey Party in the Khyber. Sir James, in writing to his father, said: "He has been most useful to me in every way. I have found him a most pleasant friend and zealous assistant. I shall miss him very much. I think your son knows everybody in India."

He was promoted Captain at this time, which, as it turned out, was most opportune. With his wonted energy he took every opportunity of prosecuting his Survey work, and joined the various small punitive expeditions against offending tribesmen—including the one into the Bazar Valley under General Tytler. His last expedition, and one which was to prove an eventful one for him, was a reconnaissance into the Shinwari country. One day while surveying in the hills he was attacked by a large body of tribesmen. His escort consisted of only 40 men of the 45th Sikhs, under Barclay, and 30 sowars of the Guides Cavalry, under Hamilton (subsequently killed with Cavagnari in Cabul). There was nothing for it but to retire. Hamilton pushed on ahead, joined his horses which had been left some little distance back and reached the plain in safety.

Leach and Barclay brought up the rear and for 2 miles everything went well, but when they got close to the plain the tribesmen closed round and a rush was made by a party of them. This Leach was able to check—emptying his revolver in their faces; but then Barclay was wounded, mortally as it turned out, and the enemy, seeing this, again closed up and prepared for another rush. Leach, seeing that the moment was a critical one, called on his men to fix bayonets and with a few men charged back to meet the tribesmen and hold a small knoll—hoping to give time for the men who were carrying Barclay to push on. A hand-to-hand encounter followed in which Leach floored one man with the butt end of a rifle he had picked up, receiving a cut on the left arm in exchange. A Sikh then gave him a handful of cartridges, with which he shot three more one after the other—and being well backed up by his men, the enemy took to their heels and fled.

The Shinwaris themselves rendered him a flattering tribute when, later on, they told another Survey officer that had it not been for the "Sahib" they would have killed the whole detachment.

For his gallantry on this occasion he was awarded the Victoria. Cross which he received at the hands of Queen Victoria, together with Reginald Hart, on 9th December, 1879. He was also mentioned in despatches and received the brevet of Major.

The wound in his arm took longer to heal than was expected, so on the recommendation of the medical authorities he went home, having in consequence to decline the appointment of Private Secretary to Sir Robert Egerton, Lieut.-Governor of the Punjab. This injury unfortunately resulted in a permanent stiffness of the left elbow joint, though this never seemed to trouble him much.

February, 1880, found him on his way to Kandahar for Survey work under St. John, who was in political charge there. In June he made a successful reconnaissance with 150 men to Giriskh, on the Helmand, 35 miles west of Kandahar, gaining a knowledge of the country which subsequently proved most useful.

On the 4th July he left Kandahar again for Giriskh with a force under General Burrows to arrest the march of Ayub-Khan, who was advancing on Kandahar.

On the 27th July, 1880, the Battle of Maiwand was fought. What followed is a matter of history. The British force was totally defeated, and retreated in dire confusion in the direction of Kandahar -42 miles away—a mere struggling mass half dead with thirst and fatigue.

The part taken by Leach in this action is described in Colonel Hanna's book, The Second Afghan War. The latter writes :: "Great emergencies are parents of great deeds, but in the published and unpublished accounts of the battle and retreat, two names stand out pre-eminently, those of Major E. P. Leach, v.c., and the Roman Catholic Chaplain, Father J. Jackson. No man in the force knew the district in which the Battle of Maiwand was fought, and through which the retreat to Kandahar was conducted, so well as Leach, and no man could have turned that knowledge to better account. From the moment he succeeded the late Sir John Slade, K.C.B., as orderly officer to General Burrows he was that General's right hand, and when the course of events separated the two, on his own initiative he carried help and guidance wherever help and guidance were most needed and he vied with Slade in succouring the wounded and encouraging the downhearted.

Slade in describing the retreat wrote : "It certainly was a terrible sight—men laid down and refused to be carried, helped or assisted in any way—only asked to be allowed to die. Again and again did Leach and I, who were almost the last in, implore and insist upon their persevering a little longer."

Leach's horse had been wounded during the action, but managed to carry him all through that day and the 42 miles retreat afterwards. On reaching the supporting troops under General Brooke, which had been sent out to cover the retreat, Leach with others volunteered to return along the line of retreat to bring in any wounded, or men who had succumbed through fatigue, and save them from being cut up by the villagers who followed up the retreating force.

On his return to Kandahar he was appointed Brigade-Major, R.E., and worked indefatigably during the siege in the defences of the place.

In writing about the disastrous sortie on the 16th August under Brooke he bore testimony to the gallantry of Turner-Jones and Waller of the R.E., both of whom he said thoroughly deserved the V.C. and for whom several times later on he tried unsuccessfully to get it, though thay had been recommended for it locally—and whom, when they brought in a wounded man, were heartily cheered by all the men on the ramparts.

On the arrival of Roberts' force he prepared a large scale map of the country over which it was evident the coming battle would be fought and was with that General during the fight. After the defeat of Ayub-Khan, he remained at Kandahar under General Hume till the following May, before taking over charge of the Poona Survey Party, with Hobday of the Indian Staff Corps as his assistant.

From Poona he was transferred to Calcutta, and after spending a very pleasant cold weather there obtained six months' leave to England. For his services at Maiwand and during the retreat, Leach was given the brevet of Lieut.-Colonel, Slade and he being the only two who received rewards for that action.

He was also three times mentioned in despatches and received the thanks of the Government of India for his Survey work and the medal with clasp.

It was in October of that year (1882) that he met his wife, eldest daughter of Sir Thomas Bazley, Bart., of Hatherop Castle, Gloucestershire, and their marriage took place in the following January.

At the end of his six months' leave he reverted to home service and joined at Chatham as a Captain, R.E., but a Lieut.-Colonel by brevet.

From Chatham he went to Shorncliffe, picking up the 24th (Field) Company, R.E., at Aldershot.

At Shorncliffe he spent two years and then embarked with his company on the 18th February, 1885, to join the force under Sir Gerald Graham for field service at Suakim, having with him the following officers:—Capt. Dickinson, Lieut. McCarthy, Lieut. Godby, Lieut. Buckland, Surgeon Cree, A.M.D.

Colonel Bevan Edwards was the C.R.E. of the force and Capt. Smith-Rewse the Brigade-Major. From the moment they landed the 24th Company were busily employed on various works connected with camps, construction of field redoubts, railway work and water supply, etc., including an expedition to Hasheen to make a fort there—and where there was a small action.

On 22. 3. 85, roo men of the company accompanied the force under Sir John McNeill towards Tamai. On reaching a point 5 miles from Suakim, subsequently called Tofrek, the force halted and proceeded to make zaribas. In the middle of their work without any warning, as far as the 24th Company and the working parties on the northern side were concerned, they were attacked by a large number of Arabs. Everybody rushed to get their arms. Some succeeded, others did not.

A covering party of the 17th Native Infantry at once fell back on the zariba. A portion manned one face, the remainder broke completely through and retreated followed by the Arabs.

The camel drivers, dhoolie bearers and other followers were thus left exposed and in one confused mass followed the native infantry through the zariba, carrying with them a large number of men who might otherwise have been able to form up. The confusion was absolute, but fortunately the Marines held their own, while a rallying square of two companies of the Berkshire Regiment with some 30 R.E. under Godby drove back a vigorous attack of the Arabs and the crisis passed.

Another party of some 20 men, under McCarthy, who were carried

away by the rush through the zariba, subsequently fought their way back and joined their comrades.

The camels all this time were under a cross fire and the majority were shot down, and the R.E. horses would have shared the same fate had they not been cut loose by the drivers under Dickinson's orders. Leach was conspicuous outside the zariba endeavouring to regulate the fire from it, which was endangering the groups outside, at great personal risk to himself, not only from the Arabs, but also from the fire from his own side.

On the 2nd April the company accompanied Sir G. Graham's force to Tamai, but after this the 24th Company had no more fighting. Before leaving Suakim they were inspected by Lord Wolseley who was very complimentary and told them that Sir John McNeill had described their services as "invaluable" and that he was proud to see them turn out so well. Meeting Leach afterwards in Cairo he was again full of praise about his and his company's share in the action and said that he was particularly struck with the way the company pulled themselves together and set to work again directly the fight was over.

Sir Gerald Graham in bidding farewell to the company also alluded in complimentary terms to their conduct at the zariba. Colonel Leach was twice mentioned in despatches, received the Egyptian Medal with two clasps, also the Khedive's Star, and the C.B. for his gallantry at the zariba.

From Suakim the 24th Company was sent to Cairo, and Leach was given the command of a mixed brigade of English and Egyptian troops—with the rank of Colonel on the Staff—at Korosko, a place of some strategical importance, where the desert route from Abu Hamed strikes the Nile.

On arrival there in July, 1885, he at once set to work to get the place into order and into a proper state of defence. He was able to obtain a liberal allowance of ball ammunition with which constant practice in the hills round, and at floating targets in the Nile was carried out. General Grenfell, after having inspected the place, described it as being "in a most creditable state." Leach remained at Korosko until March, 1886, when it was abolished as a command.

After a few months at home he again returned to Egypt, having been appointed to command the English Brigade at Assouan. Here again he found plenty of scope for his energy.

He established a system of octroi and with the funds thus obtained improved the sanitation of the place and built a river wall. He also was energetic in stamping out the illicit liquor traffic carried on by the Greek and Levantine merchants and did a great deal to improve the accommodation for the troops.

While here he won the Egyptian Derby with an arab he had

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bought from Sir George Greaves, late Chief of the Staff to Sir Gerald Graham.

In April, 1887, his command came to an end, and he returned to England, being posted to Plymouth as division officer in charge of the Sound defences, first of all under Colonel Hewett, and then under Colonel Stewart, to both of whom he was senior in Army rank, as he was in fact to most of the commanding officers in the division. Here he spent six years. He had hard work at times, but his life was uneventful and he did not get many opportunities of handling troops except when Sir Richard Harrison, the G.O.C., was able, owing to his seniority, to give him command of one of the opposing forces at the divisional manœuvres.

In April, 1893, he left for Halifax, Nova Scotia, as C.R.E., a station he himself described as a delightful one. The work there was chiefly of the routine order, but there were occasional variations in the shape of night attacks by the fleet on the forts and endeavours by the torpedo boats to slip past the guns.

As Halifax at that time was both a naval and military station, the social life was a gay one and of course there was most excellent fishing to be had.

The R.E. stationed at Work Point, Esquimault, being under the C.R.E., Halifax, Colonel Leach in 1894 crossed the Rocky Mountains to Victoria on inspection duty, a journey at that time of seven days and nights, stopping at Winnipeg and Banff *en route*.

In October, 1897, he was promoted Major-General and returned home in December of that year.

Having been selected as President of the Committee appointed to report on the military organization of Canada and of the defence of her frontier, he returned to that country in July, 1898, the other members of the committee being Colonel Dalton, R.A., Colonel Lake and Capt. Graham White, R.N. On completion of his report, for which he received the thanks of the C.-in-C. and of the Secretary of State for the Colonies, he returned to England.

In April, 1899, he took over the command at Belfast as G.O.C. Northern Division in Ireland, serving for the greater part of his five years there under H.R.H. the Duke of Connaught.

A brother officer who served with him in Belfast writes as follows:-

"He was of course very clever and very quick to grasp a subject. He would pick up a big file of correspondence, read it through, send for his shorthand writer and dictate a long three-page letter which would require no after 'editing.'

Military topography was one of his hobbies, and woe to the man who could not read a map or turn out a decent military sketch. Another hobby which he would exercise at manœuvres was to remove all the officers (supposed to have been killed or wounded) and leave operations to be carried on by the N.C.O.'s. This generally led to somewhat amusing situations.

He was the founder of Bally Kinler Camp, on an excellent piece of training ground just north of Dundrum Bay, and in starting this camp, where the troops from Belfast and Holywood go to in the summer for company and battalion training and musketry, General Leach did a real good turn to soldiers quartered there which will not soon be forgotten. This training ground is also used for the annual training of some of the special reserve battalions in the north of Ireland and is a great boon to them."

While in Belfast he had the honour of attending His Majesty the late King on the occasion of his visit to open a new hospital there, receiving the C.V.O. on this occasion.

A few months after completing his time at Belfast, General Leach was appointed to the Scottish Command and took up his residence in Edinburgh. His four years in Scotland were years of hard work. It fell to his lot to organize the territorial system in the north—no light task.

During that time also he took a keen interest in the erection and equipment of the Victoria School at Dunblane for the sons of Scottish soldiers, which was opened by His Majesty the late King Edward.

While holding the command in Scotland, General Leach was annually summoned to spend a Saturday and Sunday at Balmoral, and on the first of these visits was made a K.C.V.O. A year later he became a K.C.B., was promoted Lieut.-General on 3rd April, 1905, General on 31st August, 1910, and retired on the 4th September, 1912.

It was at this time that he first took a golf club in his hand, and from that day became an ardent votary of the "Royal and Ancient Game."

He died very suddenly of heart failure on the 27th April, 1913, at Cadenabbia, on Lake Como, in his 67th year, leaving one son, who is now in the R.H.A. in India, and two daughters.

General Leach never held a high command in the field, but he had all the requisite qualifications. He had a thorough knowledge of Survey work, had had a good deal to do with coast defences, an extensive experience of field engineering with its many ramifications, was a good rider, most energetic and determined, very quick at putting his ideas into writing, and not afraid of responsibility. He did not know what fear was and kept his head in a crisis.

He was a staunch friend and was always ready to take up the cause of any officer or man under his command whose merits he thought had not, perhaps, received the consideration they deserved.

Diners at the Corps Dinner will no doubt recollect the advice he gave to young officers, never to be ashamed of "bricks and mortar," but to learn their work and do it, and above all to recollect how much of any success they may achieve they owe to the loyalty of their N.C.O.'s.

Within the last few years he had the unique experience of proposing, as senior officer present on the Active List, the toast of the "Old Officers," which toast was responded to by his father, Sir G. A. Leach, who was the senior officer on the Retired List and who only survived his son by two months.

H.P.L.

1913.]

TRANSCRIPT.

- 3

HOW THE ANGLO-GERMAN BOUNDARY IN SOUTH WEST AFRICA WAS MADE.

(Translated from the Militär Wechenblatt).

On June 27th, 1913, ten years elapsed since Mark No. 36 of the boundary line between German South West Africa and British Bechuanaland was erected on the southern tropic. This ended the work of the Anglo-German Boundary Commission, which had gone on without interruption —with the exception of a 3-months interval—since November, 1898. A few months later the Bondelzwaarts insurrection broke out, which was the beginning of our long native war in South Africa.

The following account is intended to give an insight into the work of this commission, as, owing to the outbreak of the war, nothing concerning it has hitherto been published beyond the purely technical matters, which have appeared in scientific journals.

At the beginning of the boundary survey, the development of the land had not made much progress. There were no railways, the line Swakopmund-Windhoek was only begun, even the telegraph line, which was built before the railway, only reached Windhoek in August, 1901. At that time this railway was the only modern means of communication in the country. Communication with other places was limited by the speed of horses or oxen. A helio line between Windhoek-Koetmanshoop was added in 1902. Even war despatches took a considerable time to go from Warmbad across country. Apart from the military and administrative centres the colony had little help to offer.

On this account the boundary work was made very difficult, more especially as the boundary line, the 20th and 21st meridian and its connection on the 22nd of latitude, with the exception of the southern parts, was rather remote from even such resources as were found elsewhere in the country. The question of transporting the indispensable technical apparatus, of victualling men and animals and so forth became of necessity exceedingly difficult in such a rough country as that near the boundary.

Added to this there were many technical considerations, e.g. the Kalahari with its dry, flat and thickly wooded steppes which afforded many obstacles. Other obstacles and difficulties had to be contended with in connection with the nature of the land, such as the lack of any kind of maps, want of intelligent help (only natives of different tribes), climate, water, cattle plagues, etc.

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The white staff consisted of four "Schutztruppenreiter" (troopers) who had to be constantly relieved; it was very difficult at first to make use of their untrained substitutes. Thus it is not surprising that the work on the boundary line, which looks so simple on the globe, afforded many surprises and difficulties apart from the cost of time and money.

On July 1st, 1890, an agreement was made in Berlin between the British and German Governments in connection with the eastern boundary of our territory. The result of the negotiations was the boundary line to be seen to-day on the map. At that time there was no topographical survey, at least no trustworthy one; von François had established the boundary only by means of chronometrical measurements, but it was considerably out in many places.

Many difficulties soon cropped up about the ownership of several water places. The German troops had for the time being to quit Olifantskloof and Rietfontein, because the claim, that they were in British territory, could not be disproved.

Now England had at this time guaranteed to carry the triangulation begun at the Cape, as far as the "Ecke" (corner) in order to come to a definite understanding regarding the question, but sufficient account had not been taken of the difficulties which the Kalahari put in the way of the continuation of the work.

Then it was that Sir David Gill, H.M. Astronomer at the Cape, made a most acceptable suggestion. He proposed, that the British and the German nations, being specially interested, should undertake the work on the German side hand in hand. So through him, and then through the German authorities, arrangements were made in Berlin, and after much discussion the matter was settled. The work might have begun as early as in 1896 had not the rinderpest broken out, which rendered postponement necessary.

Each country chose an officer for the survey. The technical management was conducted in Cape Town by Sir David Gill and the German Consul-General. Major H. D. Laffan, R.E., was the British representative from beginning to the end of the commission, and on the German side was Leutnant Wettstein, whose place was afterwards taken by the writer, at that time Oberleutnant à la suite Pion.-Bataillons, No. 4, who was sent out to the colony to survey in some other parts of our colony.

The British had begun their work on a large scale according to geodetic principles. These principles require, as is well known, that the whole of the earth surface should be covered with exact triangles in order to obtain the earth's dimensions, etc. In the east the English had already measured from Rhodesia up to Egypt. On the western side of Africa a beginning had been made for the same subsidiary scientific purpose, and the triangulation had been carried as far as Rietfontein (Mier). If the work was to be homogeneous, it was necessary for Germany to measure on the same principles, although the difficulties of such an exact survey on the German side were very considerable. Of course the triangulation chain, which was made, was very advantageous for Germany, as it became the basis for every future survey.



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The triangulation chain goes at first, for reasons which will be easily understood, round the Kalahari. Its only purpose was to reach one point of the 20th meridian, etc., which gave the exact position of the places above mentioned. The survey joins the English triangulation chain, and is made on the principles of British triangulation work.

To be able to have some test in the long chain of measurement, a latitude and azimuth were taken at different points. Also in the latitude of Lehmwater a new base line was measured according to a new method. From somewhere about here the chain curved in the direction of the places in question and into the central Kalahari. The branch near Aminuis was not made until 1903.

When the "Ecke" was enclosed by triangles the commission went south to begin, after several tests which could not be put off, the real establishment of the boundary. This work, begun just on New Year's. Day, 1902, would have been comparatively simple, had it not been for the Boer War and an abnormal drought. Both these circumstances placed the commission several times in most difficult situations, and the German representative was once in danger of dying of thirst.

The line marks (numbered iron plates made in Berlin), which were to be fixed on iron posts 12 ft. high, were erected in the northern parts of the line about 10 k.m. apart, in the southern at intervals of about 3 k.m. (2 miles).

On the 19th April No. 133 on the northern bank of the Oranje was erected. The German boundary in the south is the northern bank of the river, as was arranged at the conference, but no mention was madeas to the level of water ! The British declared it was high water. In our native war this unsettled question was the cause of some curioussituations.

Exceptional hardships were produced by the chaos of the Oranje Mountains, which is described in our war correspondence.

In the north the commission could only proceed as far as Mark No. 67. The equipment was no longer suitable, after the many years of use, to proceed through high sand dunes, also the Boers were too active and the cattle could hardly be kept alive, on account of the indescribable drought.

As the work in the Kalahari could only be carried out in the height of the rainy season, which would have been over long before arriving there, the commission decided to go on leave for $2\frac{1}{2}$ months. The Boer War made the way to Cape Town through Uppington quite impossible, and, just as the commissioners were about to go by Steinkopf, the Boers blew up the railway bridge, obliging them to reach the coast by the almost impassable way to Lüderitzbucht. In the meanwhile the column was taken up to Gobabis, where the cattle were to recover.

At the end of November, 1902, the German representative began the work again near Olifantskloof. When his English colleague arrived, the boundary of that territory was—with an enormous amount of hardship and trouble—provided with marks. There were no water melons ("Tsammas") at all that year, and constantly suffering from want of water, in the thickest Kalahari wood, through which they had for miles to make cuttings for sights, the commissioners were always in the greatest distress. By the 14th April the almost impossible was achieved: the "Ecken" and the 22nd of latitude were marked as far as was proposed. Olifantskloof was found to lie well within the British territory, whilst Rietfontein was about 8 to 11 k.m., and Sandfontein a few hundred metres within the German sphere.

Although the equipment was at first sufficient when working in the south of the territory, it was quite unfitted for working in the Kalahari. The work had to be done in too many places with quite different technical means. Only ox-waggons and carts were to be had. The horses were reduced through "Sterbe"; for the water the commission was dependent only on "vleys," as Olifantskloof, and another water place found on the German side, were not permanent and only contained a few buckets full. Blasting was tried without success. When the vleywater had evaporated the cattle, with the exception of a few head, had to be taken to Rietfontein about 100 k.m. away in order to save them. It was a constant struggle for existence. In 1901 it was the same, when at one time everybody had to hurry to Oas, as between Rietfontein and that most eastern military post there was no water to be found any-The commission was obliged to remain in such a neighbourhood where. for weeks and months. Provisions had to be taken for many months for six Europeans and about 40 natives, also the technical equipment and the heavy iron marks and cement and water casks, etc. All these stores had to be loaded on ox-carts to the exclusion of even the most modest comforts for the Europeans, who had to live a regular bushman's life for many months.

Had the commission been provided with camels and with the possibility of unlimited relays, as the German troops afterwards fought in the Kalahari during the war, its work would have been considerably lightened, but the limited funds prevented these much needed supplies. From 150 to 190 k.m. of sandy "path" separated us from Gobabis, even if it had been possible to procure anything there.

At last in May, 1903, the branch east of Aminuis could be triangulated. Immediately afterwards the boundary marks were erected there, the last of which was the aforementioned No. 36.

During this part of the work even greater difficulties and hardships had to be undergone, as Gubuoms was the only place with water, and it was situated 56 k.m. (35 miles) off as the crow flies from the boundary. The growth became thicker and higher and there was no elevated ground. The technical work got more and more difficult. Diminishing the staff to less than a dozen men enabled the commissioners to continue the work, during which they utilized two or three iron cabin trunks as reservoirs for water (they could be locked !). These were filled once a week; the oxen had to trek through the sandy Kalahari 130 k.m. without being watered. These reasons explain the fact, that the boundary marks were on this part of the line comparatively few.

That the work was finished then (July, 1903) is greatly due to the able assistance of Mr. Heatly, Government Land Surveyor, who had been sent out to accelerate the work by the British Government in March, 1903. An indefatigable worker, he, together with Major Laffan, underwent the greatest hardships.

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If anything had happened to delay the work—the British Commissioner used to call our colony "The Land of Delays "—we all, at least the German military staff, would certainly during the rising of the natives have been the victims of the 28 Hereros belonging to the Commissioner's staff. It is a well-known fact that British were spared by the Hereros. Thus only one trooper of ours was afterwards killed by the Hereros in Oas.

When the work was completed, Major Laffan and Mr. Heatly went through the southern part of the German and British territory to Vrijburg and Cape Town, while the German representative took the remainder of the stock alone to Windhoek, where they were to be sold by auction. The whole of the equipment had been supplied and kept up by Germany, and Great Britain paid half the expenses. Now the work was at an end the money obtained by the sale of the equipment had to be divided, but as there were a great many difficulties in the way, the sale could not be completed until September 3rd, 1903.

After the final reckoning had been made, the German representative had left Swakopmund on 20th October, and while he was sailing to Cape Town the insurrection of the Bondelzwaarts broke out. He learnt of it from English papers in Cape Town.

With the exception of Major Laffan, only one trooper (Unteroffizier Bott) had been able to hold out from first to last. The British representative merits the highest praise, especially on account of the phenomenal brain work done during five years in connection with the survey.

During the campaign the survey of our colony was undertaken on a large scale by the "Preussische Landesaufnahme" in Berlin. The boundary triangulation is connected and enclosed in their system. The surveying and topographical measurement is still going on, and the "Schutzruppe" helps in exploring the land. There are already very good maps of our territory to-day.

Probably it will soon be necessary to establish the line of the "Caprivizipfel" and of the northern parts of the Omaheke, and to close the gaps left open by us in the centre of the Kalahari with the marks put down in Rietfontein and Aminuis ready for use.

OTTO DOERING,

Hauptmann und Mitglied des Kgl. Preuss. Ingenieur-Komitees.

REVUE MILITAIRE.

May, 1913.

JAPANESE MANŒUVRES, 1912.

The Japanese manœuvres took place from the 15th to 19th November, northwest of Tokio, in the flat region between the Arakawa, the Tamagawa, and the mountains east of the Atsugi, Hachioji, Ogimachiya, Matsuyama road. The Emperor directed in person, assisted by the Chief of the General Staff and an umpire staff.

The opposing armies were similar and were composed of :--Two divisions, one brigade of cavalry, one brigade of artillery, one brigade of heavy (5-in.) howitzers with ammunition column, one army telegraph detachment.

The Southern Army under General Oshima (Gisho) consisting of the Guard and 1st Divisions formed the 2nd Army of the Blue Force, the 1st Army being imaginary. Similarly the Northern Army under General Oshima (Hisanao) consisted of the 13th and 14th Divisions and formed the 4th Army of the Red Force, the 3rd Army being imaginary.

Divisions were composed as follows :--Two infantry brigades each of eight battalions and a machine-gun detachment, one cavalry regiment (three squadrons), one regiment of artillery (six batteries and ammunition column), one battalion of engineers (three companies), one telephone section.

The independent artillery brigades were each of two regiments, and patteries had four guns and two wagons. No bridging units were attached, as all streams were fordable. No dirigibles or aeroplanes took part, nor was wireless apparatus used except in a very limited sense for experimental purposes. Ammunition and supply columns except as mentioned were imaginary.

The manœuvres, which in the Japanese Army are chiefly intended as exercises for the subordinate commanders and as a practical test of endurance for the rank and file, do not appear to have brought to light any noteworthy departure from the accepted principles; as was the case during the Japanese War, there is still a tendency to reduce reserves to a minimum during the attack, although when on the defensive considerable reserves were kept in hand. In the decisive attack, we find the point of attack determined long beforehand and considerable depth opposite this point, the artillery being massed to support the attack. The action of advanced guards was always cautious, they were never committed until the main body had come up, and never, it appears, on the initiative of the advanced guard commander—when the situation was

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not clear, the Japanese practice was to carry out a "reconnaissance in force" or partial attack either by the advanced guard or another body of troops specially detailed, before the general deployment took place. Divisions covered a front of 3 to 5 miles.

NEW RUSSIAN RECRUITING LAW.

An account is given of the new Russian regulations dated 23rd June, 1912, by which the strength of the annual contingent is considerably raised by including various classes such as doctors, schoolmasters, etc., not formerly subject. The object is to raise the general standard by allowing a larger proportion to be refused as unfit. The new law is noteworthy from its special provisions with regard to Jews, an increasing proportion of whom have hitherto evaded service.

THE ITALIAN MILITARY CO-OPERATIVE.

An interesting account is given of an Italian Military Society similar to the Army and Navy Co-operative Society, and the German Offizier-Verein.

Brazil,

A School of Aviation is to be formed as a private undertaking at Rio, and is to be taken over by the Government with the apparatus in five years' time.

June, 1913.

NORWEGIAN MANŒUVRES, 1912.

These are interesting as being the first test on a large scale of the Norwegian organization of mixed brigades of a composition somewhat analogous to the forces of New Zealand.

Belgium.

The Antwerp defences have been recently reorganized in seven sections, each under a general or senior officer. A flying company has been formed, consisting of a central flying school, and a certain number of squadrons each of four aeroplanes, with motor transport.

GERMANY.

A volunteer flying corps has been formed, the members of which engage to take part in army manœuvres (up to 10 days per annum) and to place their machines at the disposal of the Government in time of war. The corps receives $\pounds 150$ per machine, and the aviators $\pounds 2$ per diem while serving, and a lump sum of $\pounds 10$ for travelling expenses to the manœuvre area. Searchlight sections have been attached (April, 1913) to the Guard, 2nd, 3rd, 4th, 5th, 6th, 11th, 26th, 27th and one other pioneer battalions.

July, 1913.

The new German Army Law of 30th June, 1913, introduced in the spring of 1913, is discussed.

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