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FEBRUARY, 1916.

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Replacement of Destroyed Masonry Arch

REPLACEMENT OF DESTROYED MASONRY ARCH WITH THREE-HINGED TIMBER-BRACED ARCH.

By CAPT. G. C. GOWLLAND, R.E.

PRIOR to the advent of heavy motor transport, heavier mobile guns, etc., it was as a rule unnecessary, when making a road report, to go into much detail as to the actual strength of the road bridges. It was generally assumed that all existing bridges, including bridges on and and 3rd class roads, would safely bear any train of military vehicles. Bridges on 1st class roads may usually be assumed to be strong enough to carry all modern military transport, but this is not always the case with bridges on 2nd and 3rd class roads. In England nearly all the bridges on by-roads have notices fixed to them stating what are the greatest axle loads they are capable of carrying. These permissible weights often fall short of the requirements of the heavy train of a modern army. In reporting on roads, it may therefore often be necessary for R.E. officers to quickly decide what weights can be safely carried by existing road bridges. Steel girder bridges are of modern design and will usually be safe, but if their carrying capacity is doubtful they can be quickly measured up and their strength calculated. Reinforced concrete bridges being still more modern than the steel are still more likely to be safe. The difficulty arises when old masonry bridges are under consideration. Many of these bridges have been in existence for a long time and were designed at a period when a farm waggon or a stage coach was the heaviest vehicle on the road. An officer of the Corps may be called upon to decide what load any one of these old bridges can carry with safety. The quickest guide in making a decision of this kind is to use some empirical formula, such as is found in Trautwine's or other engineering pocket books.

If a masonry arch and its abutments are safe according to the formula the bridge can be passed as safe for all military traffic. These formulae are of course only a guide for use in the field. To get more accurate information the line of resistance in the arch ring under consideration must be found and must of course fall within certain limits. This sort of work however cannot be done by the roadside and hence the value of some formula which can quickly be applied to any segmental or elliptical arch.

Besides deciding whether existing masonry bridges are safe for military traffic it may be necessary for the R.E. to quickly replace masonry arches that have been destroyed by the enemy. In cases of this sort empirical rules are not much use as it is necessary to find out what is going on in abutments, etc., when an arch ring has been demolished. Take as an example an ordinary brick arch road bridge.

Consider the abutment GAFE (Fig. 1) with the arch intact and no



rolling load on the bridge. The abutment is acted on by :—R the minimum arch thrust, *i.e.*, the arch thrust due to the dead load, T the earth thrust, and W the weight of the abutment itself. These three forces have a reaction R_1 which should pass inside the centre third of the bed joist F E if the bridge is properly designed.

Suppose that the arch ABCD is blown down. This means that R the minimum arch thrust is removed and that R2 the resultant of all the forces acting on the abutment will act nearer to E as indicated in Fig. 2, R_a being quite near to E and passing outside the centre third of the bed joint FE. This means there is tension in the mortar in the left face of the abutment. The abutment will be shaken by the explosion and probably the mortar will not be very reliable when under tension. The result will be that the abutment will be on the point of collapse under the earth thrust only. Suppose that a girder bridge is erected in place of the demolished arch as indicated in Fig. 2. The abutment GAEF is still on the point of collapse, though it will be slightly assisted in holding up by the weight of the girder bridge, but it is quite possible that any rolling load advancing to cross the girder bridge may cause the abutment to collapse before the load reaches the bridge itself. With the rolling load in the position shown in Fig. 2 T the earth thrust is maximum while W the weight of the



HALF SECTION ORD-MARY PERS AND ARCH

F16. 2a.-Sohnn Bridge (" Roorkee Treatise on Civil Engineering," Vol. II.).

[FEBRUARY -

abutment is minimum. The resultant of T and W may now fall outside the bed joint FE, in which case the abutment will probably collapse as no faith can be placed in the strength of the shaken mortar in the abutment. In any case hair-cracks will appear in the mortar, moisture from the earth will penetrate these cracks and tend to lessen the weight W, and the whole replacement will be in a state of instability. Before any replacement of an arch bridge is decided on it is always necessary to make some calculation to determine the state of the forces acting on the abutments. These calculations though important in a single-span arch bridge are still more important when damaged viaducts are under consideration. To illustrate the point in question a concrete example is given. Fig. 2a shows a brick-arch bridge taken from an illustration in the Roorkee Treatise on Engineering. It is assumed that arch No. 2 in this bridge has been destroyed by the enemy and that the bridge has to be renaired so that the road will be open for a double line of motor traffic.

The span of the arch that has to be replaced is 63 ft. Suppose that the maximum load to be dealt with is a double row of Foden steam lorries. These lorries weigh 12 tons. Eight tons on the hind axle, 4 tons on the fore axle. Distance between axles 14 ft. Then the greatest load to be dealt with will be a double row of lorries spaced as in Fig. 3, *i.e.* actually a load of 24 tons on 63-ft. span or say 32 tons



with the lorries a little bit more crowded. If the lorries were much closer than this their speed would be much reduced and the live load factor would be small. The actual live load per foot-run of the bridge for a single train of lorries will be $\frac{32}{63}$ tons, say $\frac{1}{2}$ ton per foot-run. The total equivalent dead load for a double train of lorries will be :---

 $2 \times 2 \times 63 \times \frac{1}{2}$ tons = 126 tons.

The roadway is 24 ft. broad, therefore the equivalent dead load per foot-super will be :---

$$\frac{126 \times 2240}{63 \times 24} = 190$$
 lbs. per foot-super.

1916.] REPLACEMENT OF DESTROYED MASONRY ARCH.

190 lbs. per foot-super may be therefore taken as the maximum load on the bridge. Consider the state of affairs supposing that the second arch from one end is blown down. In most cases of demolition the whole arch will disappear and there will be a gap of 63 ft. left between the first and second piers. This means that pier No. 1 is deprived of the arch thrust of No. 2 arch (see Plate I.). Pier No. 1 is therefore acted on by the minimum arch thrust of arch No. 1. That is the arch thrust due to the dead load on arch No. 1. For stability the resultant between the minimum arch thrust of arch No. 1 and the weight of pier No. 1 must fall inside the bed joint ST in pier No. 1. If this resultant falls outside the centre third of the bed joint ST there will be tension in the mortar on the left-hand face of pier No. 1. If the resultant falls outside the bed joint ST the upsetting moment on the joint ST will be greater than the stability moment and the pier will fail unless the tensile strength of the mortar is big enough to resist the overturning moment. To find the maximum resultant arch thrust caused by the dead load on arch No. 1 :--

For stability the line of resistance of the arch ring is made to fall somewhere inside the centre half of the arch ring itself, and also at some point the direction of the line of resistance must be horizontal. In this case the load on the arch being symmetrical the direction of the line of resistance will be horizontal at the centre of the arch.

We therefore know that if the arch is cut in two at the centre that equilibrium can be maintained by the application of some horizontal force and that the point of application of this horizontal force must be somewhere inside the centre half of the arch ring. To find the magnitude of this horizontal force, the dead load on the arch must be ascertained and for purposes of calculation it is convenient to represent this load by an area. Considering a slice of the bridge 1 ft. thick (see *Plate* L) the total dead load on this slice for half an arch is the masonry in the area A B C D. Of this area the portion A E F G D is brickwork or brick filling weighing 110 lbs. per cubic foot and the portion B E F G C is sandstone weighing 130 lbs. per cubic foot. The area B C D A does not therefore represent the actual dead weight on the half arch but the area A H I D bounded by the equivalent dead load line does represent the actual dead on half the arch.

The equivalent dead load line is obtained as follows :----

The length G D represents 17 ft. of brickwork at 110 lbs. per cubic foot.

That is G D represents 1,870 lbs. The actual length of G D is 4.54 in., *i.e.* 1,870 lbs. is represented by 4.54 in. and from this the scale of weights is worked out (see *Plate* I.).

The length CG represents 4'3 ft. of sandstone at 130 lbs. per cubic foot, *i.e.* 559 lbs. Measure off 559 lbs. from the scale of weights then IG represents this weight on the same scale as GD

represents the weight of the brickwork and I is one point on the equivalent dead load line.

Other points are worked out in the same way and I H the equivalent dead load line is obtained. The area H I D A therefore represents the dead weight on one-half of the arch.

This weight can now be calculated. Divide the figures HIDA into 12 or more sections 1, 2.....12. The weights of each of them can be computed. For example the weight of section No. 1 is:— Average weight (scale this off the scale of weights) × breadth (measure off scale of feet) × 1 ft. (the thickness of the slice).

This works out to be $2,150 \times 2 \times 1 = 4,300$ lbs. Section No. 2 weighs 3,640 lbs. and so on. Adding all these sections the total dead weight is 35,190 lbs.

The centre of gravity of the figure H IDA is now found and the weight 35,190 lbs. must act through this centre of gravity shown $C G_{.1}$ on *Plate* I.

Considering half the arch ring cut off at A H. There are three forces acting on the cut-off portion.

- (1). W the weight. The direction and magnitude of this is known.
- (2). R the reaction at the abutment. The direction and magnitude of this is unknown but we know it must act between certain limits, *i.e.* between O and N, the centre half of the arch ring.
- (3). H the reaction at the crown. This we know is horizontal and must act somewhere between M and Q, the centre half of the arch ring.

Taking moments about N. The lowest possible limit for R and putting H to act as high up as possible, *i.e.* H acting at M we obtain the equation

$$H \times 14^{\circ}5 = 35190 \times 12$$

 $H = 29120$ lbs.

or

Then from the triangle of forces since R, H, and W must meet at a point we obtain the direction and magnitude of R. This reaction R is the minimum arch reaction due to the dead load on the arch. The value of R being 45,600 lbs.

Considering No. 2 arch as demolished. No. τ pier is therefore acted on by R and this force tends to upset No. τ pier.

Combining R with the weight of the pier IRTS 48,640 lbs., we obtain R_1 . R_1 being the resultant between the minimum arch thrust of arch No. 1 and the weight of pier No. 1.

 R_1 is obviously exerting an overturning moment on pier No. 1 and pier No. 1 will overturn unless the mortar in pier No. 1 is strong enough to resist this overturning moment. To find the tension in the mortar at the bed joint ST. The resultant of all the forces acting on a 1-ft. strip of pier No. 1 is $R_1=88,600$ lbs. Treating this 1-ft. strip as a cantilever the bending moment at the joint ST is

88600 x 7'5 foot-lbs.

The moment of resistance of the 1-ft. strip is $\frac{1}{6}rbd^2 = \frac{1}{6}r \times 100$ ft.-lbs. since the section of the 1-ft. strip is rectangular "b" being 1 ft. and "d" being 10 ft. long "r" being the resistance of the mortar.

Equating the moment of resistance to the bending moment we obtain

$$\frac{1}{6}r \times 100 = 88600 \times 7.5.$$

 $r = 39870$ lbs.

Whence

No consideration has yet been taken of the vertical component of R_1 . This vertical component is $8_{3,350}$ lbs. This will exert a compressive force on the joint ST $8_{3,355}$ lbs. per square foot.

Therefore the maximum tension in the mortar will be 39,870 -8,335 lbs. per square foot or 220 lbs. per square inch.

While the maximum compression will be 21.5 tons per square foot. If pier No. 1 is built in good P.C. mortar the safe tensile strength will be say 400 lbs. per square inch and therefore the pier will not overturn. There will however be a very small factor of safety especially as the pier will be shaken by the explosion that demolished arch No. 2. Any rolling load placed on arch No. 1 will increase the overturning moment in pier No. 1. What we now have to investigate is the effect on pier No. 1 when the full load covers arch No. 1 from I to the left.

The maximum arch reaction must first be found. The live load is put on from the weight scale and the total maximum load on arch No. 1 is represented by the figure KLAD. The centre of gravity of this figure is found in the same way as before. H₂ the horizontal reaction under this load is 36,900 lbs. and R₂ the maximum arch reaction is found to be 55,300 lbs.

 R_2 is combined with the weight of pier No. 1 giving $R_2 = 97,000$ lbs. R_3 of course falls further outside the bed joint ST than R_1 and therefore the mortar in ST is under greater tensile stress than before.

The actual tensile stress in the mortar under the maximum arch reaction of arch No. 1 is 425 lbs. tension. The maximum compression being 29 tons per square foot.

This proves that even giving the mortar in the bed joist ST its full theoretical value, pier No. 1 is unstable under the maximum arch thrust of arch No. 1.

In any case whether the theoretical strength of the mortar is strong enough or not it is inadmissible to trust to the strength of mortar in structures of any importance. If the mortar is in tension hair-cracks will form in the face of the pier under tension and in this case since the piers are surrounded by water, this water will be forced under pressure of its own head into the hair-cracks thus increasing the tendency to overturn the pier.

Any scheme for the replacement of the demolished arch must be so arranged that the replacement shall exert a reaction due to its dead load only on pier No. 1 such that this reaction combined with the maximum arch thrust of arch No. 1 shall fall inside the centre $\frac{1}{3}$ of the bed joint ST.

Three ways of doing this are suggested.

- (i.). Place a pile pier between masonry pier No. 1 and No. 2 and then put strutted beams between the piers (see Fig. 4). This is not practical, as to get a sufficient thrust on the masonry piers about 14 ft. of earth filling has to be placed on the strutted beams. This causes the point of application of the thrust in the struts to be too far down the pier.
- (ii.). Strutting between piers. This does not seem practical, as the span is so large.
- (iii.). Replace the masonry arch with a 3-hinged timber arch (see Fig. 5).



Suppose this arch is as shown in outline UVWX (see *Plate* I.). The hinges being at V and U. Considering the arch as weightless (the weight of the arch will be small compared to the superimposed load) but loaded with earth filling as represented by X W YZ we have three forces acting on the arch X W V U. Namely :--

- (1). The horizontal reaction H_3 acting through the hinge V. Since the arch is symmetrically loaded the reaction at V is horizontal and since there is a hinge at V the reaction must go through it.
- (2). W the weight of the filling X W Y Z.
- (3). The resultant of these two forces which is the minimum arch thrust due to the braced arch X U V W and which must pass through U since there is a hinge there.

The problem is to make the weight of X W Y Z such that it will give when combined with R_3 (the maximum arch thrust of arch No. 1) a resultant R_4 which will fall inside the centre third of the bed joint ST.

Taking the earth filling over the braced arch to be as in *Plate* II., and considering the filling to weigh 130 lbs. per cubic foot. Considering a 1-ft. strip of the roadway the weight per foot-run on the braced arch is :--

or $4^{25} \times 130 \times 31^{5}$ lbs. = 17403 lbs. on the half arch.

Taking moments about U

.•.

$$15.7 \times 17403 = H_3 \times 11$$
.
H=24839 lbs. (about).

Drawing the triangle of forces we obtain the minimum arch thrust exerted by the braced arch. Combining this with R_3 we obtain R_4 the resultant of the maximum arch thrust of arch No. 1, the weight of abutment No. 1 and the minimum arch thrust of the new braced arch.

 R_t is found to be only just outside the centre third of the bed joint ST and the result is safe enough for all practical purposes.

A braced arch therefore has to be constructed of 63-ft. span. The roadway is to be 24 ft. wide and the filling on the roadway is to be 4.25 ft. of earth filling at 1.30 lbs. per cubic foot. The total dead load on the half span of the braced arch is therefore

Using six panels in the half arch the dead load will be 31 tons per panel point or say 32 tons per panel point to allow for the dead weight of the arch itself. This will give a near enough result to the' true weight of the arch and the filling above it as 130 lbs. per f.s. for the filling is a fairly high figure. The total equivalent dead load due to the traffic may be taken as 200 lbs. per f.s. over the 24-ft. roadway, or roughly 11'4 tons per panel point.

Supposing that only one braced arch was used to span the gap the loading of this arch would be as in Fig. 6.



Fig. 6.

Plate II. shows how the stresses in the braced arch are found graphically when the moving load covers the whole bridge.

Fig. 6 shows the stresses in the various members of the arch under full load. These are obtained graphically. These stresses are not however true maximum stresses except in the case of T_0 , T_1 , T_2 , T_3 , T_4 , T_5 , V_7 , V_9 , D_6 , D_1 , and B_6 . The remaining members are stressed to a maximum when the moving load is covering only certain panel points and are not stressed to maximum when the moving load covers all the panel points.

In this case however in order to obtain a minimum arch thrust on the abutment, equal to the minimum arch thrust of the demolished arch it has been necessary to load the new braced arch very heavily with a permanent dead load. This dead load is much larger than the moving load and therefore the moving load will not have any great effect on the stresses and in a case of this sort where speed is essential it would be safe to take the stresses found under full load as maximum stresses and work out the bridge accordingly. The true

1916.] REPLACEMENT OF DESTROYED MASONRY ARCH.

maximum stresses could be worked out afterwards and any corrections made.

It would not be safe to do this were the live load large and the dead load small, as in this case there would be certain to be reversal of stress in V_2 , D_2 and the maximum stresses in B_1-B_3 will be larger than those found when the moving load covers all the bridge.

Fig. 7 shows the true maximum stresses set up in the structure as the load rolls over. These stresses are obtained by the method of sections. It will be seen from this that there is no reversal of stress in any member.



Fig. 7.

From the stresses in *Fig.* 7 it is possible to design a bridge that will carry the load required. Suppose 21 braced arches were made to carry the 24-ft, roadway then each arch would have to be designed to take J_{ii} of the stresses shown in *Fig.* 7.

There is no need to go into the actual design of the arch as it will be worked out as an ordinary timber and iron girder.

The hinges are formed by merely being butt joints of wood on wood. The central hinge may be formed of an iron pin the ends of the lower booms being shod with plate iron to take the pin. This can be seen in the photographs (1) and (2). This central hinge is really unnecessary as the shear at the central hinge cannot cause failure as one-half of the arch cannot slide on the other at the centre until the abutments give out.

It has been stated by many that the three-hinged braced arch is not practical in the field.

If this is the case what is the best method of repairing a viaduct when one span is blown in? Various suggestions have been made. It has been suggested that the bottom of the sloping struts in Fig. 5 should be connected by horizontal struts, the duty of these horizontal struts being to help keep the viaduct piers in position. Another suggestion is to tie back the unsupported piers by cables passed back to anchorages. The three-hinged braced arch appears to be the quickest way of solving the difficulty as these arches are constructed quite as easily as ordinary timber girders. The photographs show a small 40-ft, span braced arch. Concentrated loads of 8 tons were hung on various parts of this arch but it showed no signs of distress. The arch in the photograph was provided with a central hinge consisting of a steel pin passing through iron plates. This hinge was calculated to take the maximum shear that could come on a girder of 40 ft, span. The hinge is really unnecessary provided the abutments are firm. REPLACEMENT OF DESTROYED MASONRY ARCH WITH THREE-HINGED TIMBER-BRACED ARCH.





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TIMBER GIRDERS.

By MAJOR R. H. CUNNINGTON, R.E.

THE attached has been worked out for timber girders of from 50 ft. to 100 ft. span. The table of dimensions and sketches may be useful as a check on calculations or where there is no time to make them.

GIRDERS TO CARRY A SINGLE HEAVY MOTOR LORRY. (Axle Loads 17,700 and 7,100 separated by 13 ft.).



Use two girders under each wheel track, the centres of each pair to be 6 ft. apart, corresponding to width, centre to centre, of wheel track.

Girders under each wheel track to be 15 in. clear apart and braced together at intervals.

Deck, double row of $9 \text{ in.} \times 3 \text{ in.}$ crosswise.

Wheel guides to be 7 ft. 4 in, apart in the clear to allow 8 in, play.



At end.

ELEVATION



odom. Co support enas of diagonals

Clear Span, Feet,	Rooms.	Web,	Height Centre to Centre of Boom, Feet.	End Part.	Web Fastening, Four Bolts, Diameter, Inches, (Screwed up tight),	Least Length of Boom Timbers, Feet.*	Weight of Girder. Lbs.
50	Тюо 9″ × 3″	6" x 1"	5	Two 6" × 3"	11	22	2,700
60	$\left\{\begin{array}{l} \text{Two 8" \times 4"} \\ \text{(or 10" \times 3")} \end{array}\right\}$	7" × 3 1"	6	$\left\{\begin{array}{l} Two \ S'' \times \mathfrak{Z}'' \\ (or \ 6'' \times \mathfrak{Z}'') \end{array}\right\}$	ž	20	4,300
72	$ \begin{cases} Four 9'' \times 2'' \\ ortwo 9'' \times 4'' \end{cases} $	$7''\times 1\frac{1}{2}''$	6	Two 8" × 3"	Š	26	5,600
84	Three $9'' \times 3''$	$7^{''} \times 12^{''}$	7	Two 9" x "3	5	23	7,600
96	Three $9'' \times 3''$	$9'' \times 1\frac{1}{2}''$	8	Two 9" × 3"	2	26	9,600

TABLE OF DIMENSIONS.

 This allows 12 in, each end for halving. If shorter timbers are used, for every panel' length they are short, four bolts are missed, which have to be specially inserted.
An extra bolt is required for last five diagonals at each end of girder.

SIEGES AND THE DEFENCE OF FORTIFIED PLACES BY THE BRITISH AND INDIAN ARMIES IN THE XIXth CENTURY.

(Concluded).

By COLONEL SIR EDWARD T. THACKERAY, V.C., K.C.B. (LATE R.E.).

THE SIEGE OF LADYSMITH.

The environs of Ladysmith lend themselves to a policy of pure defence far more readily than is generally supposed. The perimeter eventually held gave the defenders a clear field of fire for 1,400 yards and upwards along almost its whole extent.* Before October 30th, 1899, a series of fieldworks calculated for the defence of the town itself had been constructed by Major S. R. Rice, R.E., and these formed the basis, at any rate on the north-castern side, of the defence scheme which was now formulated and put into execution. The whole perimeter was divided into four sections, A, B, C, and D, under the command of Colonel Knox, Major-General Howard, Major-General Ian Hamilton and Colonel Royston.

Section A extended from Devonshire Post, the easternmost of the kopjes on the northern edge of the Ladysmith Plain, to Cove Redoubt some 3 miles to the west. Devonshire Post, Helpmakaar Hill, Cemetery Hill, Tunnel Hill and Gloucester Post, to the east of the railway, were at the opening of the siege held by the Devons, half the 1st K.R.R., half the Liverpools, and the remnant of the Gloucesters. Immediately west of the junction of the Harrismith and Newcastle railways was Junction Hill, with a naval 4'7 gun guarded by two companies of Liverpools. The other 4'7 and the remaining two companies of the Liverpools were on Cove Redoubt, while the naval 12-pounders and the chief station of the Naval Brigade were between the two on Gordon Hill. This section had the smallest clear field of rifle fire, and was exposed to converging artillery fire from every quarter. But it was strongly manned, and its commander, Colonel Knox, had not been at Plevna in 1877 for nothing. Under his direction and by the willing exertion of officers and men, the open stone breastworks already in existence were improved, connected with a curtain of stone wall, and made accessible by covered ways, till eventually the whole section became one continuous fortification. The scrub on the plain in front of the eastern portion was cut down, and converted into three parallel lines of abattis, 100 yards apart. West of Knox came Howard's section manned by the Leicesters,

* On the north-east there was at one point cover to within 800 yards from the British trenches, and on the south-west a gap of only 900 yards separated Wagon Point from Mounted Infantry Hill.

Rifle Brigade, and the bulk of the two battalions of the K.R.R. This section extended westwards from Leicester Post, past King's Post to Ration Post, along the north side of the valley in which the "tin camp" of the permanent garrison was situated, and then southward and south-castward by Rifleman's Post to Range Post on the right bank of the Klip River. The northern face of this section was strongly fortified and practically continuous with A Section. On the western face the works were lighter and more isolated. This was even more the case with Hamilton's section, the longest and most weakly held of them all, which continued south-eastward from Range Post, past Highlanders Post, and Maiden's Castle up to Casar's Camp, the latter held by the Manchesters, and the other points by half the Gordons and the two surviving companies of the Irish Fusiliers.

From halfway down the slope of Cæsar's Camp to Devonshire Post the plain was picketed and patrolled by the Natal Volunteers, under Royston. A proportion of the artillery was assigned to each The most powerful weapons of the defence were the naval section. guns, posted along the northern portion of Knox's section. In addition Helpmakaar Hill and Devonshire Post were strengthened by the inclusion in their system of works of the field guns of the 13th Battery and of two 63 howitzers of obsolete pattern which had been sent round from Port Elizabeth at White's request. Although these guns had only a range of some 3,000 yards they proved of signal service throughout the siege and kept down the fire of any gun which the enemy pushed within their range. The 42nd Battery was sent as soon as a practicable road was made to Cæsar's Camp, and posted in sections in skilfully designed pits along the main plateau. The 60th Battery was held in support of Howard's section of the defences. The remaining three batteries-the 21st, 63rd, and 67th-together with Brocklehurst's cavalry brigade and half the Gordons were kept as a central reserve. These dispositions and the composition of the reserve were however considerably varied in the course of the siege. A very complete system of telephonic communication was established between the different posts and Sir G. White's headquarters in Ladysmith. The total length of the perimeter was about 14 miles, and the force available for its defence amounted, inclusive of the reserve, to over 13,000 men.

The details of the force in Ladysmith were as follows :----

Naval Brigade.—Two 4'7-in., four 12-pounders, four Maxims, 284 officers and men; Natal Naval Volunteers.

Mounted Troops.—6th Dragoon Guards, 5th Lancers, 18th and 19th Hussars, Natal Carabineers, Natal Mounted Rifles, Border Mounted Rifles, Natal Mounted Police, Imperial Light Horse; about 2,800 men.

Royal Artillery.—13th, 21st, 42nd, 53rd, 67th, 69th Batteries, R.F.A.; four 15-pounders, two 6'3 howitzers, two 12¹/₂-pounders (captured at Elandslaagte), two 9-pounders (No. 10 Mountain Battery), two 3 pounder Hotchkiss (Natal Hotchkiss Detachment), Ammunition Column.

Royal Engineers.—23rd (Field) Company, Balloon Section, Telegraph Section.

Infantry.—1st Liverpools, 1st Devons, 1st Gloucesters, four companies 1st Manchesters, 1st and 2nd King's Royal Rifles, Royal Irish Fusiliers (two companies), 1st Leicesters, 2nd Gordons, 2nd Rifle Brigade, 2nd Dublin Fusiliers (half-company); total over 6,000 men.

Army Service Corps and Army Ordnance Department.

Town Guard about 250 men.

The Battle of Ladysmith had created for the Boers an opportunity to inflict a crushing blow on their enemy, such as was never to present itself to them again. With nearly 22,000 men concentrated round White's shaken and dispirited force, they might with every prospect of success have attempted to rush Ladysmith during the first day or two after the battle, when it was still practically unfortified. But such an attempt, involving both promptitude of decision and a readiness to face heavy losses, was foreign alike to the cautious character of General Joubert and to the constitution of the force which he commanded. With the deliberation which had marked the whole of their invasion of Natal, the Transvaalers confined themselves on October 31st to occupying the eastern edge of the Ladysmith plain, not so much to secure positions for a further offensive, as to utilize the immunity from attack thus assured in order to settle down in their laagers and discuss the situation in comfort. The Free Staters similarly settled down with their main body to the north-west of the town. That evening, however, General A. P. Cronje led out some 2,000 men of the Harrismith, Heillbron, Winburg and Brede Commandos, with two guns, and by a night march across the open plain west of Ladysmith established them in the hilly ground to the south-west where they would be conveniently posted either to check an attempt on the part of the British to break out on that side, or to cross the hills and descend upon Colenso, into which place they in fact began to drop shells a few hours later.

On November 1st a joint council of war was held at Joubert's headquarters when it was decided that the commandos should invest the town on all sides to prevent the escape of White's force, while their artillery carried on a bombardment which it was confidently expected would bring about a surrender before the end of many days. The different sections of the investing line were duly apportioned, gun positions were selected, and during the next few days the burghers busied themselves in putting their policy into execution. In this they were not seriously disturbed by the British who were too preoccupied with the task of strengthening their own defences to attempt to take advantage of the confidently negligent movements of the commandos. The cavalry reconnaissance of November 2nd did indeed succeed in surprising the Winburgers; but that of the

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Imperial Light Horse on the 3rd, developing as it did into an inconsequent general engagement, only seemed to encourage the burghers, who greatly enjoyed shelling the British back into camp, and believed that they had repelled a determined attempt to break through the investing line with very triffing loss to themselves.

The positions taken up by the Transvaalers for the investment were, with small modifications, those in which they had encamped on their first arrival and from which they had fought on October Joubert's headquarters were behind Long Hill, a little dis-30th. tance south of the railway siding at Modderspruit, which was now converted into an advanced base for the whole Transvaal force round Ladysmith and subsequently on the Tugela. Here, the commissarygeneral established his supply park, and separated from the British positions by the valley through which runs the Harrismith Railway was General Erasmus's section, 3,500 to 4,000 men in all. The centre of the Transvaal position was under Vice-President Schalk Burgen, Ioubert's second in command, and was manned by some 6,000 to 6,500 burghers. Behind Lombard's Kop and Lombard's Nek were the strong Middelburg and Heidelberg commandos. The southern section was held by Lukas Meyer, temporarily replaced by Louis Botha, with some 4,500 burghers. Wakkerstrom, Krugersdorp and Standerton were securely camped behind Balwana and Interbagone. Utrecht, Vryheid, and the Pretoria Germans, in the order named, held the ridges across the Klip river facing the plain, and Cæsar Camp with their laagers in the valley of Herman's Spruit. The rest of the circle was completed by some 7,000 or more Free Staters. The head laager under Martinus Prinsloo with part of the Winburg commando, was at Smith's crossing on the Harrismith Railway. The large Kronstadt commando, laagered in several camps, held the line eastwards to Thornhill's Kopje adjoining the Pretorians on Surprise Hill, and south-westwards to the Sand Spruit, including the ridge crossed by the telegraph line from Ladysmith to the Free State and known to the besieged as Telegraph Hill. South, Harrismith held Lancers Hill, commanding the road from Potgeiters Drift, and the Long Valley across to Middle Hill, while beyond them the burghers from Ventenburg and Winburg, on the extreme right, kept touch with Vryheid and the Germans on the Transvaal left.

The whole of these positions were admirably adapted to the work intended to be accomplished, which was not so much to facilitate the capture of Ladysmith as to prevent the escape of the garrison. The broad valleys around Ladysmith were as defensible from one side as from the other, and furnished the Boers with an outer circle of defences corresponding exactly to the perimeter held by the British garrison. By their dispositions the Boers, no less than Sir Geo. White, made all transition from the defensive to the offensive difficult for themselves, and thus prepared for the long and weary stalemate of the siege.

The Boers placed the greatest confidence in the speedy and complete

success of the artillery bombardment. The available guns some 17 in number increased afterwards to about 22 were dragged up under Colonel Trichardt's directions on to the various heights commanding the town on the British defences. These included two 6-in. Creuzot "Long Toms" firing a 96-lb. projectile with an effective range of nearly 10,000 yards, and four 4'7-in. Krupp howitzers, firing a 34-lb. projectile with a range of over 6,000 vards. For the rest, the Boer siege artillery consisted of their ordinary Krupp or Creuzot guns. A comparison of the gun power of besiegers and besieged is instructive, for it brings out the fact that, except in long range weapons, the Boers were less than half as strong as the enemy whom they were attempting to reduce. This inferiority prevented their bringing their field guns into effective range, and threw practically the whole task of bombardment on the long-range guns. Even with a very small target and a carefully concentrated fire it would be difficult to hope for much result from the fire of half-a-dozen guns. But so elated were the Boers by the success of "Long Tom" in driving Yule out of Dundee, and by the more recent prowess of the Pepworth guns on October 30th, that they attributed a well-night magical efficacy to the bombardment, convinced that it would force White into almost immediate surrender.

The bombardment may be said to have begun on November 2nd, when the Creuzot on Pepworth opened a desultory fire first on the town and then on the naval 4'7, which had just been mounted on Junction Hill, one of its shells mortally wounding Lieut. Egerton, R.N., in command of the gun. That same evening other guns joined in from Lombard's Nek, and on the 3rd and 4th the bombardment increased in intensity as new guns were brought into position. Trifling as the fire was from the military point of view, it induced the mayor to address Sir Geo. White on the removal of non-combatants, more especially of women and children, to some place of greater security. The principal medical officer also pointed out that the sick and wounded in the Town Hall, which had been converted. into a hospital, were exposed to grave danger from the fire. The result was the opening up by White of negotiations with Joubert which resulted in an armistice till midnight on the 5th and the formation of a neutral camp for sick, wounded, and non-combatants at the southern end of the plain along the Intombi Spruit. Trains were run down to Intombi on the 5th, hospital tents pitched, and before the armistice expired most of the sick and wounded were transferred. to the new camp. The camp was placed under the control of Mr Bennett, the Resident Magistrate of Ladysmith, while Major Mapleton, R.A.M.C., was made responsible for the hospital arrangements. Under agreement with the besiegers, a daily train was allowed to ration the camp, provided it made the journey in daylight.

The armistice was actively employed, alike by the British in strengthening their positions, and by the Boers in mounting and

protecting their guns. With much labour the second "Long Tom" which now arrived from Lang's Nek, was dragged on to the summit of Bulwana, and on the morning of the 8th opened fire, at a range of 7,500 yards, from a projecting spur on the west side of the hill—to the great consternation of the Ladysmith staff, who had never anticipated such a feat of gun transportation, and now found many of their defences enfiladed or taken in rear by its far-ranging and alarming projectiles. Meanwhile a week had passed since the opening of the bombardment, and to the surprise and chagrin of the Boers there were no signs of surrendering from Ladysmith.

A Krygsraad was held on the 8th, and it was agreed that the policy of investment should make way for one of active offence which should place the Boers in possession of some point commanding the town and the British positions at closer range.

The obvious key of the whole position was the great ridge of Cæsar's Camp, and Wagon Hill, known to the Boers as the Platrand which with its northern underfeature, Maiden's Castle, completely dominated the whole of the town, and of the western defences at from 2,000 to 5,000 yards range. Another point known to be weakly defended and not trenched whose occupation would seriously cramp the defences of the garrison was Observation Hill, a ridge some 1,700 yards in front of Cove Redoubt and separated by a valley only 1,400 yards across from the bush-grown plateau of Bell's Kopje held by Van Dam's "Zarps." It was decided not to waste a single day but to capture the Platrand and Observation Hill by a sudden attack that very night.

The commandos along the sections opposite these points were warned to start soon after midnight; the rest were to support or assist by a demonstration in the morning under cover of a grand bombardment. Late at night the attack on Cæsar's Camp was suddenly countermanded, for on reconsideration of the plan from his own standpoint Joubert thought this part of it too venturesome. The rest of the plan held good, and at 1.30 a.m. on the 9th Field-Cornet Zeederberg's section of the Pretorians left their laager and established themselves by daybreak in a donga within 800 yards from Observation Hill. Had they come a little earlier they could have pushed on at once and could have occupied the hill itself without opposition.

At 5 a.m. all the Boer guns began the artillery preparations for the attack, that is to say, they dropped their missiles into the town, the tin camp, and on to different points of the defences according to the gunners' fancy. An hour later the squadron of the 5th Lancers which as usual took up its position on Observation Hill at daybreak, was heavily fired at by the Pretorians, who were now advancing from the donga. Two companies of the Rifle Brigade were sent forward in support from Leicester Post, being shelled in rear from Bulwana as they reached the hill, and forced by this fire to send forward their exposed supports in order to prolong the more sheltered

firing line. The advance of the Pretorians had already been checked by the fire of the Lancers who had held their ground manfully, and the Riflemen now effectually drove back the Boer supports, who were coming on from Bell's Kopie in considerable numbers, but with no great resolution. Firing was heavy all day but the attack was never pressed, though a small party of the Pretorians remained till dusk in the donga, and even behind rocks and out-hills some distance in front of it where the road ran close under Gun Hill. Before coming to this the force halted. Leaving 100 of the Border Mounted Rifles across the road to guard the left flank, and sending Royston with the main body of his Volunteers to the right to check any counter-attack from Lombard's Nek, Hunter with the storming party (the Imperial Light Horse and 100 Natal Volunteers of various corps) struck straight across the stony donga, intersected with thorn scrub, for the middle of Gun Hill. Arriving at the foot of the hill at 2 a.m., the assaulting column deployed into line ; the Light Horse under Colonel A. H. Edwards and Major Kani Davies on the left; the Natal troop under Major Addison on the right. Then the ascent of the 250 ft. of steep boulder-strewn slope began. Slowly and steadily the men scrambled up what seemed an endless black wall of perpendicular rock. Suddenly from the darkness to their left rear came a faint uncertain challenge-" Wie daar ? "-repeated again and again, and then with a sudden realization of what was happening, rising into an agonised cry of warning to the sentry on the summit : " Schiet, Stephanus, hier kom de verdomde rooineks, schiet, schiet !" With that the whole picket fired wildly into the rear of the assaulting line, which was clambering on with silent, desperate energy, and was now within 20 paces of the summit. A fringe of fire broke out along the crest, for the defenders had waited for them. A few men began to reply, but the officers stopped them, and then Edwards' voice ran out clear-" Fix bayonets !" There were no bayonets, but taking up the cry the men rushed the skyline. The thought of the cold steel was too much for the Boer gunners who fled into the darkness. At the head of his men Edwards groped his way across the plateau to the battery, annexing "Long Tom" in the name of the Imperial Light Horse. The 47 howitzer was found soon after, and then Capt. Fowke, and Lieut. Turner with a few sappers, inserted the guncotton charge into the breech and muzzle of the guns while the stormers withdrew from the crest. Then followed the explosion leaving the guns as the Sappers thought wrecked and irreparably destroyed; but they had yet to reckon with the resources of the Pretoria repairing shops.* Hunter called for three cheers for the

*" Long Tom" was repaired within three weeks, and, with shortened muzzle and a new breech, was sent off to help in the Siege of Kimberley. The howitzer was beyond repair but an exact reproduction was made of it.

Queen and then the descent began, the men taking with them as

trophies the breech-block of the 6-in, gun, and a Colt gun, and many other articles found in the battery. The return journey was unmolested. The total casualties were seven wounded, including Major Henderson to whose leading the success of this most gallant enterprise was so largely due.

Encouraged by the successful issue of the Gun Hill sortie Colonel Metcalfe asked and received permission to take out the Rifle Brigade on the 10th to destroy a 4.7 howitzer which had been pounding all the northern posts from Surprise Hill. At 10 p.m. five companies of the Rifle Brigade moved out of camp behind King's Post. Colonel Metcalle was in command accompanied by Major King, R.A., the guides Thornhill and Ashby, and by Lieut. Digby Jones, R.E., in charge of the blasting detachment. The darkness was illuminated at intervals by the faint flicker of a flashlight on the broken clouds-they were signalling from the relief column 20 miles away. Then a harsher light would shine out from the enemy's position on Telegraph Hill, but the riflemen lay quietly in the nullah, the great beam left them undiscovered. At times there would be a rifle-shot in the distance, and perhaps a burst of firing, as some picket along the far line of defences imagined itself disturbed. But with the assaulting party all was still. Just before midnight the moon was lost in a bank of cloud, and the time for action had arrived. Silently the five companies of the riflemen filed out of the nullah and began slowly and steadily to pick their way across the uneven surface of the plain. Leaving half a company to protect their left as they crossed the Harrismith Railway, and another on their right in the shadow of Bell's Kopje, they moved on, every moment expecting to stumble on a picket, but finding none. Fortune was on their side, for till a few days before, a rise half a mile in front of Surprise Hill had been occupied nightly by a strong picket.

But Viljoen who had been responsible for that sub-section of the perimeter, had been withdrawn to the Upper Tugela, and his successor had not seen fit to continue his precautions. By 2 a.m. the foot of the hill was reached. Here two companies were halted and formed outwards to support the two other companies which furnished the assaulting line. The ascent now began, the boots and tifles of the men clattering audibly on the loose boulders of the slope. Yet it was not until the leading section was almost on the brow of the hill that the challenge came, and with it a burst of fire from the left shoulder of the hill. Heedless of the fire the Riflemen swarmed over the crest line. The battery was found in a few seconds, but for a moment the men thought their prize had been removed, until they unearthed it, covered with a tarpaulin, just outside the emplacement. The men were thrown out in a semicircle while the preparations for the destruction of the gun were made. When all was ready the party retired over the edge. But something went amiss with the fuze and Digby Jones returned to place another. This time all went 1916.] SIEGES AND DEFENCE OF FORTIFIED PLACES.

well and after a ringing cheer the men started stumbling and slipping down the slope.

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At the first outbreak of fire a Boer gunner on Bell's Kopje fired off a round to give the alarm, and in a few minutes the Transvaalers on that side, and the Free Staters at Thornhill's Kopje, streamed out of their laagers, and began firing furiously and blindly at the hill slope from both flanks. Through this fire, enveloping them atcloser range every moment, the men stumbled down. Suddenly a ring of flame blazed forth at their very feet; a small party of Pretorians had boldly come round the side of the hill, and regardless of the heavy fire from their own side, had laid down in a line across the slope ready to intercept the storming party, of whose numbers they probably had no idea. But with implicit obedience to Metcalfe's orders, and disregarding the misleading orders shouted out by the Boers, the men charged forward in grim silence. The gallant band of Pretorians wildly emptied their magazines in the vain endeavour to stay the rush and then the Riflemen surged into and over them, killing or wounding several with their bayonets as they passed. From the foot of the hill the men, as arranged, made their way back as best they could under the lee of Observation Hill, getting home to camp by dawn. The casualties, 14 killed or mortally wounded, including Lieut. Fergusson, and 50 wounded were not excessive for a feat so gallantly and successfully performed.

The success of the sortie had a most inspiriting effect on the garrison, which was beginning to feel the depressing influence of inactive isolation. To the besiegers, who had gradually become more and more careless in carrying out the ordinary military precautions, the sorties were a severe shock.

The indignation in Pretoria over the Gun Hill affair was intense. The government censured General Burger, who was in command, and he ordered a court-martial, the sentence of which suspended Commandant Weilbach and Major Erasmus of the Artillery from their commands. The second sortie led colour to the suggestion now made that the unfortunate sentrics—men of English names as it happened—had been guilty of deliberate treachery. They were arrested and sent to Pretoria, but eventually released.

The time appointed by Buller for the beginning of the relieving movement was now drawing near, and with it White's hopes of achieving some really effective stroke in the way of co-operation steadily grew. On December 9th Buller announced that he would start for Potgieter's on the 12th and would reach Lancer's Hill on the western edge of Long Valley by the 17th. On the 11th on the ground of being uncertain as to dates, he suggested that White should not attempt co-operation before he himself got to Lancer's Hill, unless he felt absolutely sure as to Buller's whereabouts. On the 13th the Potgieter's route was abandoned for Colenso and Ouderbrook Spruit and the date for the move postponed to the

17th. Impressing upon his chief the all-importance of time as a factor of co-operation, and the necessity of keeping him informed of any change of plans, White set about his preparations. The mobile column was again brought into being. To free some of Royston's mounted troops for this work the town guard was on the 12th once more embodied. Some of the artillery was brought into camp from the defences, whilst a 47-in. gun and a 12-pounder were transferred from the northern defences to Cæsar's Camp and Wagon Hill. Arrangements were made for the feeding of Buller's force and the care of a large number of wounded. The special field force created by White's order of the 14th, which he intended to lead out in person, included almost all the best troops in Ladysmith, and left the merest skeleton of about four battalions, one battery, a cavalry regiment and a few volunteers to Colonel Knox for the defence of the town. For the first time since October 30th, White was determined to strike a blow with all the weight that he could put into it.

On the 15th Ladysmith woke to the noise of the fighting on the Tugela, but it was some time before White realized from the heliograms coming in, that Buller had anticipated the date fixed for the attack by two days without giving him warning. Even then White may have thought that Buller had good reasons for not calling in his aid until he had secured a footing across the river. Assuredly the summons to action would come in the morning.

BULLER TO WHITE.--No. 88 Cipher, 16th December :---" I tried Colenso yesterday but failed ; the enemy is too strong for my force, except with siege operations and those will take one full month to prepare. Can you last so long? If not, how many days can you give me in which to take up defensive positions? After which I suggest your firing away as much ammunition as you can, and making best terms you can. I can remain here if you have alternative suggestions, but unaided I cannot break in. I find my infantry cannot fight more than 10 miles from camp, and then only if water can be got, and it is scarce here.--Buller."

BULLER TO WHITE.—No. 92 Cipher, 16th December :—" My message No. 88 Cipher. Groups 31 to 43 were correctly sent, but in place of them, and first number of 44 group read as follows : How many days can you hold out? Also add to the end of message : 'Whatever happens recollect to burn your cipher, and decipher and code books and any deciphered messages.'—Buller."

WHITE TO BULLER:—"Your No. 88 of to-day received and understood. My suggestion is that you take up strongest available position that will enable you to keep touch of the enemy, and harass him constantly with artillery fire, and in other ways as much as possible. I can make food last for much longer than a month, and will not think of making terms until forced to. You may have hit enemy harder than you think. All our native spies report that your artillery fire made considerable impression on enemy. Have your losses been very heavy? If you lose touch of enemy it will immediately increase his opportunities of crushing me, and will have worst effect elsewhere. While you are in touch with him, and in communication with me, he has both of our forces to reckon with. Make every effort to get reinforcements as soon as possible, including India, and enlist men in both Colonies who will serve and can ride. Things may look brighter. The loss of 12,000 men here would be a heavy blow to England. We must not think of it. I fear I cannot cut my way to you. Enteric fever is increasing alarmingly here. There are now 180 cases all within last month. Answer fully; I am keeping everything secret until I hear your plans."

The besieged garrison, ignorant of the inner story of Colenso, received the news with some depression, relieved by the cheerful tone of White's manly order, and by a calm consideration of the position. The defences had now been perfected and seemed practically secure against attack. Sickness was the worst enemy. There was food yet which with economy would last for two months. The most serious anxiety at the moment was the welfare of the horses. The supply of hard forage was almost exhausted. In fact in this respect the turning-point in the condition of the garrison had arrived. Up to December 15th it might have been used as a mobile force operating from its entrenched positions; after this date it gradually ceased to be anything but a garrison to the perimeter it held. From December 15th to the end of the year little occurred. The inconveniences of the siege were however brought home to the garrison more severely than heretofore. Supplies had to be husbanded and the scale of rations was reduced all round. The Boer artillery practice improved somewhat, and there was an increase in the casualties from this cause. Sir George White was forced to change his headquarters owing to the damaging fire directed upon his house, which lent some colour to the suspicion that the Boer gunners on Bulwana had information supplied to them from within the perimeter. Christmastide was not marked by any special development. Few of the festivities which mark the season were possible; but an impressive service was held by the Rev. J. G. W. Tuckey, Army Chaplain, and in the evening, Colonel Frank Rhodes, Colonel Dartnell, Major Doneton, and Major Kani Davies gave a Christmas party to the children of the garrison, an incident of pathetic interest amid the privations and anxieties of the siege.

On the morning of December 17th Lord Roberts received the news of his only son's death at Colenso. A few hours later at the call of duty he put his great sorrow behind him, and undismayed by the difficulty of the task, undeterred by the weight of his years, accepted the command of the forces in South Africa, conscious of his fitness to hold it, and to restore victory to the British arms. On December

23rd, a dreary winter day, the new Commander-in-Chief for South Africa left Southampton, and at his request Major-General Lord Kitchener of Khartoum was appointed Chief of Staff. At the moment of his appointment Kitchener was at Khartoum engaged in the task of building a new city, and creating a new administration on the ruins of the Dervish power, the last remnants of which had been crushed by his lieutenants. Leaving Khartoum on the 18th December, he reached Alexandria on the 21st after three days by steamer and train, was there taken on board by the steamer *Isis*, and joined Roberts at Gibraltar on the 26th.

As his Director of Intelligence, Lord Roberts took with him Major G. F. R. Henderson, at that moment Professor of Military History at the Staff College. A brilliant writer and a profound thinker on the great problems of strategy and tactics, Henderson was an officer who would have risen to the highest positions on the General Staff.*

Colonel W. G. Nichelson,[†] an officer of exceptional capability and of great experience of staff work, whose cautious critical judgment and skilled pen Lord Roberts had long learned to value in India, was another member of the Staff. It was from India where he was occupying the post of Adjutant-General that Roberts now summoned Nicholson to meet him at Cape Town. Originally appointed as Military Secretary, he was subsequently entrusted with the direction of the transport service, and on a variety of responsible and confidential duties.

On the south side Joubert had intended that there should be nothing more than a demonstration. But the Vryheid burghers, acting on their own initiative, endeavoured to convert this into an actual attack, and securing a lodgment in the bush-grown underfeatures of Cæsar's Camp, and in the valley between it and Wagon Hill, pushed forward with some vigour about 10 a.m., being supported by a hot fire from Mounted Infantry Hill, and from other points. But the Manchesters, who had been strengthened by the arrival of the 42nd Battery and by some 130 of the Imperial Light Horse, who occupied Wagon Hill, replied strenuously, and the attack soon died away into an exchange of long-distance rifle fire.

By mid-day Sir G. White was so satisfied that he had nothing to fear from the attack that he was able to order a salute of 21 guns to be fired in honour of the Prince of Wales' birthday. Artillery and rifle fire went on until evening put an end to a rather tame sequel to the resolutions formed by the Boers on the previous day. The total casualties of the day were 4 killed, and 27 wounded on the British side, and probably about the same on that of the Boers.

* Colonel Henderson died in March, 1903, leaving a gap in the ranks of British military thinkers which will not easily be filled.

† Now Field Marshal Lord Nicholson, G.C.B. Nicholson reached Cape Town on January 18th.

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The direct result of this affair was that White's attention was drawn to two particularly vulnerable portions of his defences, and from this date Observation Hill, and eventually Wagon Hill, were included in the perimeter and scheme of the defence.

The moral effect upon the staff and the garrison generally of the weakness of the Boer attack was excellent, and did much to remove the depression which had weighed upon the whole force since the battle of the 30th. As for the Boers, their expectations of speedy results from the bombardment were no longer high as at first ; but, on the other hand the reports of Kaffirs, caught in trying to make their way out, now led them to hope that famine and disease were already working fearful havoc with the garrison, and that the end could not be very Meanwhile, as a concession to the clamour of the party of far off. action, an expedition was organized for the invasion of Natal, south of the Tugela, and the first step taken was the reduction of the investing force which was gradually to bring it down to a mere skeleton of 5,000 to 6,000 men. Joubert himself accompanied the expedition to ensure its being conducted with due caution, leaving the command at Ladysmith in the hands of Schalk Burgher.

The departure of the Estcourt expedition on November 13th did not pass unobserved by the British outposts, and encouraged by this, and by the inactivity of the Boers since the 9th, White determined to essay a more active policy. On the 14th Brocklehurst went out with the 5th Lancers, 10th Hussars, two squadrons each of the Imperial Light Horse, and Border Mounted Rifles, and two batteries, with instructions to turn the enemy off Rifleman's Ridge. The Imperial Light Horse established themselves on Star Hill, north-cast of Rifleman's Ridge, and the rest of the force endeavoured to work round by Field's Farm. The Boers on the Ridge, some 400 Trede and Bethlehem burghers, defended themselves vigorously, while three Boer guns joined in from different points. The British guns expended a great deal more shell than could be afforded for anything but a decisive operation, but no attempt was made to push home an attack which in the opinion of spectators from Wagon Hill might easily have succeeded, and early in the afternoon Brocklehurst withdrew. His withdrawal was a signal for a hot shell fire, in which Bulwana joined as the retreating force came within range.

From this date to the end of the month no incidents of great importance occurred to break the monotony of the investment. The bombardment continued as aimlessly as before. On the 14th and for a night or two after, the Boers fired a few rounds from their big guus in the middle of the night, a most harassing manœuvre, but one which they were too indolent to keep up. On the 23rd a single shell from Bulwana killed and wounded 11 men of the Liverpools on Junction Hill. On the 24th the Boer guus on Rifleman's Ridge and Telegraph Hill stampeded a herd of 228 oxen, and by a series of shells planted just beyond them, successfully shepherded them into their

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own lines. The direct result of this incident was the reduction of the Ladysmith meat ration on the 25th.

On November 27th the Boers unmasked a third 6-in. Creuzot on Middle Hill, bringing Wagon Hill and Cæsar's Camp under fire at a damaging range. To meet this new development the two old howitzers on Devonshire Post were removed by night, and mounted on the nek between Wagon Hill and its extreme spur, Wagon Point. They set to work to such good effect on the joth that in a few rounds they completely mastered the fire of the "Long Tom," a lucky shot killing and wounding nine of the gunners and damaging the gun. It was withdrawn during the night, to reappear on December 11th on Telegraph Hill, whereupon the howitzers were sent round to Ration Post. At the increased range (4,000 yards) they were less successful, and never managed completely to silence it, and to the end of the siege it continued to shell the tin camp and northern defences. On the British side almost the only minor active measure undertaken at this time was the sending out one night of a locomotive containing some explosives up the Harrismith line in the hope that it might run into something. It successfully ran into the veld, where it overturned, its fate providing the garrison with many humorous sallies at the expense of the staff.

All this time Ladysmith had been in intermittent touch with the outside world by native runners. Maps of Ladysmith and the surrounding country, photographically reduced, were sent down to Maritzberg by carrier pigeons, and in this way Major Altham, White's A.A.G. for Intelligence, was able to give substantial help to the forces collecting south of the Tugela. On the 27th White announced his intention of harassing the commandos that were now being with-drawn to oppose Methuen, and of breaking a gap in the Boer line; a scheme which had to be abandoned owing to the coincidence of the Boer reinforcement of Rifleman's Ridge.

On the 30th in answer to Buller's inquiries, White announced that he still had 70 days' provisions and could hold Ladysmith while they lasted. On the 7th Colonel Knox was instructed to take out a small force that night and harass the enemy at Limit Hill and further along the Newcastle Road. Knox reported to Hunter that there were no Boers within reach in that direction, and suggested as an alternative an attack on Gun Hill, which since the removal to it of the Pepworth Creuzot had made itself very obnoxious to Knox's section. Hunter took up the idea warmly, and Sir G. White's sanction was secured on the condition that Hunter personally conducted the expedition and that at least 500 men accompanied him. Hunter selected for this bold enterprise too of the Imperial Light Horse, and 400 of Royston's Volunteers, entrusting the guidance of the force to Major David Henderson and his corps of Guides. Knox, whose previous orders still held good, was to cover the left flank of the sortie.

Preparations were made with the utmost secrecy, and at 10.15

p.m. the little force started from Devonshire Post, marching along the road that leads round the northern slope of Gun Hill and Lombard's Kop. There was a Boer picquet, of whose existence Henderson was well aware, on a small spur.

This completes the narrative of the Siege of Ladysmith and of the situation at the close of the year 1899, and as this short compilation of the History of Sieges only extends to those that took place during the 19th century it is not proposed to narrate in detail the final operations of the siege which terminated in the relief of Ladysmith by General Sir Redvers Buller on March 3rd, 1900.

The memorable attack by the Boers on Wagon Hill; the charge of the Devons; the operations on the Upper Tugela; the ineffective attack on Spion Kop and its abandonment; the feint attack and capture of Vaal Krantz; the operations on the Tugela Heights including the capture of Cingolo and Monte Chinto and the attack upon Inniskilling Hill, all these are fully and accurately described in the 3rd Volume of the *Times History of the War in South Africa*.

To quote from the latter history, "On March 3rd Buller's army made its formal entry into Ladysmith, and the bronzed and servicebegrimed battalions of the relieving force marched proudly through the streets lined by the haggard and emaciated garrison. It was a stirring moment and one full of pathos, as men recognized old friends and comrades-in-arms, or looked vainly down the ranks for those whom they expected, but whom they were destined not to see again. After the parade was over, addresses read by the Mayor, and speeches delivered, Buller issued a special order to the troops of both forces, thanking them for their efforts."

Thus ended the campaign for the relief of Ladysmith. In the memory of the British people it will long live as a deeply dramatic event, with its alternations of hope and disappointment, with its tale of struggle off renewed to be crowned with success at the last.

That Buller did at last break his way through to Ladysmith, was due to two causes; to the weakness of his adversaries, and above all to the fundamental soundness of the material of which his army was composed. It was the virtues of the British regimental officers and the men whom he led, that in the end broke the Boer resistance and relieved Ladysmith.

Their fearless courage, their patient endurance, their imperturbable cheerfulness in defeat, their unquestioning loyalty to their leader, lend dignity and pathos to a story which would otherwise be depressing, and give a sure hope of better things. If there is one clear lesson to be drawn from the Tugela Campaign, it is that British soldiers, trained as they might be trained, and led with courage and science, need fear to match themselves with no army in the world.

NOTICE OF MAGAZINE.

REVUE MILITAIRE SUISSE.

No. 10.---October.

PROGRESS OF RIFLE PRACTICE OUTSIDE THE SERVICE SINCE 1874.

This article deals with the voluntary efforts made in Switzerland to improve the marksmanship of the manhood of the nation. In an editorial note it is stated that the article appeared originally in the *Monatschrift für Offiziere aller Waffen* for June and August, 1914, and that the expression "outside the service" ("*en dehors du service*") has been retained as a part of the original title, because it is the officially recognized one. This expression has acquired a technical meaning in Switzerland but is misleading, since the subject matter of the article really deals generally with the military rifle practice not included in the official firing courses laid down for the Swiss Army.

A review of the situation which existed during the period 1862-1876is given in an introductory section. In 1874 a reorganization had brushed away the Cantonal Contingents and created the Swiss Federal Army ; however, it did not touch the élite and the landwehr but only the infantry. Prior to 1874 all ranks armed with the rifle, whether as infantrymen, élite or landwehr, were required to take part in rifle practice either as members of voluntary clubs or associations, or at meetings specially organized for the purpose, the State providing certain monetary contributions. The Communes were at that time required to provide suitable rifle ranges. Clubs for the encouragement of rifle practice were also recognized in connection with the new state of thingsintroduced by the reorganization scheme of 1874. Official Regulations in connection with practice with military rifles were laid down in Switzerland as far back as 1850. The Regulations of 1863 imposed, *inter aiia*, the following conditions on such associations —

- (i.). The membership was fixed at a minimum of 15.
- (ii.). Military rifles and ammunitions had to be used.
- (iii.). The targets had to conform to the pattern laid down in the official rules and regulations.
- (iv.). The articles governing the association had to be framed onlines approved by the Cantonal military authorities.

Statistics are given relating to the associations existing in certain years between 1864 and 1872, their membership and the monetary grants made to them. Matters connected with the voluntary rifle clubs for the period subsequent to 1876 are dealt with under four distinct subheads, relating to the years 1875 to 1883, 1883 to 1893, 1893 to 1908 and 1908 to 1913 respectively.

Many attempts have been made in Switzerland to deal with the question of the training of soldiers in rifle practice by utilizing the organization of the rifle clubs, which have existed in Switzerland for many decades now, and several laws have been passed on the subject. The question has also been much discussed at the meetings of the Federal Association for the encouragement of voluntary rifle practice. A considerable impetus was given to the formation of rifle clubs by a law passed by the Federal Council in February, 1893, which caused an enormous increase in the number of these clubs and in their membership, for whereas in 1889-1890 there were only 143 such clubs with a membership of 6,039, in 1906 their number had increased to 1.881 with a membership of 88,661. The introduction of a new military organization, in 1907, led to a still further increase in the number of these clubs to 2,373, and their membership at the same time rose to 109,340. The State contributions to rifle clubs has also increased very considerably; in 1877, the annual State contribution amounted to £5,650 only, but in 1913, this contribution was £28,000, and to this sum should be added another $f_{15,000}$ in respect of the rebate on the sale price of ammunition, the subsidies paid to dealers in ammunition, and the cost of transport,

THE SWISS FLAG.

The national flag of Switzerland, as well as the name by which its people are known, are a heritage from the conquerors who first successfully struck the blow against an Austrian foe in defence of the liberties of the Forest States of the early 14th century. If the ancient chronicles are reliable, it would appear that the mountaineers of Schwytz, who fought against Frederick the Handsome of Austria, in November, 1315, on the slopes of Morgarten, had for their standard a red banner with a white cross in the sinister upper corner. It is well known that the mountaineers of Schwytz fought for Rudolph of Hapsburg at the Siege of Besançon in 1289, and ancient records seem to indicate that it was this prince who first accorded to the mountaineers of Schwytz the right to bear, on their banners, the Christian symbol of the Holy Roman Empire which is now the national emblem of Switzerland. In due course the cross of Schwytz became the rallying signal of the upholders of the Confederation. The oldest flag bearing this symbol is thought to be that of the Swiss Auxiliaries of the Teuton Order of Knights captured by Ladislas V., King of Poland, at the Battle of Tannenberg in 1410. This flag was up till quite recently one of the trophies of war hung in the Cathedral of Cracow. In 1480, the Diet of Lucerne decided that each contingent of the Swiss levies, raised by the Confederation for service under Louis XL, should carry its own Cantonal flag, but with a white cross thereon. A similar decision was promulgated at Zurich in 1507, when 6,000 men were raised for service under the Emperor Maximilian.

An illustration is given in the *Revue* of a "banner of honour" presented by Pope Julius II., in 1512, to the Schwytzers; it has a repre-

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sentation of the Virgin and Child in the centre and of the crucifixion in the sinister upper corner. At the meeting of the Diet held at Baden in 1540, a decree was published, providing that the first body of Federal troops sent to the Allies of Rottweil in Suabia were to carry " a red flag with a square white cross."

In the XVII. and XVIII. centuries it became the practice of the Cantons to embroider the "cross of Schwytz" on their Cantonal colours; the same practice having been followed by the colonels of the Swiss regiments raised for service as foreign legions. Illustrations of the Zurich banner borne at Marignan as well as others of historical interest appear in the *Revue*.

At the period of the Revolution, the Helvetic Republic, "one and indivisible," received from the Council, which assembled at Aaran, a tricolour flag; green, red and yellow. At the same time, the Cantons were obliged to surrender their ancient colours to the new government. The Act of Mediation under which Napoleon was pleased to give the country a new constitution in 1804, not only restored to the Cantons their ancient sovereignty, but also the particular flags formerly appertaining to each of them. It was in 1815 that Switzerland once more adopted the federal colours and emblem which to-day float in profusion throughout the little Mountain Republic.

The design for the Seal of the restored Confederation prepared by Aeberli in 1814, was accepted by the Diet of Zurich on the 4th July, 1815. It consisted of a shield having a white cross on a red ground surrounded by the arms of the XXII. Cantons arranged in historical order of precedence. A Federal Order in Council issued in 1889 defined the Swiss arms as consisting of a white rectangular cross, on a red ground, each arm symmetrical in relation to the centre, but of which the vertical member was to have a length one-sixteenth greater than the horizontal. These arms were popularized during the first years of the Restoration by their adoption in 1817 as a badge for the army. By an article in the Regulations of 1841, the Cantonal battalions of the Swiss Army were given colours consisting of materials of the Cantonal colour, bearing the name of the Canton in letters of gold on the horizontal arm of the Swiss Cross.

The ancient Swiss regarded their Cantonal banners as something very sacred. Large standards of the Cantons were only displayed publicly when events of importance affecting the honour and existence of the State were agitating men's minds and the Militia, in consequence, was mobilized. The standard-bearer was always a magistrate, and the guard, which consisted of considerable numbers, was chosen from amongst those having the reputation for bravery. Each member of the guard had to take an oath "to guard the standard, and if the standard-bearer fell, to pick it up and raise it aloft himself or to deliver it into the hands of another and never to abandon it, either by day or by night, until death." The flag of the conquerors at Morgarten symbolizes, in Switzerland, the national life of its people, the thirst for independence, the ideal of justice and Christian fraternity, the very justification for its existence as an European state. It recalls the liberty enjoyed during the six centuries which have gone by.

NOTES AND NEWS,

Switzerland.—Questions affecting the censorship still occupy a prominent place in Switzerland. A correspondent deals with the recent decision of the Committee of Control of the Press, which has unanimously decided not to permit the circulation in Switzerland of a German translation of the official report, known as the Red Book, of the Belgian Commission of Enquiry into Germany's violations of International Law during the present War. It is considered that the Federal Council has acted erroneously in making " lois d'exception " and that the sooner a return is made to the ways provided for under the Constitution the sooner will there be a return to truth. It is held that the Federal Council was badly advised in permitting a military régime in Switzerland before there was a real necessity for the adoption of such a measure, and that, in consequence, harm has been done to the morale of the army. Confidence in the Federal Council appears to have been further disturbed, so far as the French section of the population is concerned, by its suppression of the recent work entitled " J'accuse" dealing with the German situation; it is said that the Federal Council has created a new offence, lèse-neutralité, which cannot be justified either on juridical, philosophical or any other grounds whatsoever and the Council, therefore, is held to be acting in an unconstitutional and arbitrary manner. What is thought to be a particularly serious matter is the suspicion that the Swiss military chiefs are, by reason of their admiration of the German Army and of an excessive confidence in the final triumph of this army, supposed to be the instigators of the unfortunate policy against which complaint is being made.

Reference is again drawn to the incident connected with the suspension of the *Bibliothèque Universelle* and the opinion is expressed that it was unnecessary for the Government to proceed against this publication under the special powers conferred by the Ordinance of July last since the Swiss Penal Code contained ample provisions to meet the situation; the only difference is that under the latter the case against accused must have been tried before a judge and jury. Had this been done the latter would probably have returned a verdict of acquittal and there would then have been nothing more to say. It is suggested that the Federal Council may yet regret having assumed a dictatorship, however laudable may have been its intentions. Copies of photographs, from the German translation of the Belgian Red Book, are published with this number of the *Revue*. They show the interior of a damaged church in Termonde, a part of the damage to the town, the ruins of Dinant and wounds inflicted by explosive cartridges.

This number of the Revue concludes with a bibliography.

SUPPLEMENT.

The European War.

The study of the great European War, which was begun in the Supplement issued with the number of the Revue for February last, is continued in the Supplement issued with the number of the Revue for October, 1915 (vide R.E. Journals for June and September, 1915, and January, 1916).

The Contest for Hill 60.

The story of the contest for Hill 60 was commenced in the *Supplement* issued with the number of the *Revue* for September last and is completed in the number under review.

The height known as Hill 60 is situated to the S.E. of Ypres and to the S.W. of Zillebecke. Although of relatively small altitude, this height effectively commands the plain which lies adjacent to it. The British troops captured this height in an attack made during 17th—19th April, 1915. The success obtained at this point was referred to in a British official report dated 20th April last. The report in question states that the operations were commenced by the explosion of a mine, which resulted in the killing of several German soldiers and the capture of 15 others, including an officer. The German counter-attack of the 1Sth April is referred to in this report, and it is stated therein that the German troops advanced, in close formation, under the fire of British machine guns and were repulsed all along the line with heavy loss.

The German headquarters kept the German public informed of the incidents of this contest in communiqués issued on the 18th and 19th April. In a German communiqué, bearing the first of these dates, it is admitted that, after the explosion of a mine on the previous day, the British obtained a lodgment in the German position S.E. of Ypres, but it is claimed that these British troops were driven out again by a counter-attack ; the German communiqué finishes up by saying :--" The contest is now alone in progress for the possession of the three craters." In the German communiqué of the 19th April the announcement appears :-- " To the S.E. of Ypres, the British have been hunted out of the small portions of our position which they were still holding. Last evening they attempted to retake the hill, by a violent attack directed along the Ypres-Comines Railway. This attack failed with heavy loss." The contradiction in the accounts of the two sides is absolutely complete. In the British Isles, the impression was that the British troops were in possession of Hill 60, in Germany a contrary view prevailed. The newspublished on the days following ought, without doubt, to have cleared up the situation. It might be taken for granted that if the Germans had lost a position of some importance, something would be said of the efforts to retake it. The silence of the German headquarters on this subject, after the 19th April, and the report emanating from London on the day following provides ample evidence respecting the true facts of the situation. The victory of the morrow had wiped out the defeat of the yesterday.

The tactical experiences of the War also afford some guarantee, even in the absence of fresh information from Berlin, that the reports of the Allies would tell of the Germans returning to the charge. For from the very nature of the operations connected with the attack and defence of fortified positions on the Western Front, such reflex movements had taken place almost from the very beginning of the trench warfare; experiencehad shown that three phases generally occur in operations of this kind.

The first is that connected with the reconnaissance of the position to be captured, coinciding with the operation of driving back the advancelines of the enemy covering the approaches. The second is that of the decisive attack which, if it should succeed, provokes an immediate countermove of the side dispossessed of its defences for the purpose of driving out the intruder before he has had time to make good his hold on the position seized. If the counterattack succeeds, the original attacker has to recommence his operations.

If the first countermove fails, the third phase opens. The side dispossessed still continues to cherish designs on his lost trenches. But in the meanwhile the new possessor makes himself at home in the position captured, and proceeds to prepare plans for a further forward move.

If the similarity of the two accounts to numerous precedents to which they can be compared is not deceptive, it may be safely conjectured that the Germans probably obtained some success in their first counter-attacks, as claimed in the German communiqués of the 18th and 19th April; but it is equally probable that they hid up their final want of success. That is to say in their accounts they omit reference to the intermediate operations and pass straight away to the last phase. In that they claimed to be still in their original positions, they as good as burnt their boats behind them; for this reason they could no longer say that they had regained this position without, at the same time, admitting that they had lost it. The British account bears the impress of truth; from the moment that Hill 60 was occupied there was no sound reason to invent news concerning fresh fighting in this region. If such fighting did take place, as the Germans state, it could logically only have been connected with the third phase, that is to say with an attempt on the part of the Germans to regain the ground lost.

Further enlightenment on the situation was first obtained from a French communiqué issued at 7 a.m. on the 22nd April; this announced that a German counter-attack against Hill 60 had been repulsed by the British troops. At the same time it was stated that the German losses at this point had since the r6th April amounted to some 3,000 to 4,000 men. A second French communiqué dated 7 a.m. 23rd April announced that the British troops had repulsed two German attacks against Hill 60 and that the German losses had been more serious than previously announced.

The British General Headquarters reported, on the 22nd April, that the Germans were continuing their counter-attacks against Hill 60, and that many German attacks had been repulsed. On the day following, a further report (from British General Headquarters) made mention that the German counter-attacks on Hill 60, to the west of Zwartelen had been several times renewed since the issue of the last report and that *all* these attacks had failed and that they had ceased for the time being. At the same time, it was definitely stated that the British troops were holding the summit of Hill 60, and that there was not a word of truth in the German official communiqué in which the claim was set up that the Germans had recaptured the position.

A fortnight later, namely on the 5th May, the Germans made a gas attack on Hill 60 and recaptured their lost trenches; however, Berlin was naturally unable to announce this fact, but it was made known by the British Commander-in-Chief. The British explanation was far from

satisfying the German Headquarters which issued its own account of the affair on the 7th May, in the following terms :—" Near Ypres, all attempts of the British to recapture Hill 60 which has been, since the 17th April, the centre of the contest and is situated to the S.E. of Zillebecke, have failed."

This was by way of confirming the German communiques of the 18th and 19th April, referred to earlier, in which, contrary to the truth, the capture of Hill 60 by the British troops was denied. The issue of the last attack on the hill was represented by the Germans as if the $r\delta lcs$ played by the two sides had been reversed; instead of announcing that it was the Germans who had attacked and expelled the British troops, it was made to appear that it was the latter who had attacked and had failed to expel the former.

Later the German Headquarters gave itself away badly, when speaking of the recapture of this position by means of a gas attack. This example of German Press methods is one of the most interesting. The cycle of permanent victory for the Germans was complete. Here was a denial of an enemy success put right by the account given of an event of a much later date, the careful editing of the announcement relating to which completely altered the complexion of the true facts of the real situation. The attack, which made good a previous defeat, thus became the final episode of a victory falsely claimed at an earlier date.

The situation was very similar to that connected with the Battle of the Marne. Information concerning the German repulse at Hill 60, between the 17th April and 6th May, was no more allowed to become public property in the Fatherland than was the German retreat from the Marne.

The Second Battle of Ypres.

The Surprise caused by the Use of Asphysialing Gases.—On the 23rd April last, the German Headquarters announced that, on the previous evening, the German troops had directed an attack from their front Steenstraat to east of Langhemarck against the Allied positions to the N. and N.E. of Ypres, and that these troops had pushed forward with élan on a front of over 5 miles up to the high ground south of Pilkelm and to the east of this locality. It was further claimed that during the course of a desperately contested struggle, the German troops had seized the crossing over the Ypres Canal near Steenstraat and Het Sas and had established themselves on the west bank of the waterway referred to. It was stated that Langhemarck, Steenstraat, Het Sas and Pilkelm had been captured and also 1,600 British and French prisoners, 30 field pieces and 4 heavy British guns.

On this same 23rd April and on the day following, the French General Staff substantially confirmed the news from Berlin, adding an explanatory note. From this note the public learnt that on this occasion the Germans had, for the first time in the War, used bombs giving off asphyxiating gases, which produced injurious effects at a distance of over 2,000 yards in rear of the Allies' trenches. It was learnt from German soldiers taken prisoners about this time, that asphyxiating gases were in future likely to be regularly employed by their commanders in connection with their further operations; and also that the German soldiers had been provided with protective appliances for use in the event of the Allies employing asphyxiating gases as a retaliatory measure.

The British General Staff also furnished explanations in relation to the matter; the gas attack, it would appear, was first made against the British left, at that time located near Bixschoote and Langhemarck to the north of the Ypres salient, and was begun by the release of poisonous gas from a great number of reservoirs or generators. The Germans must have had their preparations for the use of asphyxiating gases in hand for some considerable time beforehand, and did not overlook the precaution of having some excuse ready in advance to justify the contemplated breach of the provisions of The Hague Convention on this matter. For more than a fortnight before-the first mention was made on the 9th April-the German communiqués had been accusing the British, the French and the Russians alike of using stupefying or asphyxiating gases. As soon as the surprise of the 22nd April was sprung on the Allies it soon became evident that the Germans had, in anticipation, utilized the manauere morale to make it appear to neutrals that, in employing this new weapon of war, they had been provoked, by their enemy's breach of the recognized code, to adopt retaliatory measures.

Berlin, it would appear, recognized that something more substantial than mere affirmations, without any evidence whatsoever, was really necessary to justify the breach of the provisions of The Hague Convention, and the German Legation at Berne-and probably the German diplomatic representatives in other neutral capitals-furnished the Swiss newspapers with an explanatory memorandum; it is dated Berne, 12th July, 1915, and in it is put forward the allegation that the French and British troops resorted to the use of asphyxiating gases long before the German Army did so. In support of this allegation the Swiss papers were supplied by the German Legation with copies of a document issued by the French Ministry of War, on the 21st February, 1915, describing gas-grenades and canisters. The German explanatory memorandum and the French description of the gas-grenades and canisters are reproduced in the Supplement; in the concluding paragraph of the explanatory memorandum it is stated :-- " This French communiqué no longer leaves any doubt on the point. It proves that the French were the first party to use asphyxiating gases. The reproaches addressed by them to the German Army are therefore particularly misplaced."

It was very natural that the French authorities should publish a reply to the above allegation. This was done without delay, and on the 16th July, 1915, the Havas Agency issued a note to the Swiss papers, in which attention was drawn to the difference between the gases employed by the Germans in their trench warfare and that produced by the gas-grenades and canisters described in the French document of the 21st February, 1915. The Havas note states that, whereas the gases employed by the Germans seriously affected the organs of the human being and in many cases caused the death of the victim gassed, after painful sufferings, on the other hand, the gases given off by the French grenades and canisters referred to were not deleterious, but only produced a state of intense stupor for a time, which wore off leaving

the organs of the victim uninjured. In a word the difference in the effects produced by the French and the German gases was as wide as that produced by the use of stinking water as compared with that produced by the use of vitriol. It is not proposed to discuss here the question whether the use of deleterious gases is either legitimate or within the code of the ethics of war. It is sufficient to take cognisance of the fact that German officialdom practically admitted the illegal action (from the point of view of International Law) of the German military authorities in this matter, since it went to the length of attempting to put the onus for the initiation of gas attacks on to the shoulders of their adversary. This truly constitutes the manance morale designed with great care and launched in anticipation of the great move it was intended to cover.

The Germans showed great cleverness in the way they introduced. by gradual stages, the subject of the alleged use of poisonous gases by the Allics. Nevertheless, the German accounts in relation to the methods of employment of poisonous gases alleged to have been used by the French do not tally with the methods for the use of stupefying gases described in the document of the French Ministry of War, dated 21st February, 1915, contributed by the German Legation to the Swiss papers, whilst these German accounts do describe very clearly the procedure adopted by the German troops in carrying out their own gas attacks. So far as neutral countries were concerned, it was futile on the part of the German Legation to seek, in their explanatory memorandum of the 12th July Jast, to create confusion in the public mind between a gas which irritates the nostrils, and one which destroys the pulmonary organs. The manœuvre morale resorted to in this case was only another example of the persistent use of equivocation. In this new field, there is seen once more the adoption of a course which was similar to that to which attention has already been drawn in relation to the attack on Liège, the equivocation between the terms lown and foris; similar to that in relation to the operations in Northern France, the equivocation between the fighting on the Meuse and the new battle claimed to have been fought at Rheims; similar to the situation which existed on the Marne and the Aisne, the equivocation between a compulsory retreat and the adoption of a defensive-offensive attitude.

Even in relation to subsidiary details, the German methods did not alter; of this the employment of asphyxiating gases provides additional testimony. For instance, at the end of July last, the German Headquarters contributed a second memorandum to the newspapers. Under the title Un area du commandement français, there was reproduced what was alleged to be an order of the right French Regiment of the Line wherein there appeared statements, inter alia, to the effect that asphyxiating gas shells used by the Germans, in an attack made on the 20th July last, in Alsace, contained a substance capable of giving off a very strong smell, of causing tears to flow and of exciting violent coughing, but possessing no poisonous properties. According to the information centained in the order referred to above, the inhalation of the gases produced from the German shells was distinctly unpleasant, but dangerous only in a very small degree. The German memorandum went on to say that the French, after having been the first to use projectiles giving off poisonous gases, had dared to accuse the Germans of being guilty of a similar act, they (*i.e.* the French) knew—witness the order of the 112th French Regiment of the Line—that their accusations were false; further, the French were also fully aware that the German gases were not capable of producing fatal effects; these gases were not even dangerous, but only unpleasant to inhale.

The terms in which the German justification is drawn up has a flaw, and this, one of vital importance. It may well be that the gases employed by the Germans in Alsace on the 20th July were not capable of producing fatal effects, but this is by no means conclusive evidence that the gases employed in Flanders in April last were exactly similar. Indeed, it would not be a matter for surprise if, as a matter of fact, between April and July, 1975, the indignation aroused against German methods, and the stain caused thereby on the reputation of the responsible chiefs had proved to be such as to result in a demand for a change of policy being made on the chemists in the German Munitions Service to prescribe new gases for the purposes of German warfare.

The Tactical Surprise at the Beginning of the Battle.—The Anglo-French troops holding the Ypres salient, consisted of a French Division on the line Steenstraat-Langhemarck-Poelkappelle facing north; a Canadian Division on the line Poelkappelle-Becelaere facing N.E.; a British Division on a curved line from Becelaere by the cast of Zonnebeke to a point west of Becelaere, facing southwards; parts of the 5th British Army Corps extended from the point last mentioned towards Hill 60 and St. Eloi facing east. Four battalions of the 5th British Army Corps and one battalion of the Canadian Division were held as a Divisional Reserve at Ypres; a Canadian Brigade, at the same place, constituted a second-line reserve; lastly a British Infantry Brigade which had sustained heavy casualties in the contest for Hill 60 were at Vlamertinghe. The Belgian Army was stationed on the line Steenstraat-Dixmude and beyond, in extension of the French left flank.

The Real Version.-The action began at 5 p.m. on the 22nd April last. After a vigorous bombardment of the whole length of the Allied position, the Germans delivered an attack against the sector held by the French and for the first time in history a tactical success on the field of battle was obtained by the discharge of poisonous gases. An extract from the British Commander-in-Chief's report dealing with the incident is reproduced in the Supplement; in it he points out that the effect produced by the poisoned atmosphere was so staggering that all action became impossible along the whole length of the front held by the French Division. The fumes of the gas were so dense that it was impossible to see through them. Hundreds of men became comatose and in less than an hour the whole length of the position gassed was abandoned, about 50 guns being lost in this way. No blame whatever attached to the troops in connection with the loss of this section of the position ; no troops in the world could have held on to the trenches under similar circumstances, for the use of poisonous gases being at that time quite unexpected, no protective helmets or other appliances had been provided for the troops.

The gases having cleared the Allied troops out of the way the German offensive succeeded in reaching, on its right, the Yser Canal; in consequence, the bridge at Steenstraat and some works on the west bank of the canal south of Lizerne falling into the hands of German troops. Opposite the German centre, between Bixschoote and Langhemarck, the French were pushed back to the north and to the south of the Staden-Ypres Railway, as far as the bridge over the canal. This retirement brought in its train a double danger; on the west wing, the possibility that the Germans might drive a wedge between the French Division and the Belgian Army; on the east wing, the possibility that the flank of the Canadian Division might be uncovered; if this happened it would result in involving the last-named division in the retirement which had taken place. This double danger was increased by the reduction in the number of French guns and the loss of a heavy British battery which had to be abandoned in the confusion. The Reserve was pushed forward to the rescue of the Canadian Division which had held on most obstinately to their position. The Allies launched counter-attacks against the Germans, the French troops delivered a charge, and finally, at 10 a.m. on the 23rd April, contact was re-established between the French and Canadian Divisions and a new Allied front was formed, some 700 yards to the east of the canal. The unknown nature of the situation as regards the Belgian Army was met by placing a part of the Reserve under the immediate orders of the Commander of the French Division. The situation still remained critical; the Germans taking advantage of their superiority in guns, continued to display exceedingly great activity along their whole front. The German activity increased still further during the 23rd April, owing to the agrival of heavy guns from Ostend. Fresh troops of the 5th British Army Corps now came into action and the vigorous counterattacks delivered by them resulted in the Allied front being held.

A consultation had taken place on the morning of the 23rd April between the British Commander-in-Chief and General Foch the commander of a group of French armies in the north. The latter proposed to advance to the attack with the object of regaining the original front held by the Allies at the time of the gas attack. These reinforcements would require some days to reach the fighting line ; in the meantime, it was essential that the Canadians should hold on to their position. It was agreed that, if delay occurred in bringing up General Foch's troops, other dispositions would be made as it was not possible to allow the British troops to remain in the exposed situation they occupied, for long. Meanwhile orders were issued to two brigades of the 3rd British Army Corps and the Lahore Division to reinforce the Ypres front.

The Germans realized that their opponents were in a critical situation, among other things, in view of the latter's inferiority in artillery, and they therefore, no doubt, hoped that the new methods of warfare introduced by them would continue to give them further advantages of the kind they had already succeeded in obtaining. On the morning of the 24th April, indeed, the Germans gained two further successes. An attack delivered by them in the early hours of the morning, at the point of junction of the French and Belgian troops on the west bank of the canal, placed the village of Lizerne in their possession, and they also succeeded in piercing the Allied line near Saint-Julien where the French and Canadian Divisions joined up, and the village last named also passed into their possession. For two days fierce fighting took place. A counter-attack delivered on the 24th April by the British troops with the object of recapturing Saint-Julien failed in its purpose but checked the enemy's further advance. The Germans delivered no less than six counter-attacks against the Canadians who, however, held their position and maintained contact with the French on their left.

On the 26th April, the Lahore Division and a British Cavalry Division was pushed into the fight, at the point of junction of the French and Canadians. The Germans were repulsed and driven back a short distance towards the north, but continuous discharges of poisonous gases interfered with the progress of the Allies. A battalion of the Northumberlands succeeded in reaching and occupying the southern parts of Saint-Julien, but were eventually driven out by a gas attack. The German success at Lizerne was temporary only, for French and Belgian troops later recaptured this village.

The French Version.—The French communiqué dated 3 p.m., 23rd April, makes mention of the withdrawal of the Allied troops from their trenches and of the retirement of the left wing towards the west and of the right wing towards the south. However, no mention is made of the furthermost points reached by the Allied troops in this retrograde movement, nor of the capture by the Germans of the canal bridge at Steenstraat. The announcement contained in the French communiqué that the enemy had been checked and that the lost ground had been recovered by a counter-attack immediately produced a sense of relief in the public mind.

The (French) communiqué issued at 7 a.m. on the 24th April is reproduced in the *Supplement*. It announces that the Anglo-French troops had regained the lost ground towards the north, situated between Steenstraat and the Ypres-Poelkapelle Road.

A second French telegram, issued on the 24th April, provides the supplementary information that the gas attack had been renewed. Information concerning the counter-attack of the 23rd April is repeated and encouraging news is given with regard to the general situation. Thus is made patent, first, the care exercised by the authorities not to permit the public to exaggerate the dangers likely to result from the innovation introduced into the methods of warfare employed by the Germans, which had proved so efficacious at its initial stage and to combat which the Allies had adopted no anticipatory measures; secondly, the intentions and hopes of the Allied chiefs, the execution of whose plans were resulting in the recapture of the ground lost and the reestablishment of the former front. The public mind having been quieted, the intentions translated into action and the repairing of the damage done begun, the subsequent telegram told the extent to which the mischief wrought had been further made good. It is a repetition merely of a procedure now well known. This part of the examination concludes with the French communiques of the 25th-27th April, which tell of the German gas attacks and of the continued progress made by the Allies in regaining the lost ground.

The British Version.—During these three days, the tone of the British telegrams conformed to that adopted in connection with the Battle of Neuve Chapelle; they were spare in the use of words, gave a brief outline of the main lines of attack and defence and made mention of the principal features connected with the progress of events, even those which were unfavourable to themselves, in two or three well-chosen words.

The telegram of the 23rd April describes the effect produced on the French Division by the gas surprise and adds that the French were obliged to retire during the night to points outside the gas zone; they retired towards the canal. The telegrams of the 24th to 26th April deal with the incidents already described earlier in this review under the subhead The Real Version. In the concluding portion of the telegram of the 27th idem it is stated that desperate fighting continued to the N.E. of Ypres. The general situation had not changed; the Germans had seized Saint-Julien. The British public had been apprised of the full facts and were aware that owing to the dastardly methods introduced by the Germans, the French, taken by surprise, had been obliged to retire, thus uncovering the British left and that the British had, in consequence, also to retire in order to maintain the continuity of the Allied front. The public also learnt that the Germans had captured Saint-Julien, though no mention had been made, at this time, of the fact that the loss of the village was due to the employment of gas by the Germans; it was only when the full despatches were published that reference was made to the use of poisonous gases by the Germans.

The German Version.-The German communiqué of the 23rd April mentions the decisive character of the German attack directed against the Allied position north of Ypres; the capture by the Germans of Steenstraat, Het Sas, Pilkem ; the crossing of the Yser near Steenstraat and Het Sas by the German troops; the numbers of British and French troops taken prisoners and also of the field and heavy guns which fell into German hands. This was only a beginning; further information was reserved for later telegrams; that of the day following (the 24th April) announces that all attempts on the part of the enemy to dispute the possession of the ground captured to the north and east of Ypres had failed, and went on to say that the number of French, British and Belgian prisoners had risen to 2,470 men, the number of captured guns to 35, and that in addition many machine guns and rifles and large quantities of stores also fell into German hands. German communiqués, written in the same tone, continued to be issued for some days subsequent to the date last mentioned. Those for the 25th to 27th April are reproduced in the Supplement. Reading these series of telegrams, the German public could not have formed any other view on the situation than that a victory had been gained, a victory moreover which was definite and final resulting as it did in the capture of Ypres, the piercing of the Allied position, maybe in the conquest of the last square yard of Flanders, and even in the resumption of the great march towards Paris and Calais. There could be no doubt in the minds of the German public that Lizerne had been captured and destroyed. What loomed largest

was the capture of the canal crossing and its retention in German hands; it was not likely, so the public would imagine, that German troops would hold on to this crossing unless there was some strong military reason for so doing. This success was the beginning of the operation of which the bombardment of Poperinghe was the next step, to which reference is made in the German communiqué of the 27th April. It would lead the Germans on to the lines of communication of the enemy, that is to say, to the rear of the Ypres Salient. The successful attack of the 23rd April had already reached this stage on the 26th *idem*; the final triumph could not be far distant.

Conclusion.—The comparison of the three versions is an exceedingly interesting study. The French version is diplomatic; the account of the fight is tinted to suit the several incidents thereof; it contains admissions of enemy successes; discretion was exercised in regard to the hour of issue. The public became aware that the French arms had met with a reverse, but a reverse which was in no way discreditable. There was hope that the mischief would soon be compensated for; it was sufficient to await the morrow with confidence, in spite of the uncertainties of the situation.

The British version relates facts, and these alone. The Allies had met with a reverse, a reverse which had taken a heavy toll in men and *materiel*, and the damage done still required to be rectified. The public were, however, required to put their trust in the tenacity of purpose of the troops; these would only give way further when the situation made the adoption of any other course impossible. It was too soon then to express regrets or give way to despair.

The German version has a cocksure tone about it, and finishes up with an equivocation. For the bombardment of Poperinghe was only dust to throw in the eyes of the civil population; a bombardment carried out at very long range against a locality considerably behind the position, against which the Germans had found themselves not only held up by obstinate defenders, but in front of which they had been obliged to give way just at the time the tactical needs of the situation demanded a further advance on their part in order to give significance to the bombardment referred to. This was only another exemplification of the manature morale destined to stimulate the public just at the time the manature minitane appeared to be on the point of losing its efficacy.

These three versions do not exactly represent the intentions and aspirations of the Army Chiefs. The French Army Group Commander had decided to regain the lost position. The German Commander had scored a success by the employment of novel means of warfare; he felt that he had a superiority in guns; he had no doubt whatever that further successes were in store for his troops. The British Commanderin-Chief was ready to support his French comrade-in-arms, but on condition that the delay in bringing up reinforcements did not further compromise the hazardous position in which his troops found themselves; otherwise, he would be compelled to take steps to minimize the risks run by his men.

The British Retreat.

First Phase.—On the 4th May, the British Commander-in-Chief addressed a communication to his Government, in which he pointed out that the loss of ground, resulting from the German gas attack, had made it necessary to alter the line held by the British troops on the Ypres front and that the new line taken up ran westward towards Zonnebeke. During the week previous to the date last mentioned very little information-had been given out from the British General Headquarters. On the 28th April, it was announced that the joint operations of French and British troops had checked the Germans and that, on this date, the last named had not renewed their attacks. Up to the 1st May, no further change had taken place on the British front. The French communiqués of this period were not enlightening; they referred to the fighting at Steenstraat, in which French and Belgian troops were engaged. The British telegram of the 3rd May gives the principal information; it mentions the German gas attacks, one to the north of Ypres near Saint-Julien, the other to the cast, at Hill 60. Neither of these attacks was successful. The key to the mystery must be sought for in the German version; this version is very categorical, according to the practice adopted since the beginning of the War. It states simply that the British troops had been defeated and had yielded ground before the victorious advance of the Germans.

The German communiques of the 28th April and those of 2nd to 5th May are reproduced in the Supplement. The one first mentioned speaks of two British attacks, at Pilkem, near Ypres, which are said to have failed with heavy loss and it is definitely stated in this communiqué that the enemy had made no attack on the west bank of the canal. The German communiques of the 30th April and 1st May made no mention of the British troops. The communiques of 2nd to 5th May announce victories won by the Germans against British and French troops at the point of the bayonet in the region N.E. of Ypres. In the absence of a detailed reference to this fighting in the British version, it would have been difficult to contradict the Berlin account, but it so happens that a Paris telegram of the 3rd May makes mention of a German attack against the British front north of Ypres, which was repulsed by the Allied troops. This last reference may allude to a mereincident of the fight, as on the day following the British General Headquarters admitted the retirement of the British troops.

Since then the British Commander-in-Chief's despatches relating to these operations have been published and convey a very different impression regarding the events to which they relate than is to be gathered from the German communiqués. The account given in these despatches of the operations is in agreement in every particular with the fragmentary communiqués issued by the General Staffs of the Allies between the 23rd April and 5th May; the account given in the despatches is merely the original framework with the details amplified. That this version describes the actual situation is evidenced by the intention to retire, clearly expressed by the British Commander-in-Chief, on the 23rd April, *i.e.*, the day following the surprise caused by

the gas attack, at the interview with the French Army Group Commander, and repeated on the 20th April at a second interview. On each occasion, the British Commander-in-Chief consented to postpone the retirement of his troops, but on condition that the French Division should reoccupy its original position (i.e. that prior to the gas attack). This condition not having been fulfilled and the prospect of doing so sufficiently early being remote, Field Marshal Sir J. French decided to put into execution, on the 1st May, the measures agreed upon in principle eight days earlier. It is not a matter of much moment whether these measures were adopted as part of a prearranged plan, as would appear from the British version, or whether they were suddenly necessitated owing to the success of the enemy's attack, as stated in the German version. All indications point in the direction of the British version representing the actual situation more exactly than does the German version. Another presumption in favour of this view lies in the fact that the British report refers openly to the retreat taking place by reason of the renewal of the German attacks.

The Second Phase.-From the time that the British line near Ypres was pierced, on the 22nd April last, the troops holding this front were, as reported by the British Commander-in-Chief, subjected to a continuous German bombardment by a considerable number of guns, the expenditure of ammunition by the Germans being practically limitless. It soon became evident that, under artillery fire of such intensity, it would be quite impossible to dig trenches giving sufficient cover or to re-form the front in the midst of the confusion and demoralization caused by the gas attacks which were now being daily renewed. It was only on the 8th May that protective masks against gassing were first brought into The British Commander-in-Chief's despatches draw attention to use. the fact that on the date last mentioned the German bombardment was particularly violent, first along the whole front, later by the gradual concentration of fire on the salient at that time held by the troops under Sir Herbert Plumer. The German artillery completely destroyed the British trenches and caused exceedingly heavy casualties. Then, a vigorous infantry attack was delivered by the Germans which caused the British troops to break away. Sir Herbert Plumer's own report of the incidents in this part of the field is quoted in the British Commanderin-Chiei's despatches and in General Plumer's report the retreat of the British troops is referred to in explicit terms. It was only on the 26th May that the British succeeded in reinforcing their front. In the meanwhile the French had regained the ground lost by them, and on the date last mentioned the British succeeded in effecting a junction with the French front at the same point where the British and French troops had joined up prior to the gas attack.

On the oth May, a Berlin telegram announced that the enemy had been driven out of their strongly fortified positions between the Fontaine-Wieltje and Gheluveld-Ypres Roads; that Frezenberg and Verlorenhaek had been occupied and thus the Germans had entered into possession of a series of heights commanding the country lying to the east of Ypres. The German report was somewhat exaggerated; the British troops had retired before the German advance precisely because their position had

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not been strongly fortified; they had not been able to dig themselves in owing to the intensity of the fire of the German artillery. On the other hand, the British reports glossed over certain points. The fighting, according to the British reports, had produced no notable change, and in the report of the 1rth May, it was stated that in spite of the repeated German attacks during the previous week, the front held by the British troops had remained practically on the same line as that occupied immediately after the retreat of the 3rd and 4th May.

The situation is correctly described and, in spite of omissions, the British report probably gave the public a truer idea of the real situation than the German Headquarters gave to their own people, who were led to expect great things at Ypres in the immediate future. Fortunately, when the operations in Flanders came to a standstill, the important results attained by the great battle in Galicia gave justification for higher hopes being entertained by the British public in relation to the great issues at stake.

The Franco-Belgian Counter-Atlack.

Examination is next made of the manner in which the people in the belligerent and neutral countries were allowed to learn of the partial recovery of the lost ground and of the manner in which the Allies succeeded in re-establishing a junction north of Ypres. It is necessary to refer to the account of the operations on the front of the French Division and on the right of the Belgians for enlightenment on this point.

It may be remembered that, on the 28th April, the main German attack on the canal was considered by the Allies to have been checked. The French troops had retaken Lizerne. They had, in conjunction with the Belgians, on the date last mentioned and those subsequent thereto, made progress on the right bank of the canal.

The British communiqué of the 28th April had announced that the German attacks had not been renewed; moreover, there were no Germans west of the canal, except at Steenstraat--at this place they had established a small bridgehead.

The Berlin communique's were not so modest in the claims advanced on behalf of the German troops. In a telegram dated 20th April, it was stated that the German positions west of the canal, north of Ypres, near Steenstraat and Het Sas had been attacked, since midday of the day before, without ceasing or success. Encouragement is given by recalling the glories of the fight, and the telegram continues. "The number of the enemy's guns captured by us in the lights north of Ypres has risen to 63."

The bridgehead at Steenstraat was represented in the German report as something more important than the value assigned to it in the British report. In the telegram of the 30th April, it was made to appear that the Germans were about to make a further offensive counterstroke; it ran as follows:—" During the night the enemy attacked between Steenstraat and Het Sas. The fight still continues. The bridgeheads on the west bank of the canal, near Steenstraat and Het Sas have been improved by us and we have firmly established our footing in them."

The Bombardment of Dunkirk.

These telegrams throw light on another incident which could not fail deeply to impress the German mind : Dunkirk had been bombarded.

In France, the public looked skywards and hydroplanes went out seawards to reconnoitre the upper regions of the air. Shells had fallen on Dunkirk, this was an undeniable fact. They commenced to fall at 11.30 a.m. on the 20th May last. Twenty shells in all were fired, which made craters 10 to 15 yards in diameter. At first there was doubt asto whether these projectiles had been dropped by aircraft or fired from warships. As soon as it was discovered that they were shell and not bombs it was recognized that they had not been dropped by aircraft. Since they had a diameter of nearly 15 in. it was also clear that they could not have been fired, owing to their size, by the small German ships known to have been at Ostend. The gun or guns from which these huge shells were fired were soon located behind the German lines, near Nieuport, some 19 miles from Dunkirk. The ballistic properties of this heavy German artillery might well have been a cause of legitimate satisfaction to the German ordnance manufacturers, but the strategic results obtained by this bombardment of Dunkirk were nil and could. not be otherwise. This shelling of Dunkirk was after all nothing morethan an opération merale. This artillery display on the part of the Germans was most puerile, since their adversaries had not been driven from their positions on the Yser, no military advantage could be gained by a bombardment of Dunkirk. It would have been thought that rather than waste ammunition on the shelling of Dunkirk, with very long-range artillery, the Germans would have striven to bring a heavier shell fire to bear with shorter-range guns on the troops on their immediate front, where their troops were being held up; this would have proved of immensely greater assistance to their infantry, then engaged in trying to force its way through the trenches held by the Allied troops.

Some explanation of this kind might have been addressed to the civil population of Germany by the military authorities had it, under other circumstances, urged the employment of the long-range artillery for the purpose of the operations against Dunkirk actually carried out, or some other similar operation. However, it was the desire of the German authorities to create the very contrary impression on the public mind; telegrams had described the German offensive stroke along the line of the Yser; early successes had been announced, with reference to the later reverses suppressed; the situation appeared, so far as the German public was concerned, to be progressing very favourably.

It is not difficult to imagine the effect likely to be produced, under these conditions, on a public whose expectations had already been suitably manured and cultivated, by such an announcement as: "The fortress of Dunkirk brought under the fire of our guns," followed next day by the news: "The French stronghold of Dunkirk continues to be shelled by us." The public could well be excused for assuming that such announcements could but mean that the German offensive was concinuing to meet with further success. The equivocal nature of these

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announcements became a positive advantage so far as the effect on the *morals* of the public was concerned.

The German General Staff were, at all times, thinking of the morrow, and they continued to hope that it would soon bring with it good luck for the Germans. Should the results aimed at by the Great General Staff, by any mischance, not be fully attained, within given time limits, they could, as has been seen, resort to equivocation in the announcement relating thereto. The bombardment of Dunkirk was intended to connect up two phases in the operations, one that was past and the other that had yet to be put into execution. If the German plans miscarried, there would be no necessity for any telegraphic reports in relation thereto; instead, attention could be directed to some side issue, such as Turkish successes in the Gallipoli Peninsula, the German offensive in Courland, or the preparations for an offensive in the Carpathians.

In all this was to be seen a procedure which was an imitation of that which had gone before. For six months past the changes therein had been no greater than the alterations in the defensive positions occupied by the two sides. The bombardment of Dunkirk was but the ringing of a change on the practice of the past.

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