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THE EMPLOYMENT OF ROYAL ENGINEERS ON MANŒUVRES.

THE following extracts from the diaries of the C.R.E.'s and Field Companies during the recent manœuvres have been kindly communicated by the Inspector of Royal Engineers and give some idea of the work on which the Engineers were employed :—

(1).

EXTRACTS FROM THE DIARY OF THE C.R.E., 2ND DIVISION.

SEPTEMBER.

Monday, 13th.—Water supply and approaches to camp.

Tuesday, 14th.—Found bivouacs for the Division, in conjunction with the Staff, at Charlbury. Investigated water and water supply. Reported on facilities for dealing with supplies at night at the railway station.

Wednesday, 15th.—Reconnoitred position during the fight. Examined and reported on water supply facilities at Kingham, and also on those at Milton-under-Wychwood for night bivouac.

Thursday, 16th.—Water supply and approaches to camp at Witney.

Friday, 17th.—Attended Conference, Burford.

Saturday, 18th.—Improved approaches to camp.

Sunday, 19th.—G.O.C.-in-C. inspected camp. Made reconnaissance of river Thames for bridging in the afternoon.

Monday, 20th.—New bridge destroyed by enemy. Got up half 5th (Field) Company, 1 pontoon, and 1 trestle wagon to repair it at 8.18 a.m.; repaired by 8.38 a.m. Made pontoon bridge at Stanlake; ready at 8.50 a.m. Arranged water supply for bivouac same night.

Tuesday, 21st.—With G.O.C. mostly. Gave orders to companies.

Wednesday, 22nd.— Do. Do.

Thursday, 23rd.—Attended Conference at Faringdon.

(2).

EXTRACTS FROM THE DIARY OF THE O.C. 5TH (FIELD) COMPANY, R.E.

SEPTEMBER.

Tuesday, 14th.—With Guards Brigade.

Wednesday, 15th.—Escort to guns and ready to entrench position when captured, but attack unsuccessful.

Monday, 20th.—Attached to Guards Brigade to assist in forcing river. Made a bridge and used spare boats as ferry. Repaired demolished brick bridge.

Tuesday, 21st.—Attached to 6th Brigade. Entrenched Sands Farm Hill on left flank and placed two farms in state of defence.

Wednesday, 22nd.—Attached to Guards Brigade. One section with advanced guard. Assisted to entrench.

(3).

EXTRACTS FROM THE DIARY OF THE 11TH (FIELD) COMPANY, R.E.

SEPTEMBER.

Wednesday, 15th.—Supported attack and assisted in capturing a locality and resisting counter-attack. Placed churchyard in state of defence.

Monday, 20th.—Attached to Infantry Brigade. Ordered to throw bridge. Order cancelled and ordered to join 5th Brigade. Assisted in attack on Cromwell's Battery, with a view to entrenching position when captured. Marched 31 miles and delivered an assault.

Tuesday, 21st.—Entrenched locality to repel counter-attack.

Wednesday, 22nd.—Owing to a misunderstanding, the company was in rear when urgently required to fortify a locality; made a forced march, but too late to do much good. Retired with the defeated infantry and prepared bridges for destruction to cover retreat.

(4).

EXTRACTS FROM DIARY OF THE C.R.E., 3RD DIVISION.

SEPTEMBER.

Friday, 3rd.—At Charlton Park.—Accompanied the Major-General in charge of Administration and C.E., Eastern Command, on their inspection of concentration and dispersion camps at Buscot, Coleshill, Charlton Park, Wootton Bassett, and Swindon Coate. Ordered to make arrangements for water supply of two bivouac areas near Wootton Bassett.

Saturday, 4th.—Proceeded to reconnoitre the above bivouac areas with O.C. 57th Company, and handed over to him the making of the necessary arrangements. Reported to Colonel, General Staff, 3rd Division, at Sutton Benger, at 6 p.m.

Sunday, 5th.—Visited site of camp at Tetbury with O.C. 57th Company.

Monday, 6th.—Acted as C.R.E., Brown Force, under Brig.-General Mitford. 56th Company in the advance guard, half 57th with main body. Under verbal order from the Brigadier, I was proceeding to reconnoitre the Brinkworth Brook in the direction pointed out by him, to find a suitable place for a pontoon bridge, when the "Cease Fire" sounded. O.C. 56th Company was, by my order, reconnoitring for the same purpose on my right, so as to save time. Bridging equipment for both companies was available.

Tuesday, 7th.—Acted as C.R.E., Brown Force. Ordered to improve communication between centre and right sections of outpost line, half 57th Company, R.E., being available for work. This necessitated a bridge of 4 bays (*1* pontoon, *2* trestles) over the river Avon, S.W. of the Malmesbury-Little Somerford road, east of Burton Hill. The existing brick bridge, 200 yards S.E. of the site selected for the temporary bridge, appeared to be unsafe for guns, but available for infantry and light carts. The exact site selected was where the bend of the river runs close to the railway, just north of fork in the stream. The bridge was commenced at 9.30, as ordered, but only 18 R.E. being available for work, the bridge was not completed when we had to stand to arms, and fall back fighting to Burton Hill.

Wednesday, 8th.—Acted as C.R.E., White Force, with half 57th Company. The half-company marched in the vanguard. No work was required to be done during the advance. On learning that the G.O.C. had decided to retire, I enquired the direction of the retirement and asked whether I should start cutting gaps in the hedges (where no convenient gates existed) to facilitate the movement. G.O.C. informed me that he intended to retire N.W. from the Rookery, past Worthy Hill Farm, on Stonehill Wood. The half-company, R.E., started on this work, but were obliged to desist, owing to an outflanking movement by the Cameron Highlanders along the road north of Somerford Common. At this moment I learnt that the G.O.C. had given up his intended line of retreat, and was moving instead on Charlton *viâ* Garsdon. The half-company packed up their tools and got away without coming under fire. One officer and 8 men of this half-company worked at Tetbury Camp.

Thursday, 9th.—The 3rd Division united fought against a skeleton enemy; half 57th Company was present with the Division. Half 57th Company moved from Tockenham Park to Swindon (Coate) for work. Half 56th was included in the skeleton force represent-

ing 1 company; half 56th was at work preparing a supply depôt at Chippenham. The half 57th Company followed the attack of the 7th Infantry Brigade, and on reaching the top of the slopes leading down to brook running east of the village of Stanton St. Quinton, started to prepare this ground for defence in the event of our attack being driven back. Only 16 R.E. being present, it was not possible to do more than start the construction of two short lengths of fire trenches enfilading the road from Stanton St. Quinton. Application for a fatigue party of half-battalion was made to the Colonel, General Staff, 3rd Division, but a reply was received that it could not be made available until the village had been taken. The high ground east of the brook would therefore not have been prepared for defence in time to stem a counter-attack, had one been successfully delivered on the troops who carried out the assault.

Friday, 10th.—Half 57th Company working at Swindon Coate, concentration camp. The Division fought a marked enemy. Half 57th Company, R.E., followed attack of 7th Brigade, in case a bridge over the Gauze Brook was required. A brick bridge was found on the right flank of the brigade, and used by it and the 8th Brigade. It proved just strong enough to carry the batteries which had to cross it, but mortar fell out each time, and it was very near to giving way. The 56th Company marched on the high road N. of Corston. The O.C. 56th Company accompanied the Brigadier, 8th Brigade, in case it proved necessary to call on the company to bridge the Gauze Brook.

Saturday, 11th.—Work on Camps Malmesbury and Tetbury.

Sunday, 12th.— Ditto.

Monday, 13th.—Marched to Corsham with 56th and half 57th Company. Half 57th Company marched out with 7th Brigade to Calne.

Tuesday, 14th.—56th Company with advance guard with 8th Brigade. Eventually the 1½ companies supported attack of this brigade on the enemy's position near Wootton Bassett, but no R.E. work was required.

Wednesday, 15th.—The companies were ordered to accompany the attacking brigade in case the bridges over the canal at ·333 and E, Great Western Railway, were destroyed, but they were found intact. In the subsequent advance the 7th Brigade were stopped by finding the bridges over the river Ray and canal at Common Platt destroyed. The 57th Company was ordered up to repair them. I rode forward to inspect damage, and found fords for infantry close to bridges. The bridges would have taken 1½ hours to repair with material available on the spot.

Thursday, 16th.—The companies marched for Shrivenham in rear of the 9th Brigade. Before they reached that place they received the following orders:—The 56th were to go to Highworth, to join

there the expected reinforcements of two skeleton brigades, and move with them to Coleshill, where they were to assist one of these brigades to entrench a position. The 57th Company was ordered to follow the 9th Brigade to Fernham, and be ready to entrench the position at British Village when captured by the 7th Brigade. O.C. 56th Company was directed to join G.O.C. 7th Brigade at Longcot at once. Unfortunately the O.C. 57th Company mistook the road and followed the 56th from west of Shrivenham towards Highworth. On discovering his error he marched for Fernham, joining the 9th Brigade in their attack on this village. Lieut. Gowlland was in command, the O.C. having ridden on to join the G.O.C. 7th Brigade, who were on the right flank. The company assisted to prepare Fernham for defence when captured, and took part in the fighting. The 57th Company on this day marched 30 miles.

Monday, 20th.—One section 56th Company with 9th Brigade at Wootton Bassett. One section 56th Company marched with 8th Brigade and rejoined Company Headquarters in the evening. 57th Company marched at head of vanguard, and put up four troughs and pumps in a side road 2 miles short of Purton Station to water horses at the breakfast halt. Later in the day the 57th Company were ordered to make a bridge between Inglesham and Dudgrove Farm, it being supposed that the Division was about to bivouac north of the river between Lechlade and Freshford, and a bridge between these places was required. O.C. 56th Company proceeded to reconnoitre the bridges from Dudgrove Farm onwards to complete this communication. Pontoons just unloaded when Division was ordered to advance to Little Faringdon, where both companies bivouacked after assisting 7th Brigade to entrench a position just as night closed in.

Tuesday, 21st.—Orders received 12.30 a.m. to be at Langford at 4.30, to place it in a state of defence, were cancelled at 2 a.m., and operations were postponed till 8 a.m. Companies reached Langford at 9.30 a.m., having followed the 7th and 8th Infantry Brigades. Working party of two companies Leinster Regiment assisted. Very simple job, stone walls and sunken fences existing all round. Pontoons were ordered to Inglesham, as not being likely to be required. On Clanfield being taken, R.E. and pontoons were ordered up in case bridges at Redcot were found destroyed. They were however found intact, and the whole Division marched across, moving south, a rear guard being left to guard the bridges while the R.E. prepared them for demolition. The G.O.C. rear guard ordered them to be blown up at 6 p.m., or earlier if the enemy advanced against them in pursuit from the north.

Wednesday, 22nd.—The two R.E. companies advanced in rear of

8th Brigade, but halted ½ mile west of Watchfield. Officers were sent to reconnoitre the river Cole west of Stallpits Farm, in case it were necessary for the 7th Brigade on our right flank to retire. Their reports reached me at about noon, but by that time all idea of retirement had been given up. No further orders were given by the G.O.C. 3rd Division for the use of the R.E., but the G.O.C. 7th Brigade sent back the O.C. 56th Company to ask him to blow bridges on his outer flank. A section was sent to do this.

(5).

EXTRACTS FROM THE DIARY OF THE O.C. 56TH (FIELD) COMPANY, R.E.

SEPTEMBER.

Friday, 3rd.—Finished butchery. Completed washing benches and fixed screens, completing washing place. Sorting timber for cooking shelters.

Saturday, 4th.—Erecting cooking shelters for the brigade. Took up pumps and returned them to 57th Company, R.E. Strengthened culvert for traction engines.

Monday, 6th.—Operations.—Marched off 6.40 a.m. Wet in the morning. With advanced guard. Made gaps through two hedges. Returned to camp at 4.50 p.m. Erected cooking shelter for A.S.C.

Tuesday, 7th.—Divisional Training.—Marched with advanced guard 6.30 a.m. to Little Somerford. Three pontoons and trestle wagons, 2 double tool carts, 2 forage carts, and 2 pack horses. Commenced to put a bridge across near Hill, about ¾ mile west of X roads, Little Somerford, about 11 a.m., span 55′. Decided to take raft, with requisite material aboard, about ¼ mile up stream to a more favourable site, and had nearly reached the position when "Stand Fast" sounded—12.30 p.m. Reached camp at 4.30 p.m.

Wednesday, 8th.—Marched with the brigade at 6.30 a.m. Rendezvous, Dauntsey Green. No. 1 Section cut one large gap, 6′, and sixteen 3′ gaps in hedges to allow infantry to pass through in vicinity of the Rookery, about 1½ miles N. of Brinkwater. Vehicles with the company as on 7th. No. 1 Section returned at 5.30 p.m. Remainder at 4.30 p.m.

Thursday, 9th.—No. 1 Section did not go on operations, but proceeded to A.S.C. Supply Depôt for work (Chippenham). (1). Made 10′ breach in wall for entrance to camp ground. (2). Removed wooden fence for another gateway and levelled bank. (3). Erected a meat store, framework for. (4). Erected a latrine for N.C.O.'s and men, 7 seats, and 1 for officers. Erected cookhouse shelter, M.T.

Camp. No. 2 marched with brigades at 7.10 a.m. Rendezvous, Stanton St. Quinton. Entangling edge of wood with barbed wire. Putting houses in state of defence, creating obstacles, and clearing field of fire by blowing down and felling trees (theory). Demolishing walls to erect sangars. Putting church in state of defence. Also took part with infantry in defence of village at latter part of operations.

Monday, 13th.—No. 1 Section paraded at 7.15 a.m. and marched to Corsham to prepare camp there. Laid down three horse troughs and pumps. Prepared two washing places for troops. No. 2 Section removed tanks, water fittings, and benches from Hardenhuish to M.T. Camp, Chippenham. Returned fittings to contractor. Took down cookhouse shelters at Hardenhuish Camp and stacked material at M.T. Camp. Erected one cookhouse shelter at Supply Depôt. Cleared up camp of 56th Company, and marched for Corsham about 6 p.m., arriving there about 7.40 p.m. 2nd Lieut. Smith-Rewse and 8 other ranks proceeded to Calne at 7.15 a.m., to make arrangements for watering there, laying down three horse troughs and two pumps, rejoining Hardenhuish on completion.

Thursday, 16th.—Leaving bivouacs standing and pontoons in camp, company marched off at 6.40 a.m., weather very wet, to Coleshill *viâ* Shrivenham. Placed houses in state of defence, also walls and hedges (theory), and remained in village until operations ceased. Signallers formed a communication station. Returned to Moredon Camp *viâ* Highworth at 5.30 p.m. Pitched tents. Distance marched, 24 miles.

Friday, 17th.—Lieut. Norton and 9 other ranks (No. 1 Squad) proceeded to Wootton Bassett for work there, marching at 7 a.m., taking No. 1 forage cart. Remainder of company marched at 7 a.m. for Charlton Park *viâ* Brinkworth, with 57th Company, R.E. Arrived 12.45 p.m. Pontoons, under 2nd Lieut. Pearson, marched about 9.40 a.m. by straight road. Arrived about 1.30 p.m. Tents arrived 6.30 p.m. Pitched camp. Distance marched, about 14½ miles.

Monday, 20th.—(*Headquarters and No. 2 Squad*).—Marched 3.55 a.m. *viâ* Garsdon. Halted to water at a stream E. of The Manor. Marched on *viâ* Purton, Smithy, Blunsdon St. Andrew, Highworth (reached 11.25 a.m.), to Upper Inglesham, 12.20 p.m. Watered horses and started to make tea for men. Ordered to close up on rest of Division, and moved up about 800 yards, 1.15 p.m. At 3 p.m. O.C. company sent to reconnoitre bridges over canal and river Coln, near Dudgrove Farm. At 4.30 p.m. company marched on through Lechlade. Halted in a field N. of Little Faringdon, whilst a defensive position was reconnoitred. At 7.15 p.m. ordered to bivouac in same field, about 150 yards from where wagons were halted. Placed Langford Downs Farm and a cottage in state of defence (theoretical), and made 6 ramps for crossing a deep ditch (practical).

Entangled a hedge with wire from a fence (theoretical); 2 hours' work. 2nd line transport arrived, 1.15 a.m., on 21st. Distance, 26 miles. Weather fine.

No. 2 Section.—Marched *viâ* Castle Eaton—Hannington Bridge—Upper Inglesham. One officer reconnoitred positions for bridging river and canal E. of Kempsford. Placed Hannington Bridge in a state of defence (1.40 p.m.—4.30 p.m.). Marched back to Upper Inglesham and on to Lechlade. Rejoined Headquarters 7 p.m. Distance marched, 25 miles.

Monday, 20th.—(*No. 1 Squad*).—Marched 4.55 a.m., in advance guard of 9th Brigade, through Hook, Lydiard Green, Common Platt, Rodbourne Cheney, Upper Stratton, Stanton Fitzwarren, Highworth, Coleshill; rested in a field N. of Coleshill Church until 11 a.m.; watered horses from village pump. Marched to Broad Leaze Farm; O.C. ordered to report on water for the bivouac S. of Buscot. Marched at 2 p.m. to Badbury Hill across country on N. side. Remained on top of Badbury Hill till 7.40 p.m., when orders were received to bivouac where the section was then.

Tuesday, 21st.—(*Headquarters, No. 2 Section, and No. 2 Squad*).—At 9 a.m. received orders to proceed to Langford. On arrival there, ordered to place S.E. end of village in a state of defence (theoretical), with help of two companies, Leinster Regiment. At 11.45 a.m. received orders to march *viâ* Bate's Land Farm to Clanfield. *En route* received orders to march on to Radcot. Between Clanfield and Radcot road blocked, and in spite of urgent orders to push through to Radcot, was unable to pass more than three units. Arrived Radcot 2.20 p.m.; halted in a field, and cooked whilst bridge was prepared for demolition and another was demolished (theoretical). At 4.15 p.m. received orders to get on to road S. of the bridges, ready to move towards Faringdon. Found one side of road occupied by guns and vehicles, so in moving blocked road. Finally got vehicles scattered off the road at odd intervals, so as to clear road. Reached a farm ½ mile N. of Coleshill 9.30 p.m., and bivouacked in farm buildings. Distance, 19½ miles. Weather fine up to 7.30 p.m.; then rain.

Wednesday, 22nd.—Ready to march 7.45 a.m. Moved on to Highworth road and waited for remainder of Division. No. 1 Squad rejoined 8.50 a.m. Marched 10.30 a.m., following the Heavy Battery *viâ* Friars Hill to a point ½ mile N.W. of Watchfield. two officers sent to reconnoitre crossings over river Cole for infantry, in case of retreat. No. 1 Section sent at 3 p.m. to destroy canal bridges S. of Shrivenham, with 7th Infantry Brigade. Distance, 9 miles. Weather fine.

No. 1 Squad.—Marched at 8 a.m.; rejoined the company at Coleshill village at 8.50 a.m.

(6).

EXTRACTS FROM THE DIARY OF THE O.C. 57TH (FIELD) COMPANY, R.E.

SEPTEMBER.

Tuesday, 7th.—Reconnoitred for bridge sites and made bridges. Bridge attacked during construction.

Wednesday, 8th.—With advanced guard cutting gaps through hedges. Improved roads for possible retirement of guns, etc.

Thursday, 9th.—Placing locality in state of defence. With rear guard. Arranged for blocking roads by felling trees. Attacked by enemy during operation. Ordered to reconnoitre a position for entrenching; applied for half-battalion working party, but this could not be provided in time to do good work before enemy captured position. Prepared locality for defence.

Friday, 10th.—Attached to Infantry Brigade. Bridge making and assisting in advance.

Wednesday, 15th.—Attached to brigade. Reconnoitred bridge over canal for repair if destroyed. Supported brigade in the attack.

Thursday, 16th.—With brigade. Supported attack with a view to entrenching position when captured. Fortified localities during engagement.

Monday, 20th.—Reconnoitred river for construction of bridges. Improved communication on position.

Tuesday, 21st.—Placed village in state of defence. Prepared bridges for destruction.

Wednesday, 22nd.—With brigade. Reconnoitred river.

(7).

EXTRACTS FROM DIARY OF THE C.R.E., 4TH DIVISION.

SEPTEMBER.

Wednesday, 15th.—The Division was covering the retirement eastward of the main Blue Force. O.C. Divisional Engineers advised upon and inspected preparation of the position at Blunsdon St. Andrew; directed the demolition of several bridges over river Ray and canal; accompanied umpire at his inspection of the bridges after "demolition," and arranged the water supply at Stanton bivouac ground.

Thursday, 16th.—The Division took up a position S. of Faringdon, facing S.W.; C.R.E. accompanied G.O.C. at his reconnaissance, and at Conference, when he directed the disposition of the Division; conferred with G.O.C. 12th Infantry Brigade regarding his line of

defence; advised as to the employment of the R.E. companies; generally inspected and discussed the dispositions; directed water supply for Uffington Camp, which the Division reached.

Monday, 20th.—Marched with Headquarters from Uffington bivouac to Faringdon; first line taken up from Buckland to Buscot. Received orders at 2.50 p.m. that bridges would probably be required across the Thames near "Lock Inn" Bridge (S.E. of Lechlade), which had been destroyed; ordered Field Companies and Bridging Train forward to a preparatory position; the bridges were not required; I reconnoitred positions for these bridges, and for others near Philip's Farm, and found the sites favourable.

Tuesday, 21st.—Before dawn ordered an officer, 9th Company, with a section, to report to G.O.C. 12th Infantry Brigade, with a view to preparing Radcot bridges for demolition before daylight. Orders arrived about 3 a.m.—after all had turned out—to "Stand Fast" till 8 a.m. I ordered R.E. to be ready to bridge near Philip's Farm at 8; the two medium bridges were ready by 8.30; span only 50'. The R.E. being alone and the situation unsafe, at noon I ordered Bridging Train to Faringdon, and the two companies to take a covered position, with a view either to advancing to dismantle or to retiring (and abandoning the bridges), the G.O.C. approving.

(8).

EXTRACTS FROM THE DIARY OF THE O.C. 7TH (FIELD) COMPANY, R.E.

AUGUST.

Tuesday, 31st.—Part of skeleton force occupying a position. The company assisted in entrenching a position, to be occupied by the reserve in the event of the enemy attempting to turn the right. Tool cart used as dummy gun. Owing to dearth of scouts, 2 officers and 2 mounted N.C.O.'s were sent out scouting.

SEPTEMBER.

Friday, 3rd.—Company behind general reserve until 5 p.m., when ordered to entrench rallying position.

Monday, 6th.—Part of skeleton force. Especially employed in erecting an imaginary work on the left flank.

Tuesday, 7th.—Assisted in attack, then ordered to entrench rallying point.

Friday, 10th.—Reconnoitring, communication, and constructing of bridge to enable artillery to get to the front.

Tuesday, 14th.—Section with advanced guard. Barricaded a street.

Wednesday, 15th.—One officer ordered to discuss with G.O.C. Brigade the entrenching of the position. Another to reconnoitre bridges over railway, canal, and river, and then with detachment prepared bridges for demolition. Ten bridges prepared. All but two were destroyed.

Thursday, 16th.—Attached to an Infantry Brigade; 2 officers of the company rode on to reconnoitre position. Assisted in preparation for defence of houses and gardens ¼ mile E. of Furze Hill, and clearing foreground, chiefly hedges; when position was attacked the company assisted in the defence.

Saturday, 18th.—Officer reconnoitred river Thames.

Monday, 20th.—Throwing bridges over Thames and making bridgeheads.

Wednesday, 22nd.—With Infantry Brigade to entrench a position.

(9).

EXTRACTS FROM THE DIARY OF THE O.C. 9TH COMPANY, R.E.

AUGUST.

Monday, 30th.—Churn Camp.—Went with two companies of the Queen's to take up a position covering sunk road, Bower Farm-Aldworth and Aldworth-Streatley road, from attack from Compton. This was the left flank of the main position. Position was entrenched at intervals. No attack took place.

SEPTEMBER.

Friday, 3rd.—Churn Camp.—Marched with 7th (Field) Company, R.E., to a point on the East Ilsley-Compton road to resume the operations left off on Thursday. At 3.30 p.m. moved off behind the reserve brigade through East Ilsley. When ½ mile east of West Ilsley the two companies were pushed forward to entrench a position covering the West Ilsley-Chilton road east of Cow Down. Trenches were taped out, but no excavation done.

Monday, 6th.—Marched to rendezvous on Harwell-West Hagbourne road. An attack was made by 4th Division against a skeleton enemy who held the Ridgeway. As soon as the infantry had gained Hagbourne Hill the 9th Company, R.E., was brought up to entrench it. Half-company, R.E., entrenched this point; the other half-company, R.E., was pushed on behind the firing line, and as soon as Chilton was secured by the infantry, the latter half-company placed Chilton in a state of defence. This was completed by 1.30 p.m. The company then advanced eastward by South Row, and watched the infantry attack on the Ridgeway from under cover. "Cease Fire" sounded at 2 p.m.

Tuesday, 7th.—Remained at rendezvous till *12 noon*, while infantry advanced through Compton on the high ground, Lowbury Hill-Bower Farm-Aldworth. At noon advanced to Cheseridge Farm. After a short halt here, while a rallying position was selected on the high ground west of Compton, the 9th (Field) Company moved to Perborough Castle and taped out trenches, following the line of the old Roman entrenchments, and assisted infantry in selecting positions for Maxims, etc.

Friday, 10th.—The 9th (Field) Company, after picking up pumps and troughs, proceeded to the rendezvous; the G.O.C. 10th Division intended to attack a skeleton enemy who held a strong position on the Faringdon ridge. Two officers of the company went out in front to reconnoitre the ground, as the country being very enclosed and intersected by streams, it was anticipated that the attack would require some assistance from the R.E. in the form of bridging, etc. The 11th Infantry Brigade firing line had secured Sanos Farm at 11.15 a.m. The 9th (Field) Company, who advanced close behind the firing line, placed this farm in a state of defence as a rallying point and to cover a brigade of R.F.A., who had taken up a position 500 yards S.W. of the farm. Sanos Farm was in a fair state of defence by 12.45 p.m. At 1 p.m. the "Stand Fast" sounded, and the 9th (Field) Company marched 13½ miles to Coate, tool carts going on in front with an officer to put up pumps and troughs.

Tuesday, 14th.—After picking up troughs and pumps and returning tents, the company proceeded to the rendezvous at the inn on the Coate-Swindon road, ¼ mile west of Coate, arriving there at 8 a.m. Half-company was with the vanguard; the other half-company was at the head of the main body of the 11th Infantry Brigade. The 11th Infantry Brigade proceeded along the Swindon-Wootton Bassett-Malmesbury road. When the vanguard reached the point 355 near the junction of the roads 1½ miles N.E. of Brinkworth, they were ordered to retire to the cross roads N.E. of Wootton Bassett, where the half-company with the main body had already commenced putting the buildings at the cross roads in a state of defence. At 11.45 a.m. the buildings at the cross roads were in a fair state of defence and being still improved. At 12.45 p.m. these buildings were attacked by two companies of the enemy's infantry; the 9th (Field) Company, holding the buildings, beat them off. The attack was reinforced to 1½ battalions, which were held up for more than 1 hour by the 9th (Field) Company, who were not reinforced during the whole of the time. At 1.10 p.m. a message was sent to the G.O.C. 4th Infantry Brigade, but after that time no more messages could be got through, owing to the post being completely surrounded by the enemy. No artillery was employed by the enemy in the attack of this post. At 3 p.m. the "Stand Fast," and the 11th Infantry Brigade and 7th and 9th (Field) Companies bivouacked in the fields

close to cross roads N.E. of Wootton Bassett; the companies put up pumps and troughs here, and at Ballards Ash.

Wednesday, 15th.—The 4th Division took up a position on the ridge above Blunsden St. Andrew. Half-company went off early to destroy the bridges over the river Thames at Castle Eaton and Hannington. Of the remaining two sections, one proceeded to Blunsden Hill and the Abbey to assist in the preparation for its defence. The other section proceeded to Pen Hill to assist in preparation for defence of the left flank. Pen Hill was a very strong post and the key to the whole position, as from here a flanking fire could be brought to bear along the whole front of the main position. Owing to the destruction by the 7th (Field) Company of the river bridges between Blunsden Station and Swindon, the attack was greatly delayed and did not commence till 3 p.m. At 4 p.m., before the attack had been thoroughly launched, the "Stand Fast" sounded. The 9th (Field) Company bivouacked at Stanton Fitzwarren, putting up pumps and troughs there, and at Hampton. Second line transport did not arrive till 11 p.m.

Thursday, 16th.—The 9th (Field) Company paraded at 6 a.m. and marched *viâ* Highworth to Badbury Hill. The 4th Division took up a strong position on the line Badbury Hill-Great Coxwell. The 9th (Field) Company were with the 12th Infantry Brigade, and were employed strengthening the position Badbury Hill-Great Coxwell. Monks Barn and Farm were placed in a state of defence.

Saturday and Sunday, 18th and 19th.—Officers were employed reconnoitring bridges, fords, etc., over the rivers Thames and Isis.

Monday, 20th.—The Cumnor force, being in a very precarious position, bivouacked beside the road on Sunday night, in order to move off the moment hostilities commenced at 4 a.m. on Monday. Charges were prepared on ladders between 6 p.m. 18th and 4 a.m. 19th for the destruction of Newbridge, and large trees were loaded up on timber wagons in the brickfield, ready to run out on to road to block it in early morning. The men and charges for the destruction of Newbridge were carried down to the spot on R.F.A. wagons, and the bridge was destroyed at 5.35 a.m. Owing to the strength of the bridge and the necessity for rapid and immediate destruction, the gap made was not very large, but was judged by the umpires to be sufficient to delay the enemy 1½ hours. During the march west 1 single tool cart, and with 4 sappers mounted on it, followed in rear of the flank guard and main column, blocking the road at intervals by felling trees across it or in any available way. The Cumnor force successfully effected a junction with the force on the Faringdon position. The remainder of the company placed Northfield Farm in a state of defence, and later, when joined by the Cumnor section, the whole company proceeded south of Philips Farm, placing the buildings in a state of defence and holding themselves ready to

bridge the river at or near Philips Farm. At 9.30 p.m. one section was ordered to proceed to Headquarters, 12th Infantry Brigade, at Hattens Farm and to prepare for demolition Radcot Bridge as soon as it was taken by the Blue Force. This bridge, after an armistice of 4 hours, was taken, and the preparation for demolition completed by 12 noon on 20th September. The actual demolition was undertaken by the O.C. Divisional Engineers, 3rd Division.

Tuesday, 21st.—The company, less one section at Radcot Bridge, proceeded to Philips Farm and bridged the river Thames with pontoons, and took up a position to defend the bridge-head. The bridge was only used by a few cavalry scouts.

Wednesday, 22nd.—The 9th (Field) Company was attached to 12th Infantry Brigade, and marched out, with one section in the advance guard, to take up a position in Eastrop-Friars Hill. The company strengthened the right flank by putting in a state of defence a hedge which had a good field of fire over ground which was dead to the remainder of the position, and also fortified the cross roads at Friars' Hill as a rallying point, with stone sangars made of road metal. The company then accompanied a counter-attack made by the 11th Infantry Brigade.

THE COMITIA CENTURIATA OF SERVIUS TULLIUS, CIRCA 510 B.C.

By COLONEL O. E. RUCK, LATE R.E.

THIS Assembly, far reaching in its political results on the military destinies of the Roman People, differed from its prototype, the Comitia Curiata, instituted by Romulus, Circa 753 B.C., in that, in the latter, only those Roman Citizens who lived within the City or were included in some Curio or Urban parish had the right to vote.[1] An Assembly of the whole Roman People to give their vote about anything was termed a Comitia, but when only a part were assembled it was called a Consilium.[2]

In the Comitia Centuriata all important business which came under the power of the People was transacted, laws were passed, and more particularly the decisions given as to the declaration of war, or the making of peace.

A third Comitia, termed the Tributa, was introduced at the time of the trial of Coriolanus, B.C. 490, and could be held without the authority of the Senate. It dealt with less important matters, such as the creation of magistrates, the election of priests, the making of minor laws, and the holding of trials—those for Capital offences being omitted.[3] In the Comitia Tributa the votes of all citizens were of equal force, and this form of committee was seldom attended by the Patricians; moreover, all Roman Citizens might vote whether they lived in Rome or in the country.[4]

Servius Tullius, who instituted the Comitia Centuriata, was the Sixth King of Rome, the last but one of the seven Kings who reigned during the first 263 years of the City. All of these—with the exception of Tarquinius, the last—so reigned, that they have been justly considered to have laid the foundations of Roman greatness.[5]

To Servius Tullius has been ascribed the credit for founding a long-sighted political organization, based on firm bed-rock principles. Suited to the times, it tended to produce a large reserve of National Power, which ultimately led the Roman Republican Armies to a victorious zenith of success during the next three centuries of time, by giving the preponderating authority to the most responsible citizens, or those who held the largest stake in their country's interest.

Servius Tullius was however not in possession of any absolute or hereditary power, but, by the nature of the constitution, limited and

[1] Livy. IX., 38. [2] A. Gell., XV., 27. [3] Livy, II., 56. [4] Livy, XLV., 15. [5] Livy, II., 1.

elective only; neither could he declare war nor make peace without either the concurrence of the Senate, or by the desire of the representatives of the People.[1] As King of Rome Servius was also a priest, thereby possessing the chief direction of sacred things, as was the custom in Greece. To how great an extent the ancient Romans respected religion and its ministers is well known. The Patrician Augurs also had to be consulted by taking the Auspices before a Comitia Centuriata could be held.[2]

The governing principle of the Centuriata was that the People, divided into the Centuries of their Classes, gave their votes; and what a majority of the Centuries determined (quod plures Centuriæ jussissent) was held to be ratified.

This Comitia—held according to the Census instituted by Servius Tullius—virtually consisted of a numbering of the People, together with a Valuation of their fortunes (æstimatio). These estimates had to be made on oath by the Roman Citizens themselves, both in town and country, and if found to be untrue, their goods were confiscated, and they themselves were scourged and sold as slaves, as persons who had shown themselves as unworthy of liberty.[3]

Thus, according to the value of their personal estates, Servius Tullius divided all the Citizens into six classes, and each class into a certain number of Centuries, both for service and for voting power.

In the article by Colonel Hickson, in the August *R.E. Journal*, he quotes Mommsen as stating "the body of men liable to serve was distributed according to the size of their portions of land into five classes," and Mommsen was right, as was to have been expected, for the sixth class comprehended all those who either had no estates, or were not worth so much as those of the fifth class.

The number of sixth class men was so great as to exceed that of any of the other classes, and yet they were only reckoned as one Century out of a total of 192 Centuries, or an almost negligible quantity in Voting Power.

The division by Centuries prevailed everywhere at Rome. The Infantry, Cavalry, Curiæ, and tribes were so divided, and so even was the land (centuerius ager).[4] At first a Century contained a hundred, but not so afterwards; thus the numbers included in the Centuries of the different Classes was an elastic one after, and perhaps in, the time of Servius Tullius.

The First Class, or Class A, included all those who valued themselves in lands and effects as worth at least 100,000 asses, or pounds of brass, or at £7,750 a head.

This class figured up to 80 Centuries of foot—40 Centuries of young men and 40 of old men (seniorum);[5] to these were added

[1] Dionysius, II., 13. [2] Virgil, Æn., III., 80. [3] Cic. pro Cœcin., 34.
[4] Festus. [5] A. Gell., X., 28; Cic. de Senec., 17.

18 Centuries of Equites, or the corps d'élite, 12 Centuries of which were created by Servius Tullius from the Chief Officers of State, specially selected as Knights of the Equestrian Order. These were chosen by the Senate and presented with a horse apiece at the public expense, together with a gold ring. The private fortune of each of the Eques was fixed at a minimum of 400 Sestertia, or £3,229 British.[1]

A great degree of splendour attached to the Equestrian Order, and they were held in much respect in Rome. Indeed, Cicero speaks of them as "Homines amplissimi, benetissimi, et ornamentissimi"; an extremely mobile corps, without saddles or stirrups, who every fifth year were Recognoscebantur or passed in review before the Censor, seated in his Curule chair as sited before the Capitol. Each Eques dismounted and led along his horse before the Censor's gaze (traducebant), and in this manner was inspected. If any Eques had perchance diminished his fortune, or even had neglected to take proper care of his horse, he was ordered by the Censor at once to sell the animal, and at the same time to consider himself removed from the roll of the Equestrian Order. Those of whom the Censor approved however were ordered to pass along (traducere) together with their horses.[2] Thus, with the Equites, the First Class—or Class A—were valued at 98 Centuries for Voting Power.

The Second Class (calare), Class B, consisted of 10 Centuries of young men (17—46 years of age), 10 Centuries of old men (seniorum), valued by themselves at a lump sum of £5,811 a head. To these were added 2 Centuries of artificers (Fabrum), such as carpenters, smiths, etc., to manage the engines of war, included by Livy in the First Class, or Classici.

It is however hard to imagine that these artificers were included in this aristocratic class, either in A or in B Class, but merely attached as useful; for it must be remembered that not only the mechanical arts, but also any kind of trade, was esteemed dishonourable amongst the ancient Romans. It seems more likely that these worthy men were the handy men on the rich men's estates, and would be more than useful in enabling the old men, who were told off to guard the City, to man their heavy guns of the Onager and Ballista type as Garrison Artillerymen, if such existed at the time referred to.

The Third Class, or Class C, were divided into 20 Centuries, who valued themselves at a sum of £3,875, or 50,000 pounds of brass, or 5,000 Drachmæ, in the Greek way of computing.

The Fourth Class, or Class D—20 Centuries—estate, £1,937 a head.[3]

The Fifth Class, E—30 Centuries—estate, 12,000 asses—£968. Amongst these were included the trumpeters, corneters, and blowers on the horn, divided into three Centuries.[4]

[1] Horat., ep. I., 1, 57; Plin., ep. I., 19. [2] Ovid., Trist., I ., 89; Gell., IV., 20; Livy, XXIX., 37. [3] Dionysius. [4] Livy.

The Great Sixth Class, or the vast majority, not mentioned by Mommsen, has already been alluded to as the innumerable and comparatively negligible remainder.

The number of classes above enumerated summed up to a total of 191 Centuries according to Livy, or 193 according to Dionysius. Each class, as mentioned by Mommsen, had arms peculiar to itself and a certain place when in battle array, according to the valuation of the fortunes of those composing it.

As the Roman Army in early times was usually drawn up in three lines, several rows deep, the Principes in front[1]—*i.e.*, until Cæsar's time, when the best trained and bravest men were chosen for this purpose, irrespective of birth or fortune, and contrary to ancient custom—the Equites would be found behind, a class of principal foot-soldiers, ready to be let loose on the enemy should a favourable opportunity arise, and in case of a temporary repulse to rally in rear.[2]

The Classici thus consisted of the First Class only,[3] Equites, and the A Class; all the rest were said to be Infra Classem. Hence classici auctores—the best authors.

Those of the lowest class, who had no fortune at all, were called Capite Censi, rated by the head, and those whose fortune was below a certain valuation, Proletarii.[4] "This properly was not reckoned a class, whence sometimes only five classes are mentioned."[5]

By the Centuriata the chief power was vested in the richest citizens, who composed the First Class, which, although least in numbers, consisted of more Centuries than all the rest put together; but they likewise bore the charges of peace and war (munia pacis et belli) in proportion.[6]

For as the votes at the Comitia, so likewise the quota of soldiers and taxes depended on the number of Centuries. Accordingly, the First Class—which consisted of 98, or, according to Livy, of 100 Centuries—furnished more men and money to the public service than all the rest of the State besides.

But they had likewise the chief influence at the National Assemblies by Centuries, for the following excellent reason. The Equites and the Centuries of the First Class, *i.e.*, the Classici, were called to give their votes *first*, and if they were unanimous, the matter was carried as well as ended. But, on the other hand, if not unanimous, then the Centuries of the next class were called in to help settlement, and so on, until a majority of Centuries had voted the same thing.

After the Census of the people was finished for the holding of the Curiata, an expiatory sacrifice was made by carrying a sow, a bull, and a sheep round the whole assembly, and then slaying them; and thus the people were said to be purified.[7]

[1] Sallust, Jug., 49; Cæsar, Bell. Germ., I., 19. [2] Livy, XXX., 33; Sallust. [3] A. Gell., VII., 13. [4] Gell., XVI., 10. [5] Livy, III., 30. [6] Livy, I., 43. [7] Virgil, Ecl., X., 55; Æn., VIII., 231; Plaut., Amph., II., 2, 144; Virgil, Æn., VI., 229.

INTERNATIONAL AERONAUTICAL EXHIBITION, PARIS.

By Lieuts. W. D. Beatty and A. D. de R. Martin, R.E.

Almost all the better known types of heavier-than-air flying machines were collected together at the International Aeronautical Exhibition, which opened at Paris on September 25th, and the strides that have been made of late in the science of aviation were well demonstrated by the fact that each exhibitor—instead of being looked on as possibly a genius and certainly a madman—was booking orders for delivery of his machines to all parts of Europe.

The following article is intended to provide a short description of the various points of the different aeroplanes, for the benefit of those who, though interested in aviation, were unable to visit the Exhibition themselves.

The writers had the good fortune to visit the majority of the aeroplane factories near Paris last December, and were thus enabled to note the various improvements that have since been made in their design and construction. As regards design generally, there have been few new features introduced, if the Santos Dumont and Raoul Vendôme monoplanes and the Chauviére biplane are excepted.

The most noticeable alteration is in the chassis—that is, the part on which the aeroplane rests while on the ground. A year ago there were two types of chassis—the wooden skates of the Wright machine and the steel tube framework mounted on wheels of the Voisin and other types.

The skates alone offer obvious difficulties in starting, and the Wright machines are only able to start without their starting rail on very firm short turf. The steel chassis on wheels, on the other hand, frequently collapses on the shock of landing.

Now a combination of the two types is almost universal, long wooden skates with wheels mounted on them being provided. The machine is balanced so that it runs on the wheels when starting, while on landing the spring-mounted wheels give sufficiently to let the greater part of the shock be absorbed by the skates.

Pedal levers for control of the engine or the steering have come into use, and arrangements for controlling the engine are generally improved.

As regards construction, the workmanship in general shows marked improvement, and a high level of excellence has been attained. The Antoinette and Farman machines are most noticeable in this respect.

Before giving a detailed description of the various types of aeroplanes exhibited, it may be as well to set down a few of the technical terms used in connection with the machines. The following is a glossary of those most commonly met with, viz. :—

(1). *Planes.*—The supporting surfaces of the machine.
(2). *Rudder.*—Used for steering to right or left.
(3). *The Elevator.*—Used for steering up or down.
(4). *Balancing Planes.*—Small movable planes fitted to enable the aviator to vary the resistance to flight of either side of the aeroplane, and so maintain it on an even keel laterally.
(5). *Aspect Ratio.*—The length of leading edge of plane divided by distance between leading edge and trailing edge, usually about = 5 for a biplane.
(6). *The Outrigger.*—A girder or other connection between the planes and the tail.
(7). *Propeller.*—Screw behind the planes.
(8). *Tractor.*—Screw in front of the planes.

ENGINES.

One of the features of the Exhibition is the large number of well-known motor firms who are exhibiting types of light engines for use on dirigibles and aeroplanes. Amongst these are Darracq, Clement Bayard, Panhard Levassor, Wolseley, De Dion, Fiat, etc. Water-cooled engines are in the majority, the radiators and frequently the water jackets being of copper. The Wolseley 180-H.P. engine for a dirigible attracted a considerable amount of attention.

The Green engine was the only English-made motor exhibited which was adapted for aeroplanes. Simplicity and accessibility have been largely attained in this engine. The 4-cylinder 50—60-H.P. model weighs about 225 lbs. and costs about £250.

The Gnome engine was fitted to Farman's machine. This engine was very successful at the Rheims meeting, but it appears doubtful whether it will have much of a vogue in the future, in view of its absolute inaccessibility when running.

MONOPLANES.

Blériot.—The small aeroplane, on which the crossing of the Channel was effected, had the place of honour in the centre of the hall at the Grand Palais. Marked and stained from its travels, it stood out from the highly varnished and polished machines surrounding it, its rudder scrawled all over with the signatures of the various reporters and others who had hurried to meet it on its landing at Dover. Several other machines of the Blériot type were also on view, including No. 20, a large machine with a 100-H.P. engine.

Antoinette.—Two highly finished Antoinette machines were exhibited. One of them, fitted with a 100-H.P. 16-cylinder motor, is that on which M. Latham hopes to make some new speed records.

R.E.P.—M. Esnault Pelterie exhibits one of his red covered aeroplanes. These machines are of steel construction throughout and the workmanship is very good, but so far success has not attended them. The very small camber of the planes is noticeable.

Koechlin.—The Pischoff-Koechlin aeroplane has no elevator, the planes themselves being pivoted, so that their angle to the horizontal can be altered at the will of the aviator.

A.V.I.A.—This machine has a single elevator, with a double rudder, and two small fixed horizontal planes, all carried at the tail.

Hanriot.—Rather like the Blériot machine in appearance. The leading edge of the planes is very blunt. It has apparently no means of warping the planes, nor are balancing planes provided, so its lateral stability would appear doubtful.

Ganglier.—This machine has two propellers, chain driven, supported on brackets, one on each side of the outrigger, about midway between the planes and the tail. It was the only *propeller*-driven monoplane on show.

Lioré.—Two tractors, chain driven, are fitted to the front of the planes of this machine. It was the only monoplane so fitted. The trailing edges of the planes are hinged, so as to provide for lateral stability.

Grégoire Gyp.—As in the Koechlin monoplane, the planes are pivoted, so that an elevator is dispensed with. A small fixed vertical plane is fitted at the tail in addition to the rudder.

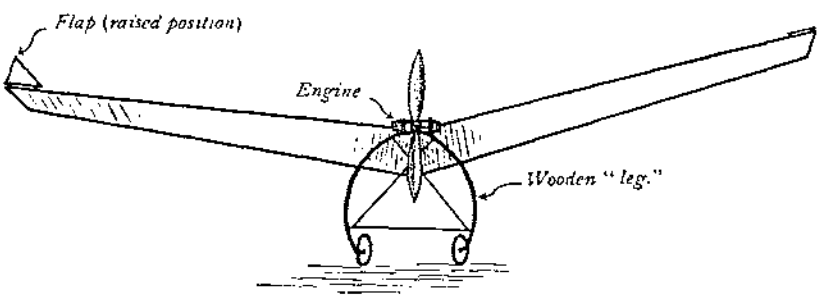

FIG. 1.—*Vendome Monoplane—Front View.*

Raoul Vendôme.—This is quite the most interesting of the lesser known monoplanes, as it embodies several distinctive features. Instead of warping the planes to secure lateral stability, it is fitted with small flaps at the front corners of the planes. In the normal position these lie close along the tops of the planes. If one side of the machine tips up, the flap on that side is raised, so bringing that edge down again by increasing the resistance. The outrigger, instead of being of girder form or boat shaped, is practically a trussed beam. The elevator is

rather large and is curved to the same camber as the planes. It is placed above the rudder at the tail. The planes are set at a small dihedral angle, like those of the Antoinette monoplane. The chassis is also of an unusual type, consisting practically of two curved wooden legs with small wheels at the feet.

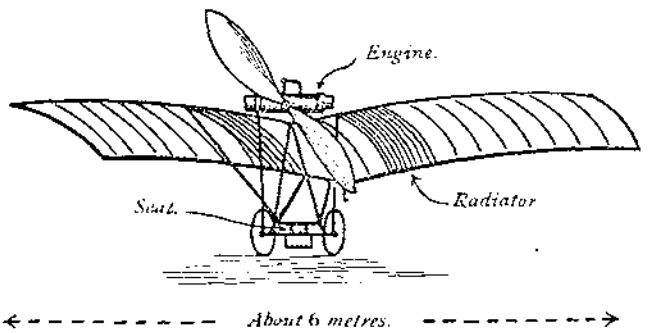

FIG. 2.—*Santos Dumont Monoplane—Front View.*

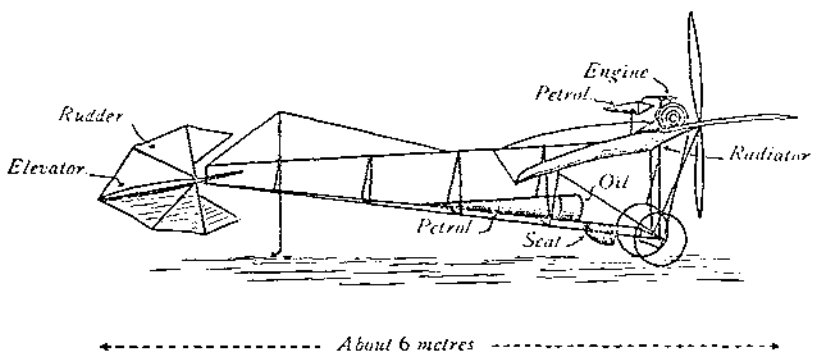

FIG. 3.—*Santos Dumont Monoplane—Side View.*

Santos Dumont.—The framework of this—the smallest serviceable aeroplane existing—is of bamboo and aluminium tubing. There is a joint just behind the planes at which the tail can be taken apart for convenience of transport. The planes are set at a small dihedral angle, and have a fairly large camber. The leading edge of the planes appears to be somewhat flexible, which is unusual. The supporting surface is only about 9½ square metres. The elevator and rudder are rigidly attached to each other, and are connected to the tail by what is practically a universal joint.

A 2-cylinder 30-H.P. Darracq engine, water cooled, with forced lubrication and magneto ignition, is mounted at the point of the V formed by the planes, with the tractor directly connected to it. The aviator sits on a slung leather seat below the planes.

The machine is supported on two bicycle wheels, which are close beside the aviator, who, on landing, uses his hands as brakes to stop the aeroplane. A small skate supports the tail. The main petrol and

oil reservoir, of conical shape, is placed directly behind the aviator's seat. An air pump, driven off the engine, maintains sufficient pressure in this reservoir to raise the petrol to the small expense tank above the engine. A rubber bulb, similar to that of a motor horn, is used for pumping up the petrol before starting the engine. The cooling water is pumped through radiators of very small copper tubing placed underneath the planes. The elevator is controlled by a lever on the right of the aviator, the rudder by a hand wheel on his left. The flexing of the planes is almost automatic. Steel wires attached to the extremities of the planes are fastened to a vertical lever fitted behind the aviator's seat. Over the end of this lever fits a small tube which is sewn onto the coat of the pilot. When the aeroplane tilts to one side, the instinctive movement of the aviator's body moves this lever, flexes the planes, and rights the machine.

A similar method of warping the planes is used on the Koechlin monoplane.

An accelerator pedal is fitted for controlling the throttle valve. Thus the pilot has both hands free for directing the aeroplane at the critical moment when he is changing the speed. M. Santos Dumont has not patented any of the features of this monoplane, as he wishes the public to have the full benefit of the results of his experiments.

Biplanes.

Wright.—The original aeroplane on which Wilbur Wright first appeared before the public in America and France was on view, and also No. 15, which was in use at Rheims. The rudder on the Wright machines is no longer used for steering in general. Turning is effected by the warping of the planes, the rudder coming into use for keeping the machine on its course when the planes are warped to overcome a lateral tilt.

Voisin.—Messrs. Voisin show one of their well-known machines. They still adhere to their system of vertical panels, which give good lateral stability in ordinary circumstances.

No means of obtaining lateral stability mechanically is fitted.

Clement Bayard.—In appearance this machine is very similar to Farman's. Balancing planes are attached to the end uprights, midway between the main planes. The tail consists of two fixed horizontal planes, with the vertical rudder between them. The elevator is carried in front of the main planes. The ends of the main and tail planes are rounded off, as in the Wright machine.

Fernandez.—The elevator is in front and nearly on a level with the top plane. The rudder and a small fixed horizontal plane are carried at the tail. The trailing edges of the planes can be flexed for lateral stability. The aspect ratio of this machine appears to be slightly larger than most of the other biplanes.

Dutheil-Chalmers.—Very similar to the Clement Bayard, except that the elevator has two parallel planes, as in the Wright machine, and is very close to the main planes. The chassis—wheeled skates—appeared to be well designed.

Farman.—This machine is similar to those used by Mr. Henry Farman at Rheims and Berlin. It has been designed by him after considerable experience with Voisin biplanes. The vertical panels of the Voisin machines have been omitted and a double rudder fitted in the tail. For lateral stability parts of the trailing edges of the planes are hinged and used as balancing planes. The elevator is carried rather higher than in the Voisin machines, and is about the same distance in front of the planes that the tail is behind them.

A notable point in this machine is the chassis, which consists of two long wooden skates with a pair of small wheels mounted on each, and pivoted in a similar manner to the bogie of an engine. A Gnome motor is fitted to this machine *behind* the propeller. The finish of this aeroplane compared favourably with that of any other exhibit.

Chauvière.—Perhaps the most interesting exhibit, next to M. Santos Dumont's "Demoiselle," was the biplane—or as some termed it the "double monoplane"—shown by M. Chauviére, the manufacturer of the well-known "Intégrale" propellers. A very small machine with a triangular girder outrigger, it consists of a horizontal upper plane, and a lower plane placed behind the upper one, the halves of which are set at such an angle with each other that their ends almost reach the level of the ends of the upper plane, to which they are rigidly attached. The engine and tractor are mounted at the centre of the front of the upper plane, and the aviator's seat is just in front of the middle of the lower plane. The chassis consists of wheeled skates. The ends of the planes are easily flexed to obtain lateral stability. A small rudder and elevator are fixed at the end of the tail.

This arrangement of the planes is said to ensure good automatic lateral stability, and, as a type, the machine stands by itself in the show.

MISCELLANEOUS.

Messrs. De Dion Bouton exhibit a multiplane. This machine was not finished and appeared of very heavy construction. It did not seem to be a promising type.

Messrs. Vuitton show a helicopter. The lifting screws are of canvas stretched over a light wooden framework. This ensures lightness, but this type of screw has been proved to be very inefficient owing to its high skin friction.

Several model dirigibles and a large number of model aeroplanes were on show, but all the time available was devoted to the study of the full-sized machines.

*THE FYERS FAMILY.**

(*Continued*).

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

In the preceding pages of this paper some account has been given of the children and descendants of Lieut.-General William Fyers, and before referring to the children and descendants of his brother Peter and of his sister Alexandrina, I venture to return to a grandchild of Lieut.-General William Fyers who bore a rather remarkable name. The eldest child of Elizabeth Lydia Fyers and General the Hon. William Henry Gardner was born under unusual circumstances in the autumn of 1804. Her grandparents and parents were all living in tents in a camp which had been formed at Europa Point during the time that the terrible visitation of sickness, commonly called the plague, was raging in the town. In memory of the place of her birth, and the circumstances surrounding it, the child was christened "Europa."

The sickness was a fever of a very malignant kind, and a book was published in 1815 by the distinguished Physician to the Forces, Sir James Fellowes, brother of Rear-Admiral Sir Thomas Fellowes, in which he gives an account of it. He calls it the *Andalusian Pestilence*. Certainly it made sad havoc at Gibraltar, and all who passed through that time had good cause to remember it.

It was said to have been brought to the Rock by a foreigner, who went to live in the neighbourhood of the married quarters of the Royal Artillery, in August, 1804. The disorder began in these quarters, and spread with an extraordinary rapidity and virulence until the whole fortress was infected. Out of a population reckoned at 6,000, with 4,000 additional of garrison, altogether 10,000, nearly 6,000 died between the month of August and the end of the year. It is absolutely appalling to contemplate a death rate of 60 per cent. in four months.

Strange to say, the Royal Military Artificers were the greatest sufferers of the garrison in proportion to their numbers. Their barracks at Hargraves' Parade were some distance from the place where the sickness began, yet early in October its ravages were so great that all work was suspended. A camp was formed at Buena

* *Corrigendum*. Letter of Lord Nelson from the *Medusa*, 4th August, 1801, on previous page. *For* Sir Esau Nepean *read* Sir Evan Nepean.

Vista, but the plague followed them thither, and was worse than in the barracks. In August the companies of Royal Military Artificers mustered 263 of all ranks, and at the end of the month of December, when the epidemic ceased, 123 had died; but that is not all, for no less than 229 men were admitted to hospital with the fever, of whom 106 recovered, so that there were only 34 men effective when the sickness was at its worst.

Amid the alarm and fear that was general, brave men and women of loving heart were not wanting to volunteer their help in tending the wretched victims of the disease, who were deserted by all others. They sacrificed themselves in devotion to a common humanity. Among these were all classes; some privates of the garrison were notable examples of constant and indefatigable work in the plague-stricken town; they passed unscathed through the ordeal, although surrounded by the pest in its worst forms. Less fortunate than these were the Rev. J. T. Frome and his wife, whose services were so great among the sick and dying, but who themselves succumbed to the pestilence, leaving three little orphan children behind them.

I have received from Major Evan Fyers a copy of a letter, written in November, 1804, at the camp at Europa Point. It is from Anne Wanton, wife of Lieut.-General William Fyers, then Colonel Commanding Royal Engineer at Gibraltar, to her daughter Sarah (Mrs. Cornelius Mann, in Scotland), and was penned shortly before the birth of her granddaughter, Anne Europa Gardner; it gives a very vivid description of the state of affairs during this awful time. This letter is full of interest. Several officers of Royal Engineers are mentioned in it, in addition to those of other arms, and some side lights are thrown on small matters, it is true, but none the less worth recording. I therefore make no apology for giving the letter at length.

Letter from Mrs. Anne Fyers, wife of Lieut.-General William Fyers, R.E., to her daughter Sarah, wife of Major-General Cornelius Mann, R.E.

"GIBRALTAR, *November 3rd*, 1804.

"MY DEAR SALLY,

"It is certainly a long time since I have written to you, but as our girls wrote occasionally, I thought you would not be uneasy at not particularly hearing from me. This day is five weeks since we came to our encampment at lower Europa in the Governor's meadow. Mr. Mann will know the place. Our cousins Darby and Wilkinson who came with us have now returned to their houses, though much against their inclination, but Mrs. Wilkinson is so subject to the rheumatism that she did not like to sleep in a tent during the very heavy rains which appear to be coming on immediately. However, we have been dry as yet, but Mr. Fyers[9] urges us to go to town, as he also fears the bad effects of the rain.

[9] Her husband, Colonel Fyers.

"The Doctors think we are more safe here, the air being so perfectly pure. We are also, they say, so much more liable to get the fever after leaving this than those who have been the whole time in the putrid air of Gibraltar, which is so offensive to Mr. Fyers and Gardner* that when they return from town (where they are sometimes obliged to go for half an hour) they are quite sick.

"I have once written to dear Charlotte,† and once to my good mother,‡ but except those I have not taken my pen to write a line since our arrival here till now.

"Eliza§ makes a very good soldier's wife. She is now very near her confinement. She has no idea of fear, although the wind blows their tent pins out of the ground at night, and the goats run about and nibble at the cords in such a way as would alarm anybody at first. Besides she knows that both Dr. and Mrs. Geddes are dead, and at present we do not know anyone to supply their place. However in some of the regiments there may be someone of this description. Mrs. Baynes embarked a few days ago in the *William*, store ship, with Frome's‖ three children for England.

"You can form no idea of their situation, nor indeed the distress of any family who have had this dreadfully . . . (words illegible). The servants of the house run off immediately, knowing they will be in the same situation if they remain. Mrs. Baynes was obliged to put both Mr. Frome and his wife in their coffins, not having a creature near her; nor could she get them buried till the Governor ordered some men who were then in the street to be pressed for that purpose. How the town is to be cleaned we can scarcely tell, as we fear that the dead bodies are at this moment shut up. For instance, Mr. Cordoza (went) on board ship at the first, but he wanted a few articles from his house, and requested that a young man of the De Rolls¶ should unlock the apartment which he had 'let' to a Jew. On doing this he was almost instantaneously struck with death, from the shocking smell which met him even before he had entered the shop.

"At a meeting of the inhabitants they have agreed to break open and examine such houses as have been left, as they fear there are a number of bodies unburied. One man at the sickness used to be for ever

* Her son-in-law, Capt. the Hon. W. H. Gardner, R.A.

† Her daughter, Mrs. Young.

‡ Old Mrs. Fyers, widow of Thomas Fyers, Overseer of the King's Works in Scotland.

§ Her daughter, the Hon. Mrs. W. H. Gardner.

‖ The Rev. J. T. Frome, one of the old Dorsetshire family, the Fromes of Woodlands. Both he and his wife died of the plague at this time at Gibraltar. One of the three children mentioned by Mrs. Fyers was the late General Edward C. Frome, Colonel Commandant, R.E., and at one time Inspector-General of Fortifications. He was the last recipient of the pension granted by a generous Government to the children of the Rev. J. T. Frome for the services rendered unto death by their devoted father and mother.

¶ A Hanoverian corps, which was with Abercromby at Alexandria.

running to the main guard to beg they would remove the dead from one street, there being six persons lying there, and there was no other chance of getting their dead buried but by doing so. Miss Fleeter, who is now a very pretty young woman, was seen by Capt. Wilkinson throwing her dead father from the chamber window into the street, not having a creature near her, her mother had died some time before.

"Mr. Pritchard* of the Artillery is dead, and Mr. Palgrave of the Register Office, Mrs. Northe, Mrs. Wooden, Mrs. Bound, Mrs. Green, Mr. and Miss Gavins, Mrs. Way, Mr. and Mrs. Glyn, all are dead. We have only 30 artificers who have not had the fever; 106 have died and both the Winlows, poor old Dr. Sharpe and his wife, all the McDonalds, all the Master Artificers of every description except Mr. Johnstone the Carpenter. Hockings is still in England. Miss Hockings and her brother George are dead, also the Town Major. . . . All the Standlys are dead, with the mother; Williams the Pratique and Ponce the Deputy Pratique-Master are dead.

"*Tuesday 6th.*

"We have just heard that our friend, Capt. (Arthur) Wilkinson,† caught the fever as soon as they went to town. Yesterday we were nearly packed up to go, but this news, with the Doctor's opinion on the subject, has induced us to stay till all danger is over. Capt. Darby, Capt. Heywood, and Lieut. Cuthbert, of the 54th Regt., are all ill, also Mr. Sweetland; Gardner says old Mr. Geddes is still alive, although very weak. It was the Doctor's wife who died a few days ago, and the report of the old lady's death arose from seeing the coffin which she had bespoke to be buried in carried to her house. Neither are the Winlows yet dead, but they are everything but dead.

"*Saturday 10th.*

"Our poor good friend, Capt. Wilkinson, died two days ago. As Colonel‡ and Mrs. Darby have never left their house, they will I fear get this dreadful infection. Pym says you may talk of the fever of the West Indies, but he never had an idea of anything so very dreadful as the fever that now rages here. Major Adye§, Dr. Pym‖, and Capt. Lee, A.D.C. to General B——, went to Malta two or three months before this sickness broke out, but as they could not all return in the same vessel, they drew lots which should come first, unfortunately for Adye, who, poor man, thought himself particularly favoured in getting here two days before his forage money was paid. I think he died in about a week after his arrival. He had his senses to the last, which is an uncommon circumstance, and told Capt. Campbell that his wife and children were left in very good circumstances, she having 5,000 of her own.

* Lieut. John Pritchard, R.A., died 17th October, 1804.

† 13th Foot.

‡ 54th Foot.

§ Capt. R. Willett Adye, R.A., died at Gibraltar on the 22nd October, 1804.

‖ Surgeon-Major William Pym, Headquarter Staff.

"Mrs. Brown, who was the daughter of Colonel Spry,* was buried yesterday in South Port Ditch, where the beautiful Mrs. Jephson† and many others lay. Capt. (John Beaver) Brown, who married her some time ago, is a poor creature, but the ladies of the 13th Regt., to which he belongs, permitted him to visit them, as they lived at the South. I never saw her except once, but so different from what she was when I saw her in London 19 years ago, when her father's carriage, with several servants attending, brought her of a Saturday evening from Boarding School. I certainly should never have guessed her to have been the same. She has grown very fat and her face as red as scarlet. After we passed, the children cried out 'Oh! Mama, did you ever see so extraordinary a looking woman.'

"Capt. Thackeray‡ left the Governor (Lieut.-General Sir Thos. Trigge, K.B., Lieut.-Governor of Gibraltar) about a week ago, and has pitched his tent with his brother officers of Engineers. It appears that after the Barrack Master's decease Thackeray asked the Governor to let him do the duty of that office until another was appointed, as he thought it might give him the rank of Major in the Army. The Governor told him he did not think it would be the least advantage to him; besides, he meant to offer it to Capt. Young, of the 13th Regt. Thackeray ran to Mr. Fyers to ask his advice, as he said, in case the Governor did not appoint him, he was determined not to remain in his family. Mr. Fyers strongly advised him against taking so rash a step, but Thackeray said it was the second time he had been served in this way. He had been his first A.D.C. when in the West Indies, and instead of sending him with the account of a victory, etc., Sir Thomas sent a young man who was perfectly indifferent to him. It was true Sir Thomas gave *him* the £200 or £300 which is granted on those occasions, but this did not satisfy him, as promotion was what he was most anxious for. On his return to the Convent, the Governor told him that he had just settled the matter with Capt. Young, who was to have Major Andrews's appointment until further orders. Upon this Thackeray stept upstairs, stript off his red coat and put on his blue§; then coming quickly past Sir Thomas, wished him 'a good morning.' Sir Thomas called him back and told him he thought he had better consider on what he was about to do, but Thackeray told him he had most thoroughly considered it.

11*th.*

"Gardner‖ has returned from town, where he has heard that my cousin Darby is ill, also Colonel (John) Keane, now of the 13th Regt.

* Lieut.-General William Spry, R.E. It will be remembered that he was godfather to Mrs. Sarah Mann, and Mrs. Fyers is alluding to the time when she met him in London in 1785. He was then a Lieutenant-Colonel. He died in London on 12th July, 1802.

† Wife of Richard Jephson, Deputy Judge Advocate at Gibraltar.

‡ Afterwards General F. R. Thackeray, C.B., Colonel Commandant, R.E.

§ The uniform of the Royal Engineers was changed in 1782 from scarlet to blue, faced with black velvet. Thackeray's uniform as an A.D.C. would have been red.

‖ Capt. the Hon. W. H. Gardner, R.A.

You will recollect him a sub. under Colonel Ogilvy, I think of the 44th Regt. Old Mr. Witham died this morning. Almost all old Mr. Cooper's family are gone. We have just been informed that they have a dreadful fever at Leghorn; God grant that it may never reach England. We are particularly favoured in our situation here, where not a soul can get at us, and our being so near to the sea is a great comfort.

"Capt. Gore (Sir John Gore), Capt. Pearce, and Capt. Bosenhagen have very much contributed to our comfort by calling continually, or, rather, rowing past our tents, where they generally 'lay to,' and with a speaking trumpet we could hold a conversation. They also brought us two sheep, two dozen fowls, six turkeys, six ducks, with cheese, vinegar, etc., etc. This you may suppose is a great comfort to us, as whenever we do send into town, it is done with fear and trembling.

"Colonel Smith, R.A.,* with his wife and four charming daughters, are now here. They have during the sickness remained in the quarters left by Colonel Wellington, and as yet have done well. Morvet has lost the little white-haired girl who danced so well; you remember she sang on board Sir James Saumarez's ship. Joseph† the hairdresser died among the first, also Mr. Hollister and his wife, your servant Slocum, and our man Smith, Sally Webber and child, and Major Bellew,‡ who was very anxious to marry poor Sally, had not Colonel Darby prevented it. They are all dead. The young man is also dead that married Nancy Warner. Poor old Sherres died yesterday, and one of the Winlows. The woman, Mrs. Staker, who nursed one child is dead.

"General Trigge called at our tent this morning. I fancy a Spanish war is hourly expected,§ so that we are beset on all sides. As soon as this is declared, Sir Thomas must shut up the gates; in that case I know not what we shall do, as we had concluded on Mrs. Gardner lying-in here, the Doctors having said that it would be death for us to go to town. Every person who left the south for the town (to the northward) last week is sick, and several died, so that we must stay if possible. The Malaga fever is nearly over; about one person dies in three days, except such as come fresh from the country, who do not live more than two days after their arrival.

"*Monday 12th.*

"The *William* has just returned after an absence of 10 days. I will send this if possible. I hear Mrs. Baynes is well. Colonel Holmes and Capt. Gaskell, of the 10th, are in the ship with Mrs. Baynes. We have just heard of the death of Capt. Heywood, of the 54th Regt. Mr. Cuthbert died some time before. We are all, thank God, most wonderfully well; we eat our brown bread with the greatest relish, and if it was not for the dreadful sickness we should have thought the six

* Afterwards General Sir John Smith, G.C.H., and Lieut.-Governor of Gibraltar.

† Joseph, the German barber, employed by Colonel Fyers (see *ante*).

‡ Major Patrick Bellew, 54th Foot.

§ Spain declared war against England on December 12th, 1804.

weeks which we have been here delightful, but every day brings news of the death of some of our friends.

"You will have heard of Gore and Capt. Sutton and some other captains' success,* and, if you have not, you must write to Capt. Young, for I have not time to tell you particulars. I think our friend, Sir R. Barlow, was one of the fortunate heroes.

"God bless you. We are all thinking of Eliza, as she expects to be confined at the end of the month, or the first of next. I am sure you will laugh at the sort of room she is to be in. Ten days ago we had dreadful lightning and thunder and rain. Their tent appeared to be all on fire. Gardner declares he was so frightened that he could not shut his eyes all night, but that Eliza thought nothing of it, as he had assured her the tent was perfectly fastened, so that it could not blow down. Eliza has made up her baby clothes to admiration, but we were obliged to send to town for all cambric, etc.

"God bless you. Adieu, and believe me your most affectionate mother,

"ANNE FYERS."

Another gossipy letter to the same daughter from Mrs. Fyers, containing allusions to several officers of the Corps, has been preserved. It is not dated, but as it was written from London, where Colonel and Mrs. Fyers arrived from Gibraltar in May, 1807, it is tolerably easy from internal evidence to infer that it was written in the autumn of 1807, from the house they had recently taken in Portugal Street, Grosvenor Square. Sarah Mann at this time was in Ireland, where her husband was quartered at Athlone.

* Note by Evan W. H. Fyers:—

A description of this action will be found in Sir Wm. Laird Clowes's *History of the Royal Navy*, Vol. V., p. 350, derived from James, the Nelson Despatches, and the Naval Chronicle.

On October 5th a British squadron, acting under special secret orders from the Admiralty, and consisting of *Indefatigable*, Capt. Graham Moore, *Lively*, Capt. Graham Eden Hamond, *Medusa*, Capt. John Gore, and *Amphion*, Capt. Samuel Sutton, captured off Cadiz a squadron of four Spanish ships just arrived from Montevideo laden with treasure, which, though carried by neutral ships, was obviously destined to be used by the French. One Spanish ship (the *Mercedes*) sank, not more than 46 of her company being saved; but cargoes valued at a total of about £1,000,000 were taken with the other three. The Spanish were much weaker in force than the British, and were taken unprepared. Capt. Sir Robert Barlow, Kt., was at that moment on his way in the *Triumph* to Cadiz.

The action was severely denounced both at home and abroad, and led to the declaration of war by Spain two months later. Capt. Moore would appear to have exceeded his instructions, which were limited to detaining the ships "until His Majesty's pleasure shall be further known."

Letter from Mrs. Anne Fyers, wife of Colonel (afterwards Lieut.-General) Wm. Fyers, R.E., to her daughter Sarah, wife of Capt. (afterwards Major-General) Cornelius Mann, R.E.

"LONDON.

"MY DEAR SALLY,

"As Capt. and Mrs. Buchanan* go in a few days to Ireland, I shall not permit them to depart without a few lines. I have been rather unwell for the last three months with a pain in my back, which does not much affect me till about 5 o'clock in the afternoon, when I have not been able to lay, walk, or sit for more than two minutes at a time; it leaves me at 11 or 12, when I sleep well until morning. I was under the necessity of sending for a physician, who tells me I am in no danger, as it is a very common complaint. I had flattered myself that, after all the fatigue and trouble of nursing and bringing up children, everything would go on well, and that I should have nothing to do but attend the family and amuse myself. But, alas! I now know that no age is free from danger. Poor Mrs. Fox is a proof of this. She was boasting of her good health at Gibraltar, when it was discovered not many months after that a cancer was making its appearance (this is two years ago), and she is not now expected to live many weeks. General Fox† is very well; they live at no great distance from us.

"Charlotte is now at Portsmouth, where she will remain till Young‡ sails.

"General Gother Mann§ dined with us about 10 days ago. He is to go to Portsmouth when Sir G. Provost‖ is removed. I think they will be very happy there, but I am sorry that Mrs. Mann's indisposition will prevent her from enjoying the beauties of the garden. We found General Mann very pleasant, and not formal as we expected.

"Your Uncle Peter¶ has been ill since his return from Copenhagen. He took a drawing of the place, which he gave to Mr. Barker,** and it will soon be exhibited to the public eye.

"Edward†† is behaving well, and is reported by the person who superintends the surveying party very diligent.

"Mr. Fyers‡‡ has just received orders to have three horses kept for him, which will lessen the expense of keeping a carriage, which is enormous. I hope you will never live in London. I believe I told you in a former

* Capt. Gilbert Buchanan, R.E. He became a Lieut.-Colonel in 1825, and died at Chatham in 1830.

† General the Hon. Henry Edward Fox, son of the first Lord Holland.

‡ Capt. (afterwards Vice-Admiral) James Young, R.N.

§ Afterwards Inspector-General of Fortifications.

‖ Major-General Sir George Provost, of the 60th Foot, 1st Bart., who went to Nova Scotia as Lieut.-Governor in 1808.

¶ Capt. (afterwards Major-General) Peter Fyers, R.A.

** W. Barnard?

†† Her son, Edward Fyers, was then a Woolwich Cadet, and going through the final course of surveying under the Ordnance Survey.

‡‡ *i.e.*, Colonel Fyers. His wife always so called him.

letter that Sir C. Holloway* was very averse to going to Gibraltar. I have however since heard that Mrs. E. is quite an inmate of Sir Charles's family, but I fancy it will not be long before she will discover to them the 'cloven foot.'

"How fortunate we consider ourselves in being out of Gibraltar at this time, and yet how very unfortunate I considered our removal from that place. Here is another proof how little we know what is for the best.

"We find our new house very comfortable as well as elegant, and we now have, after changing and changing again, got very excellent servants. Our coachman assists at table, so that one footman serves, as we go out but little, and the housemaid assists the footman, she having been accustomed to live where no footman was kept. Our cook is also a very quiet and economical woman. She keeps the dining room, steps, etc., in order, besides the kitchen, so that we have only four servants. We had five, but I found I got so little work done that I could not keep a fine lady's maid at 18 guineas a year.

"I was in hopes your papa's picture† would have been engraved before Capt. B.‡ left, as then we should have presented you with a copy, but I fear it will require a week longer. You will find Capt. and Mrs. Buchanan a great acquisition to your society; although Mrs. B. is rather quiet, she does not want for understanding. On the contrary, I think her very clever; she dances very well. Capt. B. is an uncommon officer, and a most honourable gentlemanlike young man.

"Your excellent father is perfectly well. He is just gone to dine with General Morse,§ where he is to meet General Twiss, General Mann, Colonel D'Arcy,‖ etc. He is very happy in his appointment,¶ it being exactly what he likes. Doctor Pym** came from Messina with General Fox; he is not very well. This is a shocking climate. How do you exist in Ireland? It is a very great pleasure to know that you have such kind friends in Colonel and Mrs. Fisher††; the Buchanans are quite pleased to find that they, with Miss Fisher, are in Ireland.

"Eliza and Gardner‡‡ beg to be kindly remembered; they will write to you soon. Our children have grown out of your knowledge. Mrs.

* Lieut.-Colonel (afterwards Major-General) Sir C. Holloway, R.E., who went through the celebrated Siege of Gibraltar in the years 1779 to 1783, and had now been appointed to succeed Colonel W. Fyers as Commanding Royal Engineer there.

† The portrait by John Hoppner, R.A., painted for the Garrison Library, at Gibraltar, which was engraved by Henry Meyer.

‡ Capt. Buchanan.

§ Then Inspector-General of Fortifications.

‖ Lieut.-Colonel (afterwards Major-General) Robert D'Arcy, C.B., R.E., died in 1827.

¶ Deputy Inspector-General of Fortifications.

** Surgeon-Major William Pym.

†† Colonel (afterwards Major-General) Benjamin Fisher, R.E. He died at Portsmouth in 1814.

‡‡ Capt. the Hon. W. H. Gardner, R.A.

Thomas Fyers* makes an excellent wife; she is again in a thriving way! Their son is a lovely child.† They come in their gig to dine with us once a week. We think it likely Mr. Fyers and myself may go to Scotland in the summer by way of duty. My love to Capt. Mann, and kiss all the young ones for grandmama. I hope you do not spoil them.

"I saw Whitmore‡ a few days ago; he was on a visit to his mother, who is ill. He says he is not so fond of plays as formerly. Mrs. W. has grown stout. I hear they are very happy. Mrs. Eyre§ looks, they say, very well. . . ."

The end of this letter is lost.

Mrs. William Fyers died at the house in Portugal Street on the 27th September, 1808, aged 54 years, less than a year after this letter was written.

After this digression, I proceed to notice the children and descendants of Major-General Peter Fyers.

* Louisa Clifton, wife of her son Thomas, afterwards Major-General, R.E. Capt. Thomas Fyers was then quartered at Chatham.

† This was the first child, who was born at Gillingham, Kent, in February, 1807. He was afterwards in the 11th Foot.

‡ Capt. (afterwards General Sir) George Whitmore, K.C.H., Colonel Commandant, R.E.

§ Wife of Lieut. J. W. Eyre, R.E., who died at Tobago in 1825.

(*To be continued*).

RAILWAY SLEEPERS.

By Lieut. G. C. V. Fenton, R.E.

Many forms of railway sleepers have been used in the development of railways, and yet apparently the last word has not been said on the subject, as the ever-appearing reinforced concrete has been suggested as the material for this important purpose. Stone sleepers were tried, but it was found that the road was too hard and unyielding, and they were soon discarded. Steel sleepers were used experimentally in England by the London and North Western, and Metropolitan Railways. They too have been dropped, and the whole of the railways in England are practically all laid on wood sleepers. In India, and other places, where the white ant abounds, the steel sleeper holds its own, but the use of teak and creosoted pine, and other hard woods appears to be considerable.

Wood sleepers are used in two forms, transverse and longitudinal, but the latter are only employed in the case of certain bridges, where the transverse sleeper would be unsuitable. With the exception of a limited number of larch and fir sleepers grown in this country, the majority of timber for this purpose is imported from the Baltic. It is brought over in logs or blocks, each 8′ 11″ long, and about 10″ × 10″ in section, and when sawn down the middle, each block forms two sleepers. The specification for the timber, as issued by the Midland Railway Company, is contained in Appendix A.

These sleepers, when received, are in a comparatively green condition, and they are seasoned by being stacked in the open air for *at least* six months, and if possible for much longer. The method of stacking is in rectangular heaps, made by layers of sleepers placed on edge, with about 1″ air space between, and each layer separated from the next by a row of sleepers on their flat sides, placed at each end of the stack. This allows a good current of air round each sleeper and gives the whole stack a fair chance of seasoning.

A railway sleeper is particularly exposed to deterioration, being surrounded practically on three sides by moist ballast, while the top is more or less uncovered. Many processes have been tried to preserve timber, but the system which has given the best results is creosoting, and this method is adopted by all the railways in England.

Creosote is a dark oily liquid distilled from coal tar, and as used, is about the same consistency as thick treacle when cold, but when heated becomes only slightly thicker than water. The Midland Railway's specification for creosote is contained in Appendix B, and a plan of the Midland Railway Company's creosoting works at Beeston is attached, the method of procedure being as follows :—

The sleepers are stacked in the method described above at the Nottingham end of the works, and, when required, are loaded on to small carrier trucks, which are run on the narrow gauge line between the stacks. Each truck carries 45 sleepers, and is at present drawn by horses to the shed where the boring machines are, but it is proposed to substitute a small travelling crane for the horse traction.

These boring machines are two in number and are driven by an 8-H.P. engine; each consists of two sets of drills, four in each set, situated in the relatively correct position to drill the holes for the chairs on each sleeper, and the sleepers are loaded from the trucks on to the endless chain carrier, which conveys them under the machine. The man working the machine stops each sleeper as it passes under, raises a catch which holds it firmly in the correct position, and depresses the boring machine gear, and thus drills the holes. The sleeper then passes on to be loaded up on to another empty truck waiting to receive it at the other end of the carrier. These machines can bore three sleepers a minute on an average throughout the working day.

The creosote is received in railway oil tanks, which are run alongside the storage tank, the capacity of which is 28,290 gallons, and empties into it. This tank is heated by steam pipes, which pass through the creosote and raise its temperature until it becomes a fairly thin liquid. The creosote is run from the storage tank as required into the working tanks, of which there are two. Each working tank is provided with an indicator to show the amount of creosote in it, and is warmed by steam pipes in a similar manner as the storage tank.

There are two creosoting cylinders, one 75′ in length and the other 54′, but it is proposed to lengthen it to 75′ in the next few months. These cylinders are 6′ in diameter, and the narrow gauge line is laid right through them in continuation of the lines from the boring machines. They are fitted at each end with strong air-tight doors, which are held in position by a number of strong clamps. These doors can be easily removed and run alongside when it is required to charge the cylinder with sleepers.

The space between the rails in the cylinders is packed with sleepers, and the trucks loaded with sleepers are run in, until the

whole is filled. The doors at each end are then put on and secured. The 75′ cylinder holds 400 sleepers and the 54′ 300.

Each cylinder is connected with the 10-H.P. engine, which consists of two pumps, one capable of forming a vacuum in the cylinder and the other for pumping in creosote.

The vacuum pump is put on for 10 minutes and withdraws all the air from the cylinder. The engine is then stopped and a cock from one of the working tanks is opened, and creosote rushes from it and fills up the cylinder. As soon as the cylinder is full, the reading on the indicator of the working tank is read and noted. Each sleeper, for proper creosoting, should absorb $3\frac{1}{8}$ cubic feet of creosote, and this is equivalent to $2\frac{1}{2}$ gallons. From this data the amount of creosote required for the sleepers in the cylinders is calculated, and the creosote pump is started and continued at work until the reading on the indicator of the working tank shows that the required volume of creosote has been pumped into the cylinder. As soon as this is done, the pump is stopped, and the cock from the working tank is opened, and the creosote allowed to drain back into the tank. The vacuum pump is then started to withdraw all surplus creosote, after which the doors are opened and the sleepers run out at the Trent end, and are there laid out to have the chairs attached.

The time taken for this process varies according to the state of the sleepers. The process is speedy when the wood is dry, but when the wood is wet, or in cold weather when the sap becomes frozen, the time taken to pump in the required amount of creosote becomes much longer. The cylinders are provided with relief valves, which open at 120 lbs. per square inch, but that pressure is rarely required. On an average dry spring day the time taken with each cylinder for the different processes is tabulated below, the indicator on each cylinder showing a pressure of 20 lbs. per square inch only, when the required amount of creosote had been forced in.

	Cylinder, 54′ long.	Cylinder, 75′ long.
Vacuum	10 minutes	10 minutes
Filling with creosote	15 minutes	12 minutes
Pumping in creosote	50 minutes	60 minutes
Emptying	30 minutes	25 minutes
Revacuum	10 minutes	10 minutes
Total	1 hour 55 minutes	1 hour 57 minutes

Wood sleepers are laid in a track in both positions, sap-side up and sap-side down, most railways preferring the former, but the Midland Railway use the latter method. They claim that in laying in the latter way, the chairs can be placed direct on the sleeper without any adzing to give a bearing, thus saving in labour and also in the life of the timber, as it does not give any break in the surface through which the wet might percolate into the body of the sleeper, and thus cause rotting. The average life of a railway sleeper is from 12 to 18 years, and it is generally sound enough at the end of that period for level-crossing places, fencing, loading banks, and similar work, or for use in sidings. The cost of a sleeper as landed in England is about 2s. 6d., and the creosoting brings it up to 3s. 3d. When it has done its work, it can generally be cut up for firewood, and will bring in about 1s. when sold for that purpose.

APPENDIX A.

SPECIFICATION FOR REDWOOD SLEEPERS.

The sleepers shall be rectangular, of Baltic red timber, of Dantzig, Memel, or Riga shipment, 8′ 11″ long by 10″ by 5″ in section. They shall be cut from blocks of 10″ × 10″, and shall be straight, sound, of good quality, and free from large and dead knots and shakes. Not more than 1 per cent. of the sleepers shall be imported sawn, and at least 55 per cent. shall have a flat surface of 10″. The sleepers shall be submitted for inspection in entire cargoes, as imported without any previous selection having been made therefrom.

Power is retained to reject as defective, either before or after delivery, all unsound sleepers, all sleepers having a wane exceeding 1″ on each of the two outside angles, and presenting less than 8″ of flat surface on the outside at the smallest part, or any sleepers which do not in every respect comply with the specification.

APPENDIX B.

SPECIFICATION FOR COAL TAR CREOSOTE.

The creosote shall be obtained exclusively by the distillation of coal tar, and shall not contain more than 3 per cent. of mechanically mixed water. It shall become perfectly fluid when raised to a temperature of 100° Fahr., and shall remain perfectly fluid at a temperature of 90° Fahr. It shall have a specific gravity of from 1,040 to 1,065 at 90° Fahr., as compared with water (= 1,000) at 60° Fahr. The creosote shall contain not less than 25 per cent. (by volume) of oils that do not distil over at a temperature of 600° Fahr. when tested in accordance with the instructions given below, and the distillate at 600° Fahr. shall yield not less than 6 per cent. (by volume) of phenols.

Process for Testing Coal Tar Creosote.

The sample is to be warmed, if necessary, until it is perfectly fluid. 100 c.c. of the well-mixed creosote is to be then poured into a 4-oz. tubulated retort, and heated gradually to a temperature of 600° Fahr. over a naked flame surrounded by a screen, the distillate being collected in a 100-c.c. graduated cylinder. The thermometer is to be immersed, so that at the end of the distillation the bulb is just out of the oil. The flame is to be arranged so that the distillation of the oil after all water has passed over, and the oil has commenced to distil quietly, shall occupy from 18 to 22 minutes. The distillate is to be measured at the same temperature as the original creosote.

The distillate obtained above is to be poured into a stoppered flask of about 250 c.c. capacity, and vigorously shaken with 30 c.c. of a solution of caustic soda of specific gravity 1·21. The flask is to be then placed on a steam bath heated to about 180° Fahr., and again shaken vigorously for at least one minute. The contents of the flask are to be next poured into a separating funnel, and allowed to stand until the liquids have completely separated; the soda solution is then to be drawn off into a 10-oz. stoppered separating funnel. The oil left in the separating funnel is to be returned to the flask and treated as before, but using only 15 c.c. of the caustic soda solution. After the soda solution has again been drawn off, the treatment is to be repeated a third time if necessary.

The mixed alkaline solution in the separator is to be made quite cold, and well shaken with about 70 c.c. of ether to remove any neutral tar oils which have escaped separation, and after the ether has completely separated, the soda solution is to be drawn off into an 8-oz. wide-necked flask and heated until the dissolved ether has completely evaporated, after which the alkaline liquid is to be cooled and treated with dilute sulphuric acid (1 vol. of strong acid to 3 vols. of water) until the solution is slightly acid and the crude phenols have completely separated. The whole is to be then poured into a graduated 100-c.c. or 150-c.c. cylinder and the volume of phenols read off when cold.

TRANSCRIPT.

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THE FINAL STRUGGLE FOR 203-METRE HILL AT PORT ARTHUR.

Translation of an article by Staff-Capt. Kostiushko in the March, April, and May numbers of the *Yenzhenernee Zhoornal*.

(*Continued*).

After he had sent away his last reserve General Irman was very anxious about the fate of the hill, and could not wait for the joyful news of the repulse of the Japanese, but himself rode up there, taking with him the writer of this account and two mounted volunteers. The newly appointed commandant of Visokaya, Captain Pobilevsky, 26th Regiment, accompanied them.

The distance from the 5th Regiment Headquarters to the hill was from 1 to 1¼ miles, and lay along the Tea Ravine, which was now swept with rifle fire from the hill, so that the whole way bullets were singing overhead and falling alongside, but did little harm, as the Japanese, owing to the darkness, could only fire at random. One or two ricocheted at the very feet of General Irman's horse and frightened him so that he jumped to one side, but the General succeeded in quieting him.

Visokaya Hill, on which at that time a desperate battle was raging, presented a most majestic and effective picture. In the dim light of the stars its terrible silhouette was being lighted up by fiery flashes of all kinds.

Common shells bursting on the side of the hill turned towards the riders, formed sheaves of brilliant light, from the top and sides of which brown-coloured sparks flew in all directions. This light would burst out unexpectedly in various places, and, after brightening up for two or three seconds the sombre repulsive silhouette of the hill, would suddenly die out. The bigger the shells, the larger the sheaves of light which burst from them, and the longer they remained visible. At the same time the neighbourhood resounded with the crashes of the explosions and the whistling of flying splinters and stones. This was the impression given by the common shell. The shrapnel burst at some distance from the hill, producing long tongues of fire, which were quickly extinguished. The air mines which were thrown by the Japanese, on bursting, threw up enormous sheaves of fire on the crest and on the Japanese side of the hill, and very rarely on the Russian side. The hand grenades thrown by the Russians burst on the far slope, and each with its brief flash lighted up

the crest for a single moment; but the finest effect was produced by the *rak-a-rok* candles and rockets.

In the darkness of the night it was difficult to carry on the fighting without seeing the enemy; in the eyes of wearied men the enemy appeared to be on all sides, and they fired at random, without taking aim. To overcome this, the officers of the mining company had invented a candle which was about the size of a large radish (in length about 14" to 16", and 3" in diameter). The combatants were within 20 to 30 paces of one another, and in places even nearer, and at such a distance it was easy for the Russians to throw a candle by hand with such accuracy that it would fall in rear of the enemy and show up their figures distinctly against its light. Some of these candles burnt with a bright red, uncanny light, while others gave a white light, like that of acetylene gas, and they weirdly lighted up the crest of the hill, as it stood out darkly against the lighter heavens. Each candle burnt for a minute or somewhat longer, and its burning was accompanied with the continuous crackling of the Russian rifles.

From time to time also rockets soared into the sky, but they proved less serviceable to the Russians, because bursting overhead they lighted up both combatants equally.

By all these lighting effects Visokaya Hill was illuminated in an extremely varied and beautiful manner.

Close up to the hill in the head of the ravine was an enormous accumulation of men. Some were boiling something in kettles, others were eating something, or drinking from their waterbottles; around a belated travelling kitchen a group of cooks was collected, and these as usual were jostling and abusing one another. Near a dressing station there was a crowd, chiefly of stretcher-bearers and wounded. Such groups need not have attracted attention, as both dressing stations and kitchens are natural adjuncts to the rear of a position. But besides these, on both sides of the road, with their heads on the sides of the ravine, men of all sorts of detachments lay and slept side by side, and so many were there that General Irman asked who they were. At first the writer thought they must be the dead, but a touch convinced him of his error—they were neither dead nor even wounded.

On being roused some of them were found to be so utterly exhausted that no intelligent answers could be got from them, while others said that they had been sent down from the hill because they suffered from night blindness and became useless at nightfall. But others, who were having a comfortable tea round a small fire, had no better excuses than that their eyesight was naturally bad, while others said that they were suffering from slight wounds, but were not allowed to go to hospital.

It may be mentioned here that subsequent enquiries elicited the fact that it actually was the custom to send down at night those who suffered from night blindness; but there were not very many of them, although as the men became weaker the number of sufferers progressively increased, until out of every five riflemen three were suffering from night blindness, while among the sailors the percentage was somewhat less; yet all were not sent away, or no one would have been left to defend the hill, and

there were sent down only those who had long been sufferers from this disease. By day these men returned to the hill, but not all of them, some stayed on all day under the hill. As to those who said that they were wounded, it may be remembered that on the 29th November parties of convalescent wounded were sent out of the hospitals to form a reserve. The strongest of these had been sent to Visokaya, but having crawled as far as the hill, some of them were quite unable to climb up it, and so remained at the bottom.

During the 1st and 2nd December the Japanese became quieter, and good order was established in rear of Visokaya Hill.

On mounting the hill General Irman and his escort learnt that the assault had been finally repulsed, and that the whole of the position was, as at first, in possession of the Russians. Rifle fire was heard occasionally, but grenades and shells fell continually, though in considerably less quantity than by day.

Stumbling up the rocky slope and over heaps of rubbish, they eventually reached the top of the hill, and here the picture was very far from being as enchanting as it had been from afar.

Visokaya Hill had completely lost its original form, and presented to view a mound of broken stones and fragments of wood, rags, and corpses. The 11″ shells on striking the rock broke off great blocks, which successive shell broke up into smaller pieces, so that by the 30th November no more blocks remained, and only small rubbish, which covered the face of the hill to a depth of about 2½′.

Of the 43 blindages, by the 30th November only two on the left flank remained uninjured. A shell had even struck the edge of the commandant's blindage, which was also the telephone room, but it had fortunately been only a 6″, and had not wrecked it.

The rest of the works, such as the shrapnel hoods, were completely destroyed; in several of the blindages several shells had fallen, and these had converted enormous beams into awkward chunks and rubbish.

In order that the reader may appreciate what a ruined blindage looked like and with what horrors its destruction was attended, the following report of Sapper Peter Oleinik, of the Kwantung Sapper Company, is published in full:—

"I do not remember the date, but one evening an 11″ shell wrecked a blindage on the left flank of Visokaya. They at once sent for us, nine men of the Sappers, to dig it out. When I reached the ruined blindage a terrible picture met my view—almost in the very middle of the blindage there was a crater 5′ deep and 10½′ wide, from the midst of which, as well as from the entrance of the blindage, rose the smoke of smouldering mattresses and sand-bags and the suffocating stench of the gases of the explosion. From within came groans, wails, and cries for water and help. These cries ended sometimes in heart-breaking petitions, sometimes even in abuse. The first to whom my attention was directed was a junior N.C.O. of the 5th Regiment; he lay on his back; his head, arms, and the upper part of his chest appeared from under the ruined blindage, but the rest of his body was buried and so crushed that he in vain

struggled to free himself from under this frightful mixture of earth, beams, sleepers, rails, and iron sheets. We fetched three buckets of water, and when we had extinguished the smouldering sacks and mattresses we began to dig out those who were buried alive. We got out the N.C.O. first; he was badly crushed and had both legs broken. As we reached the others, we became more horrified; all were badly mutilated, almost all had arms and legs broken and their hair burnt off. One had his head completely crushed, but all showed signs of life. There were no stretchers, so we removed the sufferers in cloaks, in which many died at once; a few of the men were only badly crushed, but without any limbs broken. When no more groans were heard we stopped work, assuming that all the rest were dead."

There were sometimes as many as 10 to 12 men buried in the ruined blindages under splinters of wood and stones. During the fighting there were neither time nor spare hands to dig them out. During the night fresh trenches were built up over the old ones of sacks filled with the rubbish. These trenches in their turn were very quickly wrecked, and from them pieces of the sacks flew like cloths over the whole hill And so the hill had a very unattractive appearance, no trenches, no cover, only deep craters and a universal heap of rubbish. General Irman first of all turned towards the commandant's blindage, but Tretyakov was not there; he, after driving off the Japanese and going round the position, lay down under a light shrapnel hood which had accidentally escaped injury; he was half lying, resting his head on a stone and apparently dozing, but at Irman's approach he got up, clad in a short black fur coat, and greeted him.

Weariness and exhaustion, already giving place to complete apathy, appeared in every feature. His face and beard were covered with a thick layer of dust, but his ever bright kindly eyes, although bloodshot, to some extent animated his face. He had been deafened by his contusions, and from tremendous shouting all day he had lost his voice and spoke very softly. Besides this he had a splinter of shell in his back and had had no time to get it dressed. All this showed that more had been taken out of him than would have been expected from an ordinary man, and that he, more than anyone, required rest.

The second in command to General Tretyakov on Visokaya Hill was Lieut.-Colonel Seifulin, 5th Regiment, who had arrived on the hill after Stempnevski had been wounded, and was evidently less fatigued than his commanding officer.

"Now, as you see, there is a lull," said Tretyakov, although this was by no means evident, for in reality grenades and shells were bursting all around; but this was really a lull when compared with the hell which had existed on the hill during the whole day and evening.

Passing round the hill, Irman and Tretyakov turned into the telephone blindage and, sitting on the bench which had served Capt. Stempnevski as a bed, began to give their opinions on the matter of Visokaya Hill.

General Irman was of opinion that Visokaya expended too many of the reserves, of which there were really none to spare.

General Tretyakov at first only listened, but later, when Irman asked

him what he thought about the fate of the hill, he said that its days were numbered, that they could hold it for three to five days more, possibly for a week, but with great loss, and in the end it must be given up, because there would be no one left to defend it. Its only chance of safety was that the Japanese might suspend their assaults for a week or two; then it might be re-fortified, even to a small extent, and new troops collected. But this is just what the Japanese would not do; they were now attacking each day more strenuously, and in all likelihood they would continue attacking it whatever happened. This they could do the more easily as they were losing comparatively few men, while the Russians from their artillery fire were losing masses.

During this conversation several times riflemen came running up with various reports.

"Your Excellency! In the left redoubt the grenades are all expended; please sanction more."

"Here are some grenades," counting out twenty, "Be careful of them."

A N.C.O. came running up.

"Your Excellency! In the left redoubt we have only seven men left, including two sailors, who will soon go away; please grant a section to enable us to defeat the Japanese should they approach."

"Send 10 men more from the reserve; keep up your spirits."

"It shall be done, your Excellency."

A rifleman ran up, out of breath.

"Your Excellency! The Japanese are coming round our left."

"Where?" asked Tretyakov, quite calmly.

"There where the slope runs into the ravine, in order to get at us from behind."

Everyone sprang out of the blindage and, with alarm, peered down the left flank of the hill to where the man pointed.

"There is no one getting round! It is your fancy," Tretyakov again answered, calmly and confidently.

"They are getting round, your Excellency! By God, I saw them myself, and the section commander also said so; they are moving on the slope down which you are looking. Why should I tell you a lie?" answered the rifleman.

"And I tell you that you are making a mistake," replied Tretyakov, and he sent off a volunteer to find out if the Japanese were coming round at the place pointed out. After some time the volunteer returned and reported that they were not, but were sitting still in their saps.

"Why did you say they were moving round? Where are they?"

"Marvellous! But they certainly were doing so; I saw them, and the section commander also . . . ," murmured the confused rifleman.

"Well, now go and convince your section."

"It shall be done. Pardon for having disturbed you," and he went away.

"They are continually reporting turning movements to me; I am used to it," the General explained in the same calm voice, very softly, from his hoarseness. "The men, you see, are utterly tired. Their nerves are so strained that in the night they imagine all kinds of evil. And it is impossible to blame them—they are all brave—they are heroes!"

"Colonel," said the writer to General Tretyakov, "is it possible that there are only 17 men in the left redoubt, including the reinforcement you have just sent?"

"Probably 17, unless any have since been killed or wounded."

"But surely that is too few for the defence of the redoubt?"

"What can I do? All the reserves remaining at my disposal are 46 men in rear of the left flank, and about 50 behind the right, and even these I had difficulty in collecting after repulsing the assaults. Certainly 17 is few, but what can I do? One must keep some for contingencies."

In the course of a little time rifle firing broke out in the right redoubt. Although there was no immediate call for them, it was necessary to get the reserves ready for any contingency. The writer ran to rouse some men who were lying in a row by the road to the rear, which led from the commandant's blindage near the top of the hill.

"Here, get up quickly!"

"No, those will never get up," explained Tretyakov; "they are dead; the reserve is further on there."

Just then there ran out of the right redoubt what appeared to be a crowd of scared men. Tretyakov immediately ran to meet them, thinking that they must be retiring. But no, they were only bringing away a few of their own wounded and one Japanese; the bearers explained that the latter had been wounded, but fearing to show himself had lain patiently in the redoubt hiding among the dead, until he had been again wounded by a bursting shell, and had revealed himself by moving and crying out. He was taken on to the dressing station. Such an occurrence was rare by December, because both sides had taken to bayoneting their wounded enemies. There were several reasons for this. In the first place the combatants were embittered by the desperate nature of the fighting and the murderous effect of the weapons. Secondly, it was dangerous to leave a wounded enemy in the trench, as cases often occurred when wounded Japanese suddenly jumped up and dashed at the defenders, and sometimes bayoneted them; probably the Russians did the same; in a word, it was not safe to leave a wounded enemy in the trench, but there were neither time nor spare hands to take him to the dressing station; it was difficult enough to look after their own wounded, in fact sometimes a wounded man lay in the trench for hours. Thirdly, the Russian soldiers reasoned very simply in this way:—To take a man prisoner meant that he had to be fed and treated in hospital; but their own men had nothing to eat and there was no room for them in the hospitals. Besides this the Japanese were causing them to die of starvation, and without pity were destroying the hospitals, although the latter were marked by red cross flags, thus showing that they had neither pity for the Russians nor their wounded, so why should the latter pity them? Finally all the men were tired out and could hardly get through their actual work, let alone carrying away wounded enemies, against whom they were bitterly enraged.

And so this wounded Japanese who was taken down the hill to the dressing station was exceptionally fortunate. He evidently fell into good hands when the men were a little calmer than usual, or he would have

taken his place among the dead, of whom there were a vast number on Visokaya Hill; almost at every stage there lay corpses or bits of corpses of either Russians or Japanese.

After going round the hill several times, the two Generals passed along the firing line on the saddle and then went down the enemy's side, and came back convinced that in that part very few Japanese remained opposite the Russian trenches. The riflemen and sailors stood in their places like heroes, repairing trenches and keeping up a fight with hand grenades.

Lieut. Fetter, of the mining company, superintended the engineering work on the saddle, as this was considerably weaker than the redoubts. Practically no defences remained here, and he was endeavouring to make at any rate a shallow trench with sand-bag parapet. Although the 11" shells were falling at the rate of one every five to six minutes, Fetter looked after his work with great coolness, standing completely in the open and paying no attention to them.

General Irman did not quit the hill till 6 a.m.

Fighting on Flat Hill.

Though the main Japanese attack on the 30th November was directed against Visokaya, yet they also attacked Flat Hill with great desperation.

They prepared the way for the attack with increased fire of artillery and mines. The mines had a terribly destructive effect; they blew the men to bits and scattered them with earth and stones in all directions. They absolutely wiped out the parapet of a trench, sometimes forming a breach as much as 10 paces in width, and they consequently had a great moral effect upon the men. Probably the Japanese had not very many of them, as they did not fire them very often, and, fortunately, they were not always successful in hitting the trench itself. The mine apparatus was on Long Hill, at 400 paces from the trenches on Flat Hill.

At 9.30 a.m. the Japanese carried out their attack and occupied the trenches of the 11th Company, 27th Regiment, and part of those of the 10th Company, 5th Regiment, and the Volunteer Party, 27th Regiment. The chief attack again fell on the unfortunate section with the dead ground in front of it. On this section, 20 paces in length, an especially heavy artillery fire was concentrated.

The gallant officers of the 10th Company, Staff-Capt. Astafiev and Lieut. Selikov, said that they would rather die than yield to the Japanese a single yard of their trench, and took all possible measures accordingly. Astafiev had volunteered for the war from the 28th Polotsk Infantry, and having taken over the 10th Company after Kinchow, distinguished himself with it on the 19th and 20th August at Angle Hill, where the company lost three-quarters of its strength. The 1st Half-Company lost practically all its men in the bayonet fighting and from artillery fire, but all the time gallantly held its ground, for which it gained the praise of General Kondratenko, who said that the companies of the 5th Regiment stood "like a rock." Kondratenko ordered all who remained of the 10th Company to be recommended for decorations, and that their names

should be posted in their companies in letters of gold for all time. Astafiev was recommended for the Cross of St. George, but General Fok did not confirm this recommendation, but replaced it by some other award. Astafiev went round the trenches of his company before the fight and urged the men to maintain the high distinction they had won on Angle Hill; he foretold his own death in the fighting, and besought the men to fight as bravely after it as before, so as not to tarnish the glorious fame of their company.

The "unfortunate" section fell to the share of the 3rd Section, and here Astafiev collected the men who were most skilful at grenade throwing and ordered them to prevent the Japanese from collecting in the dead ground, and he also ordered that casualties in this section should be instantly replaced by men from the neighbouring sections.

When the increased bombardment commenced, both officers were in the "unfortunate" section, and Selikov was trying to cheer the men with jokes, so that in spite of heavy losses the company was in good spirits.

At 9 a.m., close to where these officers were observing, an 11" shell fell in the "unfortunate" section, and the scene of its bursting was marked by a heap of bodies. Sergt. Fedorov and several riflemen lay dead, and both officers were wounded and crushed, and each had one leg blown off. Astafiev was unconscious and did not speak again, but Selikov begged to be left alone, as anyhow he must soon die. The men lifted up both their heroes and carried them quickly out of the trench.

Astafiev died in the stretcher on the way to the dressing station, but Selikov (who was a Caucasian, transferred from the 25th Regiment) lived for some hours after his wounds had been dressed, and was able to press the hands of the men who had carried him to the dressing station in token of his thanks.

Hardly had they succeeded in removing the officers when the Japanese began to jump into the trench. The riflemen who remained there met them with their bayonets, and all perished in the unequal struggle, and the "unfortunate" section passed into the hands of the enemy.

On this, Sergt.-Major Evseiv lost his wits, and instead of taking over command of the company, ran to the commandant of the hill with a report of what had happened, and a hospital detachment, which was on the right of the 10th Company, abandoned part of their trenches without any apparent cause.

Under these circumstances disorder spread among the men of the 10th Company, and some moved to the right along the trench with the intention of retiring, but Sergt. Kominar, commanding the 1st Section, rushed to meet them, and stopped and calmed them. Then collecting a few resolute volunteers he led them forward, and by skilful grenade throwing compelled the Japanese to fall back; he could not completely drive them out, as by that time he had only 30 men left, with whom to defend from the front a length of 200 paces of the trench.

Much in the same way the Japanese obtained success in two or three other places, and Flat Hill was evidently in a very critical state; but its commandant, Lieut.-Colonel Budyanski, was brave, energetic, and ready in expedients, and knew his work thoroughly. Collecting all the reserves

whom he could lay his hand on, he forthwith launched them against the Japanese, and after a desperate struggle, which continued with varying fortune till 11.30 a.m., he finally drove them back, and everywhere re-occupied his original positions.

At 11.50 he reported that, by the terrible bombardment which had continued since dawn, all his trenches were destroyed and a very large number of his men killed; in the Stony Redoubt as many as half the garrison had fallen; that the Japanese had made an attack and had occupied part of his trenches, but that by his dispositions they had been beaten off, and all the trenches were once again in his possession; and that now he could see that the enemy were concentrating their forces against the centre of Visokaya Hill.

After midday the Japanese made no serious attack on Flat Hill, but limited themselves to demonstrations and artillery bombardment. Lieut.-Colonel Budyanski, who since the 27th November had repulsed such a number of Japanese attacks, became famous throughout the garrison, and was recommended for the Order of St. George, with which he was afterwards deservedly rewarded.

1st December.—The Japanese, as usual, increased their artillery fire at dawn, and their infantry recommenced their attacks, but with far less energy than on the previous day. Their tone had notably weakened. They advanced to the attack, not in large masses, but in small parties of about 50 men each, and these attacks lacked the *élan* and persistency of the day before. What generally happened was that some 50 men with loud cries would climb out of their trenches and make a dash up the hill; the Russians would overwhelm them with grenades and rifle fire, and they would fall back; after a little time they would repeat the practice. In this way the defenders had to be constantly on the alert, and as they were exposed to a powerful artillery fire the whole time, their losses were considerable. Unfortunately no count was kept of the number of shells which were fired on this day against the hill, but it must have been fully 800, and possibly 1,000.

Lieut. Erofiev reported to the 5th Regiment Staff, from Pigeon Bay, that about two regiments of infantry were seen to move from Visokaya to Angle Hill, and on towards Louisa Bay; that there remained enough men on Visokaya to keep a few moving about in the Japanese saps and to man the lower parallels, though not so strongly as on the day before, while of the columns which overnight had been noticed climbing the hill, not a sign was to be seen.

As Erofiev could obtain a good view of the side of Visokaya which was being attacked, his information was very accurate and valuable, and on this occasion it was decidedly consoling (see *Fig.* 7, which is a sample of the sketches which accompanied Erofiev's reports).

At about midday the Staff of the Land Defence reported that about two battalions of Japanese were moving over towards the left flank. Two regiments going away at dawn, two battalions coming in the forenoon. Evidently the enemy were replacing the troops who were exhausted in the fighting. They too were worn out, which was satisfactory!

If one considers that two regiments had been relieved and that

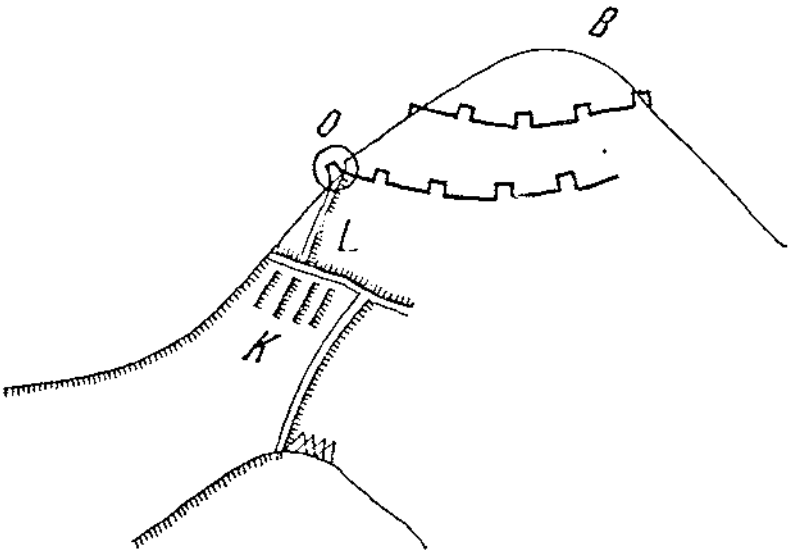

FIG. 7.—*View of Visokaya Hill from Pigeon Bay, 1st December, at dawn. Eye-sketched. Lent by Lieut.-Colonel Gobyato.*

O.—Shows site of blindage occupied by the Japanese on 28th November.
K.—Traverses erected by the Japanese to shelter their reserves from artillery fire from Pigeon Bay.
L.—Japanese communication trench, connecting their sap with the captured portion of the Ring Trench.

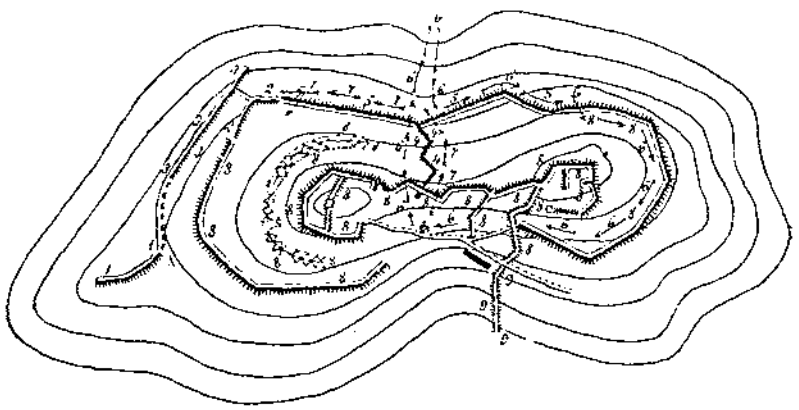

FIG. 8.—*Plan of Visokaya Hill, showing the events of 1st to 4th December*, 1904.

(1). Trench excavated by the Japanese for correcting their fire on the fleet and the town.
(2). Portion of Ring Trench captured by Japanese. The sortie before dawn on the 5th December was directed against this.
(3). Japanese sap.
(4). Demolished portion of covered communication trench.
(5). Demolished and unoccupied portion of Ring Trench.
(6). Route of first reconnaissance on night 2nd—3rd December.
(7). Route of second reconnaissance on same night.
(8). Trenches, communications, and obstacles occupied and repaired by the Russians.
(9). New communication trench constructed by Ensign Ermakov in the nights 2nd and 3rd December.

sufficient troops still remained, one may assume that the hill had been attacked by three regiments; on the Russian side there were never present more than 500 men, and sometimes only 300. It is true that casualties were constantly being replaced from the reserves, but these casualties were caused by the Japanese artillery, and if the reserves are written off against the Japanese artillery, it remains that the 500 wearied, half-starved Russians had been opposed to three regiments of Japanese infantry. As each regiment numbered from 2,500 to 3,000 men, it will be seen that the proportion against the defenders was about 20 to 1.

And these overwhelming masses by continuous fighting during the day succeeded in gaining the very summit of the hill, only to fall back during the night before the charge of two, three, or four fresh Russian companies, which had been meanwhile brought up from the reserve. It was noticed that the Japanese could not as a rule withstand the Russian bayonet charges, and for these the night was most suitable.

The admirers of Japanese bravery may explain their ill-success by the maxim that it is much more difficult to attack a hill than to defend it; but how can they explain that the enormous forces of the Japanese could not hold ground *already taken*, and were driven back by mere handfuls of Russian soldiers?

Even Tretyakov, self-sacrificing, gallant, experienced, and energetic though he was, could not work miracles. In the opinion of the writer, attentive criticism of the actions of both combatants at Port Arthur does not confirm all the praise which has been lavished upon the Japanese.

Their Generals had great perseverance, but the quality of their troops was not at all superior to that of the Russians. In Manchuria the Japanese with weaker forces captured the positions because the Russians fell back before them by order. All were struck with their discipline, order, courage, etc. The same Japanese fell back themselves several times at Port Arthur, while at Visokaya, where they met a fine garrison under the direction of a first-rate commander, their ill-success was extraordinary—extraordinary because, after converting the position into a heap of ruins, and with enormous preponderance of artillery and infantry, they could not capture the hill, in fact they even retired before mere handfuls of its defenders.

No! The Japanese troops are excellent, but nothing exceptional, nothing invincible, and they do not excel the Russians. They are not exempt from errors and disorders. Everything depends on the troops with whom they have to deal. Three regiments were so exhausted in the struggle with the wearied handful of Russians that it had become necessary to give them relief and rest. Surely this was not victory!

In a report by Lieut.-Colonel Seifulin, who had temporarily replaced Tretyakov on Visokaya Hill, it was stated that at about 3 p.m. a small party of Japanese, numbering 25 men, suddenly climbed out of their sap and running up to the parapet of the left redoubt opened an irregular rifle fire, and at the same time made fast some long ribbons of paper, which being blown out by the wind disclosed both the line of the parapet and also that of the damaged covered communication trench down the hill.

The party was soon driven back by rifle fire, but the Japanese artillery began shelling the spot where the ribbons were blowing about, and struck down several railway labourers and riflemen who were there. Colonel Seifulin ordered the ribbons to be taken away, and when this was done the previous conditions of fire were re-established. Evidently the Japanese had endeavoured to point out to their artillery points at which further demolition was required.

The Japanese, who were making an outwork on Visokaya in front of the Russian trenches, worked hard at it all day, and in order to conceal the working parties they lit up wood fires in places so chosen that the smoke driven by the wind concealed them from view. They probably threw damped rags into the fire, at any rate whatever they used produced a very thick smoke, which effectually concealed their work. General Tretyakov correctly gauged their intention and ordered the men to fire into the smoke, but as the actual position of the working parties could not be seen, the random firing probably did very little harm.

At about 3 p.m. the newly-appointed commandant of Visokaya, Capt. A. I. Veselovsky, with his company, the 5th, 26th Regiment, set out for the hill. On his way he was laughing and making jokes, and his men, taking their cue from their gallant commander, were in a state of cheery good-humour. "With such a company as ours," said the men, "no place is to be dreaded!" Their sincere, light-hearted, and honest tone inspired the conviction that in that company there was no injustice, no discontented man, but a strong bond of unity between the commander and his subordinates.

On this day the Japanese also carried out small attacks against Flat Hill, and in one place, as usual near the "unfortunate" section, they had a certain amount of success. The Hospital Detachment, who happened to be there, by moving towards the left evacuated the bays between three traverses, and the Japanese burst into these and thus secured an entrance into the Russian works. On hearing of this Capt. Baron Geikin began calling for volunteers to drive them out. But among the hospital men no volunteers came forward, and he had to turn to the 12th Company, 5th Regiment, who were alongside, and who at that time, including the wounded remaining in the ranks, numbered in all 12 men; he secured three, Sergt. Zakharov, Rifleman Ryabukhin, and Town Guard Tiushev. These fearless men, throwing grenades into the bays held by the Japanese, rushed forward, followed by Geikin and the hospital men. Communication with the neighbouring company was re-established, because few Japanese were left.

Zakharov, Tiushev, and Ryabukhin were taken by Geikin before the commandant, Budyansky, who thanked them, and begged for them decorations of the Military Order. Zakharov had already greatly distinguished himself in the preceding fighting, and had performed many gallant deeds, of which three were especially brilliant, namely, on 28th November guiding the volunteers who drove the Japanese from the "unfortunate" section, on the 30th November, after being wounded in the knee, remaining in the ranks, and on the 1st December volunteering to restore connection in the trench. In all, he was recommended at various

times for four grades of the Military Order and for promotion to sub-lieutenant; but he was promoted only to the rank of ensign, and received no other grade of the Military Order.

General Kondratenko was able to replace Tretyakov by Lieut.-Colonel Organov, 26th Regiment, in order to give him leisure to rest and have his wound dressed; but it was already evening and quite dark before the relief had been carried out, and Tretyakov rode down from the hill to the 5th Regiment Headquarters. Kondratenko, who had spent the whole day there, asked him many questions, and deliberated with him for many hours as to the fate of the hill, and not till after midnight did the former ride off to his quarters.

After his departure Dr. Troitsky inspected Tretyakov's wound, and found that he had a splinter in his back and that the wound was beginning to fester, and advised him to go at once to hospital to be operated upon; but he was exceedingly tired and hardly understood what the doctor was saying, and forthwith fell asleep.

The riflemen on the hill meanwhile did their best to clear and repair the trenches and blindages which were wrecked and encumbered with corpses, but the work made little progress owing to the heavy artillery fire, which was destroying not only the works, but even the very hill itself.

2nd December.—During the night the enemy kept up an occasional artillery fire on the hill. At dawn this was increased, and the attacks by small parties were renewed, the events of the previous day being generally repeated. No serious attack was made, and no change took place in the condition of the defenders.

From Louisa Bay it was seen that the Japanese were moving about in the villages; under Visokaya increased energy was being put into the work of strengthening the defences; every sap and traverse was adorned with a fresh layer of sand-bags, which were being brought up with this object in large numbers to the foot of the hill, and unloaded just above the lower parallels.

The Russians also increased their efforts at repairing their ruined works and making new trenches. It was decided first to put the trenches into good order, and afterwards to start repairing and unearthing the blindages. At this time Lieut.-Colonel Organov was director, and Capt. Veselovski was commandant, both belonging to the 26th Regiment.

Tretyakov, after spending the night at the 5th Regiment Headquarters, went at 10 a.m. to the 9th Hospital, where Doctor Krzhivets dressed and bandaged his wound, but did not remove the splinter, as he did not consider it harmful.

Kondratenko had returned to the 5th Regiment Headquarters at dawn, and awaited with impatience the return of General Tretyakov, which occurred at about 2 p.m. Taking him by the hand, Kondratenko overwhelmed him with enquiries about his health and about Visokaya Hill, and they continued to consult together until circumstances separated them, as it turned out, for ever.

It was proposed to give Tretyakov rest for two days, but at about 3.30 p.m. Lieut.-Colonel Organov reported that the firing on Visokaya

was increasing and that he anticipated an assault, and as he himself was ill-acquainted with the hill and how to defend it with small forces, he begged that either Tretyakov or Irman, who were well acquainted with it, would ride up there to give him any necessary information and advice on the spot.

Organov was a very efficient staff officer; though brave, he did not feel confident that he could manage, in case of assault, the complicated problem of the defence of Visokaya Hill, and so he frankly asked men, whom he knew to be capable of it, to direct him in this difficult path.

Tretyakov at once got ready, and at 3.45 p.m. mounted his horse and galloped off to the hill.

At 4 p.m. ten separate 11" shells fell in the Tea Ravine, near the artillery barracks, where the reserve companies were quartered. This circumstance showed clearly that the Japanese could see well the whole Tea Ravine, and could correct their fire perfectly from the outwork which they had been at work upon the day before. As it was undesirable to expose the reserves to such danger, they were ordered to be removed from the Tea Ravine, and orders were also given to look to the safety of the 5th Regiment Headquarters, as the building was very exposed. But it was impossible to induce any of the staff to move at any time, because in the ravine they were near Visokaya Hill, could see what was going on there, and were consequently always in touch with their work. Therefore they contented themselves with closely veiling by night only the windows which looked towards the hill.

On arriving at Visokaya, Tretyakov found that Organov's fears were without foundation, but he remained on the hill, and decided during the night to find out accurately where the enemy was posted and in what force. For this enterprise more volunteers came forward than were required. Four men were selected by casting lots, and these, descending by the saddle on the far side of the hill, got as far as the trench which had been originally held, but which it had been decided on the 2nd could no longer be occupied.

It should be mentioned that the covered communication trench having been demolished and all movement along it stopped, it became impossible to send assistance to the troops who were kept in this western portion of the ring trench, and consequently they all fell victims, at first to artillery fire and later in the unequal bayonet fighting, so that on both the 30th November and the 1st December the Japanese captured the trench with little difficulty. Seeing this, General Tretyakov, in order to save himself from devoting a fresh company each day to useless destruction, decided on the 30th November to occupy this portion no more, and no harm had resulted thereby. The Japanese apparently did not occupy it either.

The reconnaissance party found the trench to be a complete wreck, the blindages broken in and presenting to view nothing but heaps of stones, splinters of beams and planks, torn sacks and other rubbish, mixed with fragments of human bodies.

They crossed this trench and went on down until they came to the Japanese parallel, which at this point they found to be empty. Wishing to decide whether the whole parallel was unoccupied or only a part of it,

they turned to the right along it, but the Japanese began firing, and after this they could ascertain nothing accurately. Thereupon they climbed up again and went round the whole of the right half of the hill in the demolished trench without finding any Japanese. All four received decorations of the Military Order; they were all sailors belonging to Lieut. Lavrov's aeronaut detachment.

During the nights of the 2nd—3rd, and 3rd—4th December, Ensign Ermakov was employed in making a communication trench up the eastern slope of Visokaya. The object of this trench was to protect reinforcements going up the hill from the Japanese artillery posted in the village Shiushin, and striking Visokaya Hill in rear from the north-east. Thanks to Ermakov's energy and the united efforts of Lavrov's aeronauts, a trench 7′ in depth was completed in the course of these two nights.

3rd December.—Having got such encouraging results from the reconnaissance on the right half of the hill, Tretyakov sent another four men to explore the left. Of this party none came back, a fact which was taken to show the close proximity of the enemy on the left flank, in trenches under the redoubt, though probably not in large numbers.

Wishing to relieve themselves of such undesirable neighbours, Tretyakov and Veselovsky decided to drive them out, and with this object they organized a small sortie. General Irman, who came up in the night to enquire into the state of affairs, approved of the undertaking, but, although a greater amount of success was to be expected from a large sortie, he was of opinion that it should be limited to a small one. This was because it would have been necessary to ask for reinforcements, and also for permission from the Commander-in-Chief for a large sortie, and even if permission were granted and reinforcements collected, the night would be past and all hope of success would have been lost, since in daylight no advance was possible, in fact it was barely possible to hold on to what they had.

The volunteers selected for the sortie took with them a good number of grenades, and creeping near began throwing them at the Japanese, who fell back raising furious cries and groans; the Russians advanced, but strong reinforcements for the enemy coming up the hill prevented them from completing their task. Yet not being thrown into disorder by this, and in spite of the overwhelming number of the enemy, they decided to make a fight of it, and met them with grenades and rapid rifle fire; the Japanese replied with the like, and about 5.30 to 6 a.m. a sharp firing broke out. The enemy were disturbed and, an hour earlier than usual, opened a terrific fire on Visokaya from all their artillery.

It is unnecessary to say that under such conditions the volunteers could do nothing, but had to retire suffering inconsiderable loss. But, in spite of its ill-success, this sortie was of very great value, as it disclosed exactly the position and strength of the enemy. It showed that the Japanese on Visokaya Hill were posted in great strength and complete readiness for action. It showed that from day to day and hour to hour it was necessary to await a desperate attack. But in connection with this sortie occurred the heaviest loss suffered by the Russians.

Tretyakov and Veselovsky were still uncertain of the results of the sortie, when between 5.30 and 6 there commenced a hot firing on both sides on the left flank of Visokaya. They at once stood up in their observation post and got ready for emergencies, but before they had time to ascertain what was going on a storm of every possible nature of shells burst upon the hill. In an instant the hill was in disorder—there was a pause. The reserves quickly ran up and dragged away the wounded who were near them. Another moment, and a huge shell had converted the whole observation post into a heap of killed and wounded. As the shell reached the hill, it struck the head of Capt. Veselovsky, carrying away the upper half, and sprinkled those near, and especially General Tretyakov, with his brains. Then striking the rock it burst with a crash and caused a terrific vibration in the air. Splinters and stones struck all those standing near and converted them into a heap of killed and wounded. In this heap Tretyakov lay insensible, and he was at once dragged down the hill, placed on a stretcher, and carried to the Red Cross Hospital. The distressing news spread on all sides like lightning. When he was carried past the headquarters, 5th Regiment, he presented a ghastly spectacle. His pale inanimate face was covered with congealing blood and dust, his hands and clothing were blood-stained, and his grey coat was bespattered with brains. The bearers said that he was wounded in the head, and although he opened his eyes, he evidently recognized no one. All who saw him felt that his wound was mortal, and they went back to their work with heavy hearts, feeling that they could now bid farewell to Visokaya Hill.

In fact the loss of Tretyakov was acutely felt by the whole garrison. His name was associated with success; both his seniors and his juniors put trust in his capacity, and in him was their hope. Both hope and trust were never disappointed, but every time strengthened.

From the evening of the 28th November, when he made himself famous by retrieving the fortune on Visokaya Hill, his name was everywhere mentioned with respect and pride. Since that date his series of brilliant deeds performed before the eyes of the rank and file had further enhanced his reputation. In fact among the men he was looked upon as a demi-god, and the preservation of Visokaya Hill with such small numbers, in spite of the overwhelming artillery fire and preponderating numbers of the enemy, was attributed to his supernatural influence. This idea was developed automatically by the circumstances, in combination with the talent and character of this rare man. As an example of this, when most of the original officers had been killed and those who replaced them were entirely ignorant of the position, it became important to show the men that they were not uncared for, and consequently it was necessary to constantly visit and encourage them. This was naturally the work of their officers, but on Visokaya Tretyakov himself led them in their attacks, went round their trenches, giving advice, orders, and information as to the state of affairs in neighbouring sections, and in his quiet way, by kind words and by his presence at the most dangerous points, not only cheered the men and confirmed in them a sure trust in future success, but also

inspired in them resolution and a thirst to take part in the most heroic enterprises. The men so venerated him that they prayed to God for his protection, and his fame extended beyond his own justly proud regiment, and beyond the defenders of the hill, to the whole garrison, and even to the inhabitants of Port Arthur. Tales of his exploits went from mouth to mouth and frequently passed into the realms of romance. Yet nothing was too wonderful to be believed by the men, who did not doubt that the hill was preserved by his influence alone, and felt such affection for him that they all, and especially those of the 5th Regiment, wept bitterly at his loss.

In order to truely estimate the value of his services on Visokaya Hill, one must discard all fables and restrict oneself to the bare facts. Tretyakov arrived on the hill at a critical moment, when the greater part of it was in the hands of the Japanese, re-captured it, and for 5½ days repulsed endless attacks without losing anything that could be considered a key to the position. From shortage of officers, he had to do, besides his own duties, all kinds of subordinate work, such as practically leading each company in attack, directing the work of the sappers, visiting rounds, encouraging the men, etc. In spite of fatigue he never had time for rest. On the 2nd, in spite of his wound, he appreciated the urgency of the situation sufficiently to remain at his post without asking for relief or rest.

In the fighting he displayed the qualities of courage, energy, activity, skill in influencing the men, and, from his engineering training, genius for putting his knowledge of fortification into practice. For every critical complication that occurred he always found some solution, and the more hopeless the appearances the greater were his coolness, activity, and courage. Only with the help of such qualities could the five major attacks (28th November one, 29th November two, 30th November two) by overwhelming numbers of the enemy have been so brilliantly repulsed.

His exploits did not pass unnoticed by the enemy, and the deeds of the 5th Regiment and its commander were frequently recorded in their gazettes. On the 6th January, after the fall of Port Arthur, when towards evening the 5th Regiment arrived at the 19th Verst ready to be entrained for Dalny, a Japanese major, who spoke Russian well, made many enquiries as to the whereabouts of the 5th Regiment, and going up to the officers spoke in great praise of the whole Port Arthur garrison, and especially of the 5th Regiment. In conclusion he begged earnestly to be presented to "the very gallant commander of the regiment." The Major's desire was granted, and he acknowledged himself very flattered by the acquaintance of such a brave Russian commander. At Nagasaki a deputation waited on General Tretyakov, and after many expressions of praise and enthusiasm, produced a gazette printed in their own language, in which his exploits were recorded.

General Kondratenko was greatly afflicted at the news of Tretyakov having been wounded. He said that he was "invaluable" and "impossible to replace," and sent Dr. Troitsky to him with the following

message:—"Give Nicholas Alexandrovich my deepest thanks for his valiant defence of Visokaya Hill, and express my sincere sorrow for his being wounded; say that a very great reward awaits him, and wish him a speedy recovery, for he is very necessary to us." It may be here mentioned that, in company with Stessel, Smirnov, and Irman, he afterwards received the 3rd Class of the Order of St. George.

Visokaya Hill having by these casualties been left almost without commanders, Lieut.-Colonel Seifulin volunteered to go there, and having received the sanction of Generals Irman and Kondratenko, set forth immediately.

The Japanese artillery were shelling the hill with somewhat greater vigour than on the previous day, and their infantry continued to alarm the garrison with attacks made by small parties, but no resolute assault was attempted. They continued to push forward and worked hard at their entrenchments. The Russians also worked indefatigably at repairing their defences, but both sides also found time for the interchange of rifle fire and grenades.

And so the Japanese rested for yet a third day, but the wearied Russians carried on the fight without relief or rest. In the majority of cases a company was told off to a trench, and remained in it until all were either killed or wounded. The men knew this, and it was very trying to their *morale*.

But for the successful defence of the hill efficient and not exhausted men were essential. This Kondratenko recognized, and therefore he sought for an arrangement by which companies could be relieved every two days. At the same time he made up his mind that the garrison of Visokaya should consist solely of companies of the 5th Regiment. This decision is intelligible when it is understood that the companies of the 5th Regiment were receiving praise at all hands, and in view of the probability that after their rest the Japanese would renew their more powerful attacks, it was necessary to be prepared to meet them with the best and most trustworthy troops of the garrison.

But a very material obstacle impeded the carrying out of this intention. All the companies of the 5th Regiment had carried on without intermission the fights on Visokaya, Flat, and False Hills, and were tired out, besides having suffered enormous losses. Some of them numbered only 20 men each, including the wounded, who had remained in the ranks. Besides this, most of the officers had fallen. But the desire to form the garrison of the hill from companies of the 5th Regiment was so great, the idea so tempting, that Kondratenko decided to bring these companies up to strength, and as there were no reservists available, he did this partly with hospital men and partly with a draft of 213 men of the 28th Regiment, which was sent up for this purpose, under Sub-Lieutenant Gudkov. This combination at first sight appeared very suitable, but complaints had been made against the hospital detachments, and the stoical, trusty companies of the 5th Regiment would have preferred to have been made up without them.

Orders were also given to repair the shortage of officers by appointing the best of the 5th Regiment N.C.O.'s as acting ensigns.

In this way about 600 men, chiefly hospital men, were drafted into these 11 companies. About 20 of the best N.C.O.'s were made ensigns, and thus the regiment again possessed officers and an average of 100 men per company.

When distributing the hospital and 28th Regiment men, the companies were brought up to approximately the uniform strength of 100 each. Where more of the original men remained the hospital men were in a minority, but in the companies which numbered only 20 of the original men the result was not satisfactory. The hospital men did not serve willingly under the officers, and under ensigns they worked still less willingly. Where there were comparatively few of them they were influenced by the majority, but in the companies where they were four times the stronger party they were difficult to manage.

The 2nd, 3rd, 4th, and 6th Companies were the first brought down from the hill, and when they had been made up to strength, they were sent to the barracks to rest.

Kondratenko personally met the decimated companies, and shook hands with, and in some cases kissed the newly-appointed ensigns, praying the men to love and obey their new commanders. He cordially thanked the men for their courage and congratulated those who had distinguished themselves, decorating 10 men in each company until the supply of crosses was exhausted, and when there were no more left, noting down names for future rewards.

About midday Dr. Feodor Semenvich Troitsky arrived with the joyful news that Tretyakov's wound was not serious. Everyone rejoiced at the good news. On further enquiry, he explained that the General was wounded in the neck, eyes, face, back, badly bruised by the "wind" and by stones, and crushed by the heap of killed and wounded who fell on him.

Besides the wounding of their commander, the 3rd December brought further irreparable losses to the 5th Regiment, as on that day both Capt. Stempnevski I. and Staff-Capt. Belozerov died of their wounds.

Stempnevski had on the 30th November been wounded by several splinters; one hit him in the back and lodged in his lung. In the hospital his wound was probed, but the splinter was not found, and he was unnecessarily exhausted. He gave every hope of recovery; on the evening of the 19th December he took a bath, got into bed almost unaided, and then lay asleep. During the night he began to breathe heavily, and at dawn was gasping for breath, and then died quietly.

Belozerov was wounded on the 29th November by a splinter from an 11" shell in the head, which formed a large wound, but his brain was little damaged; as he lay in the 9th Hospital he at times came to himself and talked. His comrades were delighted and hoped that he would recover, but for this he required good nursing, and there was none at that time in the hospitals. A very limited number of servants and assistant surgeons had been left, and no Sisters of Mercy were obtainable,

the rest of the attendants having been drawn from the ranks. For this reason Belozerov did not get good nursing. He soon became delirious, and in one period of delirium, falling out of bed on to the floor, he struck his head and did not recover consciousness, but died in about two hours.

As a means of repulsing the threatened assaults, Kondratenko asked two naval officers to make an attempt to establish on Visokaya Hill a mining apparatus, and to fire from it into the Japanese saps. On the evening of the 3rd December these officers and a few sailors with the apparatus went to the hill and long searched for a convenient spot sheltered from the Japanese shells on which to put it up; but they were finally convinced that no such spot existed, and were obliged to return without carrying out their object.

(*To be continued*).

NOTICES OF MAGAZINES.

Revue Militaire des Armées Étrangères.

August, 1909.

Military News from Various Countries.—*Belgium.*—A new dirigible is being built from plans made by the head of the ballooning department, and thus at the end of the year Belgium will have two military dirigibles.

A new Field Artillery Training Manual has been temporarily edited; the main points emphasized in it are:—(1), The value of initiative to all ranks; (2), that troops should be economized at the beginning of the fight, most of the batteries being kept in positions of observation, and above all in positions of readiness; (3), the importance of sudden "rafales," and (4), the utility of a counter-attack made by the guns at unexpected moments.

Austria.—A new infantry bullet is just being experimented with; it is so constructed that on striking the ground a cap sets fire to some smoke composition in it, and thus enables the position where it strikes to be easily located.

Germany.—Pay of Officers.—A new law concerning the pay of Government officials was passed by the Reichstag in July, 1909. From it are taken the following extracts, which refer to the pay of officers and N.C.O.'s; the new rates take effect from the 1st April, 1908:—

Subalterns—	1 to 3 years' service	£75	per annum.
,,	4 to 6 ,, ...	£85	,,
,,	7 to 9 ,, ...	£95	,,
,,	10 to 12 ,, ...	£105	,,
,,	from 13 ,, ...	£120	,,
Company, squadron, and battery commanders—	1 to 4 years as such	£170	,,
	5 to 8 years as such	£230	,,
	after 9 years	£255	,,
Majors and lieut.-colonels		£328	,,
Officers commanding regiments		£439	,,
Brigade commanders		£513	,,
Divisional commanders		£678	,,

These sums do not include allowances, and lodging allowance is given, and varies from £15 per annum in small towns to £28 per annum in Berlin.

The fact that an officer is senior enough to get a higher rate of pay does not prevent him from *not* getting it, should he have been condemned by the Emperor to forfeit it for conduct unbecoming to an officer.

The German Association of Automobile Builders, in conjunction with the War Office and the Lines of Communication Technical Committee,

have fixed a standard size for the wheels of heavy motor cars, so that the wheels of all army vehicles may be interchangeable.

Russia.—On the 22nd July, 1909, £8,060 were granted for dirigible balloons. From 1910 the dirigibles will be paid for out of the Army Estimates.

Turkey.—The "High Commission of Military Inspections," which was reorganized after the revolution of 1908, has once more been altered. Its name has been changed from "Military Affairs Council" to "Chourai-Asker," *i.e.*, "Superior Military Council." It remains under the War Minister, who is its president, but now also includes as members the Inspector-General of the 1st, 2nd, and 3rd Army Corps, the Inspectors-General of Artillery and Cavalry of those corps, the 1st Army Corps Commander, and the Chief of the General Staff.

This body studies all questions concerning the military reorganization of the Empire.

September, 1909.

MILITARY NEWS OF DIFFERENT COUNTRIES.—*Denmark.*—Reorganization of the army.

The army is organized in 2 army corps.

The different arms are organized as follows:—

Infantry.—2 Brigades of 2 regiments; each regiment is composed of 2 regular and 2 reserve battalions. 5 regular regiments of 4 battalions, 1 regular regiment of 2 battalions, the Guard—1 regular and 1 reserve battalion, 3 reserve regiments of 4 battalions. Total, 31 regular and 21 reserve battalions; 4 companies to each battalion. The increase due to the new organization is 4 battalions.

Cavalry.—2 regular regiments of 3 squadrons each, 2 regiments of 2 regular and 1 reserve squadron each. Total, 12 squadrons, instead of 15 as before.

Field Artillery.—2 regiments of 2 brigades each, 2 independent brigades. Each brigade has 4 batteries. Total, 24 batteries, instead of 16 as previously.

Coast Artillery.—12 regular batteries, 6 reserve batteries. Total, 18 batteries. (No alterations).

Engineers.—1 regiment of 10 regular and 2 reserve companies, 2 headquarter sections. Total, 12 companies, instead of 9.

The army is supplied in recruits as follows:—Infantry—8,000 recruits for 165 days. Guard—272 men for 150 days. Cavalry—380 men for 200 days. Train (A.S.C.)—270 men for 60 days. Field artillery—792 men, the drivers for 1 year, gunners 280 days. Coast artillery—800 men for 1 year. Engineers—300 men for 210 days. Technical services—60 men for 13 months. Supply department—50 men for 125 days. Army Medical Corps—120 men for 230 days.

Germany.—Aeronautics.—(1). Dirigibles on the Non-Rigid System.—No. 3 Parseval, after its preliminary trials, has been increased to the following dimensions:—Length, 70 metres; diameter, 12·3 metres; capacity, 6,700 cubic metres. Two 100-H.P. motors fixed to the car cause two propellers of 4 metres in diameter to revolve. There is an

arrangement for travelling backwards, which is of the greatest use in coming to earth. The car can carry 6 to 8 passengers besides the crew. A new 3,300-cubic metre Parseval is soon to be sent up by the German Aero-Club.

A balloon belonging to the Rhine-Westphalian Motor Club will soon complete its trials. Capacity, 3,000 cubic metres; length, 54 metres; diameter, 10 metres; motor (one), 150-H.P. The speciality of this machine is its arrangement for preventing the contraction of the gas in cold air.

The "Clouth" balloon length 40 metres, diameter 8 metres, and capacity 1,700 cubic metres, is intended for sport, and was tried at the Frankfort Exhibition.

(2). Semi-Rigid System.—No. 2 Gross completed its trials last April and is actually in use. No 3 Gross has just been finished, and its trials are to begin at once. It is larger than Nos. 1 and 2; length, 86 metres; lifting power, 2,000 kilogrammes; 4 motors of 75-H.P. each, actuating 4 four-bladed propellers fixed to the sides of the car.

(3). The Rigid System.—Nos. 1 and 2 Zeppelins belong to the War Department, and are kept at Cologne and Metz respectively. No. 3 Zeppelin at Berlin is the same size as No. 2, but has two motors of 150-H.P. each instead of 110-H.P., and consequently a velocity of 14·5 metres per second instead of 13. Its propellers have two blades instead of three, and power is transmitted to the propellers by means of steel bands, which do not however appear to be very satisfactory. No. 4 Zeppelin is soon to be begun, and a Schutte dirigible of a capacity of 19,000 cubic metres and 500 to 600-H.P. is being built.

(4). Sheds for Dirigibles.—There are sheds at Metz, Cologne, Biesdorf (near Berlin), and at Leichlingen, but of these, the first two only are military. A new portable shed for use in the field, 120 metres long, 20 broad, and 25 high, which can be put up in 12 hours, has been acquired. There are several other sheds to be erected in important towns such as Kiel, Strasburg, and Stuttgart.

(5). Principal Experiments and Flights.—(*a*). In May the Parseval No. 2 attained a height of 1,200 metres.

(*b*). Several experiments have been carried out with the Gross machines as to the possibility of communicating with a dirigible by means of "wireless"; the results however have not been made public.

(*c*). The Zeppelins have accomplished four very remarkable journeys. These are, however, too well known to be described in this paper.

(6). Military Ballooning.—At present (1st September, 1909) the German War Department is in possession of six dirigibles, viz., three Gross, No. 2 Parseval, and Nos. 1 and 2 Zeppelins; it will very soon possess a 7th—No. 3 Gross. These ships are stationed at Metz, Cologne, and Berlin. Nos. 2 Zeppelin and Gross seem to possess the faculties of being able to land anywhere, and of having a wide zone of action.

It is most probable that the War Department is making arrangements for using private dirigibles on the same terms as for private motor cars in time of war.

It is undeniable that the German dirigibles have attained such a state of perfection as to render real assistance on active service by making both strategical and tactical reconnaissances.

Technical Academy of Berlin.—The course at this academy has been increased to four years. There are three divisions—those of the armament, engineer services, and of the lines of communication department.

Most officers will however only remain at the Academy for two years, the advanced course being given to only about one-third of the class originally admitted (50 out of 166).

Six officers of the advanced course will, after their fourth year, be granted leave to make an instructional tour of 4 to 12 weeks in Europe or the United States.

Italy.—The following modifications have been made in the Italian Army:—(1). The number of Alpine regiments has been increased by one; (2), the number of cavalry regiments has been increased by five, and (3), the number of mountain artillery regiments has been increased by one, *i.e.*, by 12 batteries.

A. H. SCOTT.

RIVISTA DI ARTIGLIERIA E GENIO.

A description, by Major-General P. Spaccomela, of the various kinds of detonating fuzes, is given in the September number of this review. Fuzes were formerly manufactured in France with a core of guncotton contained in tin or leaden tubes. The diameter of the tubes was 4 m.m., the velocity of detonation from 5 to 6 k.m. per second if the tube was of tin, and of 4 k.m. if of lead.

The difficulty of manufacturing these tubes induced the French Army to substitute another kind, having a core of mélinite contained in a tin tube, with a velocity of detonation of about 7 k.m. per second.

In Austria, General Hess proposes to adopt a detonating fuze with a core of fulminate of mercury. This fuze has the drawback of being too sensitive.

Nobel, in 1888, proposed a fuze with a core composed of a mixture of camphorated gelatine, chlorate of potash, ferrocyanide of potash, and nitrocellulose.

A detonating fuze of picric acid enclosed in a tube of pure tin is now in use in the Italian Army, with a velocity of about 6,000 m. per second.

All these fuzes should be used as detonating fuzes only, with the exception of the guncotton one, which can also be used as a fuze of slow combustion, but with very uncertain results.

The great object now of the Italian Army is to find a fuze which combines the property of slow combustion with that of detonation. Preference is given to ballistite, an explosive which is manufactured in Italy, and numerous trials have been made to obtain satisfactory results. Fuzes made with this substance can be exploded either in the air or under water. When however used for slow combustion they will not always burn under water.

Although the fuzes of ballistite have given good results, especially when detonated, the manufacture of the explosive itself is troublesome,

as it requires to be reduced to a fine powder. This is a long operation, and one which causes great inconvenience, as the men employed are subject to bad headaches, especially when the work is prolonged and carried on in enclosed places. Great care is also required in filling the leaden tubes, as unless completely filled, the detonation is arrested at the point where there is discontinuity in the core.

Long and numerous trials have been made to produce a fuze with a core of ballistite and powder, in a tube of tin, which will either burn in air or under water with a velocity of about 1 lineal metre in four minutes, and detonate in air or under water with a velocity of about 5 k.m. if exploded with a gramme of fulminate.

The following trials were also made to determine the stability of the fuzes and their safety when used:—

(*a*). Some pieces of the fuzes were kept for two consecutive years, without any protection and exposed to the atmosphere, under the roof of a manufactory near Turin, and some of them burnt and exploded with the same regularity as before they were placed under the roof. It was however found advantageous to close one of the ends with gummed tubes, securely attached to the fuzes.

(*b*). Pieces of the fuze enclosed in wooden boxes, and in boxes bound with sheet iron, were next fired at with ball cartridge from a distance of 10 metres. All the pieces of the fuzes, enclosed in wooden boxes which were struck by the bullets, burnt, but only a portion of those enclosed in the iron boxes burnt, the rest falling to the ground without burning, but with a partial detonation at the point actually struck by the bullet. Similar trials, which gave the same results, were made with pieces of fuzes kept under a roof for nine months.

(*c*). Several pieces of fuze were placed in sea water with a temperature of between 55° and 60°; they were kept at this temperature for 12 consecutive hours. There was then an interval of 12 hours, after which they were left for another 12 hours.

It was found afterwards that the fuzes burnt regularly, although slightly quicker in the air, and that they detonated regularly. These last trials were repeated with four or five pieces of fuze each day for 20 consecutive days, similar results being always obtained.

(*d*). Some pieces of fuze were kept for 40 days under the snow, whilst others were exposed for 24 hours to a temperature of 20° below zero. They burnt and exploded regularly.

(*e*). Pieces were immersed in water for 50 days, with their extremities protected by gummed tubes, and burnt and exploded regularly when taken from the water.

From these trials it is fair to assume that the detonating fuzes of ballistite and powder in grains have the properties of stability and of great safety in handling.

To ensure the proper explosion of the fuzes, a capsule containing at least 1 gramme of fulminate of mercury must be used for detonation, as experiments proved that detonation is not always certain when capsules containing less than 1 gramme were used. It is sometimes necessary to join up pieces of fuze, and for this copper tubes of 5 or 6 c.m. may be

used; the proper contact of the pieces within the tubes must be very carefully attended to.

Under the title of "Tactical Studies of the Three Arms," Capt. Luigi Giannitrapani, the well-known author on military subjects, has collected and published a complete summary of his views.

Chapter VIII. deals with the future employment of field fortification. The lessons learnt from the Boer and Russo-Japanese Wars have certainly convinced us that in consequence of the extraordinary power of modern guns and rifles, field fortification has become a weapon of defence constantly at the disposal of the soldier, and is now so completely allied to tactics that it is impossible to advance a step, either in attack or defence, without taking advantage of cover.

We intend to speak of that branch of field fortification which we are accustomed to call "improvised." The experience of war teaches that we have to construct trenches, as much to conceal the combatants as to provide for them the best conditions for protection. Also that these trenches should have the *least elevation*, the *least width*, and the *least exposure*.

The employment of improvised fortifications should not be considered as an exclusive aid to tactical defence only, but also as a powerful auxiliary of offence.

The more important questions relating to the employment of field fortification in the wars of the future, may be considered under the following heads:—(1), The distribution of sappers' tools to the infantry; (2), determination of the time that the infantry soldier should work; (3), the manner in which the detachments of engineers should be employed; (4), the most convenient works that should be executed for the strengthening of a position, either for offence or defence; (5), utilization of localities and of woods as an auxiliary to field fortification; (6), organization of entrenchments for artillery.

(1). *Distribution of Sappers' Tools to the Infantry.*—It is absolutely necessary to lighten, as far as possible, the weight to be carried by the infantry soldier, and the portable tool should be considered as necessary to the soldier as his rifle.

According to the "Instructions in the Work of Sappers for the Infantry" in war time, the tools (93 in all) are distributed among the several squads in the manner that the commanding officer considers most convenient. It is certain that there should be one tool for each soldier, and, as the result of their recent experience during the war, this is being provided for in the Japanese Army.

It has always been impossible to gauge the sequence of events in a battle, and to-day this difficulty is greater than it was formerly. Consequently, if the tools are distributed before the commencement of the action, the very tools that are actually required may not have been issued, whereas, if one waits for the moment at which they are wanted, precious time may be lost, besides confusion being caused during the battle itself.

The system adopted in the Austrian Army is to distribute the tools required to the front ranks of each company.

(2). *Allotment of the Time for the Soldier's Work.*—According to our regulations for "the instruction in the work of sappers for the infantry" mentioned above, it is laid down that, for the construction of trenches with light tools, the men should be arranged in one rank at 5-c.m. intervals along the line selected by the officer, and that they should not be employed continuously for more than half an hour—a sufficient time to complete the trench for a kneeling man. The question which may well be asked however is whether such conditions are practicable in view of the physical qualities of the soldier and the principles of modern tactics. The soldiers arranged for the work and almost elbowing one another, work with difficulty even with short tools. They then perform less work than they would do if they were able to work more freely and choose a more convenient position. It is clear that for freedom for work a certain interval between man and man is required, and that of 5 c.m. is quite insufficient.

The duration of the work fixed for half an hour is considered excessive, because the spade—like all tools of that kind—is fatiguing to the soldier from the bent position which he has to assume when removing the earth. In addition to this, he has to excavate the trench under the danger of being hit by the enemy's fire, and has therefore to work with the greatest energy and alacrity.

From experiments made in Italy and abroad, and in the opinion of those who have taken part in the war in the Far East, spells of from 10 to 15 minutes' work are ample, with rests of about the same length of time in between.

(3). *Employment of Detachments of Engineers.*—Engineer troops—whether actually in contact with the enemy or not—should prepare for defence works of support of general importance. They should also be employed on demolitions, and lay out and trace works of communication, etc., while the completion of the works themselves should be executed, as opportunity occurs, by the same troops who occupy the various points of the same position.

(4). *On the Execution of Works for the Rapid Strengthening of a Position.*—These may be grouped as follows:—(1), Trenches and redoubts; (2), works thrown up rapidly for cover; (3), masking the position.

In dealing with the first of these the author points out that the modern trench should be of the simplest kind, and only of such a form as the soldier can easily understand and can execute with facility. The Japanese—especially in defence—used two types of trenches; the first, which was for one or two men lying on the ground, consisted of a simple isolated heap of earth, about 30 c.m. in height, sufficient to protect the head and shoulders. The second type served for the firing line on foot, and consisted of a simple trench about 80 c.m. in depth and 50 in width, and with a parapet of 40 c.m.

The small trenches for one or two men should serve for the isolated groups in front of the firing line. If the soil be hard and stony, bags filled with earth or sand must be used to form a first protection immediately in front, so as to impede the fragments of stone caused by the projectiles striking rocks, etc., in the foreground.

EDWARD T. THACKERAY.

RECENT PUBLICATIONS OF MILITARY INTEREST.

OCTOBER, 1909.

(*Published Quarterly*).

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

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PART II.

SECTION I.

AERIAL NAVIGATION.

AVIATION (L'aviation). By *Capt. F. Ferber, French Army. 250 pp., with numerous diagrams. 8vo. Paris, 1908. Berger-Levrault. 4s.

Capt. Ferber has done, perhaps, more than anyone else in France to develop the art and science of aviation, and his opinions deserve careful study. (In France the term "aviation" is confined to the flight of machines heavier than air).

The book deals exclusively with aeroplanes (four pages only being devoted to remarks on ornithopters and helicopters), and is divided into two parts, the first part being historical and descriptive, and the last part mathematical. This historical and descriptive part commences with a lucid summary of the underlying principles of the flight and stability of aeroplanes. This occupies fifteen pages. Then follow one hundred and seventeen pages covering the history of the subject from Cayley (1809) to the present day. This portion is very fully illustrated, and includes short accounts of the gliding experiments of Lilienthal, Pilcher, Ferber, and the Wrights.

The more modern historical portion is confined to French experiments. A short *résumé* is given of the principal points considered to be established by the author's own experiments, and finally about twenty-one pages are devoted to some interesting anticipations, some of which have already been realized.

The four pages devoted to the use of flying machines in war should be read, being as they are the views of an artillery officer, who has made a thorough theoretical and practical study of aeroplanes.

There is a short note on some details of construction, followed by the mathematical portion, which occupies eighty-two pages. Conclusions based on mathematical argument cannot, in most cases, be accepted as final, owing to the uncertainty that exists as to several of the premises, but the author's mathematical analysis is worth studying. The theory of the screw propeller is well treated.

* The author, a most brilliant officer, has since paid for his devotion to aviation with his life, having met with a fatal accident whilst making a flight with his aeroplane at Boulogne.

THE AEROPLANE OF THE BROTHERS WRIGHT (L'aéroplane des Frères Wright). 30 pp., with diagrams. 8vo. Paris, 1908. Berger-Levrault. 10d.

This book contains :—

(1). A report presented by the Brothers Wright to the Aero Club of America in 1906, giving details of their progress to date.

(2). The conditions of contract for the supply of an aeroplane, issued by the Army Board of Ordnance and Fortifications of the U.S.A. in 1908.

(3). Particulars of trials carried out by Orville Wright at Fort Meyer in September, 1908, up to the time of the accident, resulting in the death of Lieut. Selfridge.

(4). Particulars of the French patent specification deposited by the Wright Brothers in March, 1904, together with drawings and some explanatory information.

(5). Description of the machine with which Wilbur Wright made his first experiments in France in 1908.

BOOKS OF REFERENCE.

THE RISE AND PROGRESS OF THE BRITISH EXPLOSIVES INDUSTRY. Published by the Explosives Section of the VIIth International Congress of Applied Chemistry, and edited by E. A. Brayley Hodgetts. 418 pp., with numerous illustrations. 4to. London, 1909. Whittaker, 15s.

This elaborate compilation contains a complete history of the manufacture of explosives in this country, and traces the development and uses of various kinds of explosives, from their discovery up to the present day.

The subject is dealt with in two parts, namely, "Historical" and "Descriptive." The latter contains a description of "Existing Government establishments" and of "Private establishments," and gives an account of their origin and subsequent history. The "Historical Part" is of greater interest from a military point of view, and contains special articles by recognized authorities on the various subjects dealt with.

As a book of reference this work may be considered of great interest.

THE ARMY ANNUAL. Edited by Major F. S. Baden-Powell. 447 pp., 4to. London, 1909. The Army Press. 7s. 6d.

The contents of this year's edition differ from those of previous years in so far as information contained in the latter, which has become out of date, has, to a great extent, been omitted.

Information with regard to the health of the Army and the Indian Military Supply Department has been added, and an account of the progress of the Territorial Force and aerial navigation is given. Lists of "Public Inquiries into Army Matters since 1800" and "Interesting Questions and Answers in Parliament" are also for the first time included in this volume, which maintains the same general features as the last edition.

CAVALRY.

THE RÔLE OF CAVALRY IN RECONNAISSANCE AND SECURITY DUTIES (Rôle de la Cavalerie dans le Service d'Exploration, de Sureté, et de Couverture). By Capt. Janet. 36 pp., with 6 maps. 8vo. Paris, 1909. Chapelot. 1s. 2d.

This short pamphlet endeavours to prove that, as a general rule, too much is expected of the cavalry as far as concerns obtaining information, and affording a commander a clear insight into the actual position of affairs in the theatre of war. The writer claims that the old theory of superiority in mounted troops ensuring the receipt of full and accurate intelligence is exploded, and that under modern conditions it is impossible for

the cavalry, however great its superiority in numbers and handling, to obtain information on which a commander can place implicit reliance. He asserts that, though secret agents and kindred methods of collecting intelligence can be utilized with advantage, no true reconnaissance can be carried out unless a force of all arms is employed. In support of his contention he quotes specific instances from the war of 1870, tending to show that the mounted troops, sometimes under the most advantageous conditions, failed completely to "clear up the situation," owing to the lack of the support of the other arms.

FORTIFICATION AND MILITARY ENGINEERING.

IMPROVISED BRIDGES (Ponts Improvisés). By G. Espitallier and F. Durand. 284 pp., with 99 illustrations. 8vo. Paris, 1909. Doin. 4s.

This volume is intended essentially as a guide to practical work in the field, and, as such, forms a most complete and concise book of reference. Military bridges are classed under the usual categories of floating, pier, and suspension, and various types of each are considered in minute detail, and their method of construction clearly shown by means of excellent illustrations. Calculations are given for estimating the carrying capacity of each type, and, though complicated details are avoided, the data are sufficiently concise for all practical purposes.

Special reference is made to the system invented by Lieut. Tarron, which was tested in 1904, when a flood carried away the bridges in the village of Bozel. On this occasion a semi-permanent bridge on his system, with a span of 25 yards, was constructed in 72 hours. It is claimed that bridges of this type, without intermediary supports, can be used for a span of 50 yards, and though their camber appears somewhat excessive, their utility is undoubted in the case of mountain gorges, when it is impossible to employ either floating or pier bridges, and when material for a suspension bridge is not forthcoming. A short chapter is devoted to light foot and other quickly constructed bridges, which are especially suitable in the case of advanced guards and other detached bodies of troops, whose transport must be reduced to the lowest possible scale.

Our own manuals contain practically the same information regarding flying bridges as is given in the present volume, but there is much which will be new to the non-specialist officer in the paragraphs dealing with cordage and other make-shift suspension bridges.

Perhaps the most interesting chapter is that which deals with the bridging equipment of the French Army and that of the armies of other Powers; it concludes with a table giving the number of pontoons or boats taken into the field, the method of transport, length of bridge which can be constructed, etc., in the case of each of the various armies. The last chapter touches on the question of the preservation, destruction, and restoration of the different bridges commonly constructed in the field.

PERMANENT FORTIFICATION (Die Beständige Befestigung). By Ritter von Brunner (Major, Austro-Hungarian Engineer Staff). 149 pp., 1 plan, with numerous plates and figures. 4to. Vienna, 1909. Seidel. 5s.

The author of this well-known work, now in its seventh edition, states that he has arranged his subject in an altogether different manner to that adopted in the previous editions; for example, he has endeavoured to separate the technical details from the tactical and strategical portion of the subject. In addition, there is a great deal of new material, notably the plan of a modern girdle of forts, and what perhaps is of more particular interest to the British Army, a more detailed handling of coast defence and local or "blocking" works ("Sperrwerke") in hilly country.

The chapters are five in number:—

I.—Introduction.

II.—Use of permanent fortifications (with examples from Central Europe).

III.—Land defences—

A. The "girdle" fortress.

B. "Blocking" works.

C. Special forms of land defences.

IV.—Coast defences—
A. Remarks on warships.
B. Effect of naval and fortress guns against ships.
C. General arrangement of coast defences.
D. Details concerning coast defences.
V.—Improvised or supplementary works.

HISTORICAL.

THE NATIONAL WAR OF 1812 (La Guerre Nationale de 1812). Published by the Russian General Staff. Translated by Capt. E. Cazalas, Historical Section of the French General Staff. Vol. III., 443 pp.; Vol. IV., 481 pp.; Vol. V., 448 pp. Each volume has an index. 8vo. Paris. Lavauzelle. 8s. 4d. per volume.

The historical value of these volumes is very great, since they contain the whole of the enormous correspondence of the Russian War Minister, General Barclay de Tolly, from May to October, 1811.

In Volume III. and Volume V. an interesting light is thrown on the intelligence and secret service systems of the Russian Army. In Volume IV. all other matter is dwarfed by the historic despatch of General Barclay de Tolly to the Czar, which was the genesis of the strategy that destroyed the "Grande Armée." The Russian War Minister, after examining the causes that had contributed to the success of the French, lays bare the weak points in their organization and administrative methods. He points out that Napoleon's new method of war must in its turn be met by a still newer method, that of taking famine as an ally, avoiding all decisive battles, and operating incessantly against the flanks and rear of the enemy. In no country could these methods be applied more successfully than in Russia, with her wide spaces and her rigorous climate, while the hordes of irregular horsemen at the disposal of the Czar formed an admirable instrument for putting them into execution. The lines of advance open to Napoleon are then reviewed, with suggestions as to how each invasion should be met.

The want of a map forms a serious handicap to the reader.

THE QUESTION OF FORTRESSES IN THE DEFENCE OF STATES. (Grundlagen und Aufgaben der Reichsbefestigung). By Colonel J. Schön, of the Austro-Hungarian Infantry. 112 pp., and 3 maps. 8vo. Vienna, 1909. Seidel. 2s. 9d.

This book is a reprint of articles which appeared in the third and fourth parts of "Mitteilungen über Gegenstände des Artillerie-und Geniewesens" of the current year. The title is somewhat of a misnomer, as the discussion is mainly confined to the influence exercised by the fortresses in the two campaigns of 1796-7 and 1866; the first twenty pages however contain remarks of more general application.

Whilst enumerating cases in which the possession of fortresses has exercised a harmful effect upon the general operations of a campaign, the author by no means adheres to the views expressed in the work, "Influence of Fortresses in Military Operations" (by P. Rath), reviewed in the April number of this publication; on the contrary, he shows that the possession by the Austrians of the various fortresses in the two campaigns specified contained much that was or might have been advantageous.

GERMAN OFFICIAL ACCOUNT OF THE RUSSO-JAPANESE WAR. Liao-yang. Authorized translation by Karl von Donat. 221 pp., with 10 appendices and 10 maps. 8vo. London, 1909. Hugh Rees. 10s. 6d.

This volume is a continuation of the series of which parts have appeared from time to time, the last instalment, "Wa-fan-gou," having brought the history of the war down to

the eve of the Battle of Liao-yang, after the junction of the Japanese 2nd, 4th, and 1st Armies. The present portion, after a brief *résumé* of the situation, takes up the story on the morning of the 29th August, 1904.

The work suffers from the defects of the previous instalments, in that the names of places are transliterated after the German system. It is often very difficult to find villages on the maps, and since there is a large amount of detail in the account, it is at times fatiguing to a British reader. But the progress of the fight can be traced from the admirably clear way in which the forces are shown on the maps, and the last two chapters, describing the Russian retreat, and commenting on the conduct of the battle, are models of lucidity.

Attention is drawn throughout to the nervousness which General Kuropatkin exhibited as to his line of retreat, and General Umezawa's small detached force, operating in the mountains miles to the eastward, is shown as exercising an undoubted effect upon the battle, owing to the exaggerated reports to which its presence gave rise. The alternative courses open to the rival commanders are discussed in the last chapter. General Kuroki's action in passing half his army (the 1st) to the right bank of the Tai-tzu Ho early in the action is adversely criticized, but is condoned since it arose from an erroneous belief that the Russians had commenced their retreat. On the other hand, his vigorous action when he discovered his error is most favourable contrasted with that of his opponent. The situation is summed up in the words: "The will to conquer, conquered."

The appendices contain details as to the strength of the opponents and their disposition at various dates.

GENERAL WOLFE. By E. Salmon. 242 pp., with index. 8vo. London, 1909. Pitman. 3s. 6d.

This admirable study of the life and achievements of General Wolfe is one of the series of "Makers of National History."

In the first half of the book Mr. Salmon briefly draws a clear and sympathetic portrait of the subject of the memoir. He gives an excellent idea of his character and of the manner in which he came to the front notwithstanding lack of private means and of influential connections.

The second half of the book contains a detailed account of the Quebec expedition up to the death of General Wolfe, at the very moment when success was assured. The plan of the St. Lawrence River and defences of Quebec render the description of the operations easy to follow.

Mr. Salmon makes use of the latest ascertained facts about the expedition, and shows that the success which attended it was due to General Wolfe's personality and plan for the final assault, and not to the action of his subordinates.

FIELD MARSHAL SIR NEVILLE CHAMBERLAIN, G.C.B. By G. W. Forrest. 504 pp., with index. 8vo. London, 1909. Blackwood. 18s.

The record of this distinguished soldier's services in India is so closely bound up with the history of the country itself that, to appreciate the former thoroughly, it is essential to have a clear outline of the latter, and this the writer of Sir Neville Chamberlain's biography has given us in his admirable description of the stirring events with which this period of British rule in India was replete.

The subject of this biography landed, as a cadet of eighteen years of age, at Madras in 1837, and did not sever his connection with India until 1881, after five years in command of the Madras Army.

During this period he was actively employed in nearly every campaign which took place in that Empire, and it can be said, without exaggeration, that he distinguished himself in every one of these, both by his personal dash and bravery and by the soundness of his judgment, as shown by the numerous letters now published.

Although a stern disciplinarian, he was full of human sympathy, and, notwithstanding the difficult positions in which he was frequently placed, he managed to gain the goodwill and hearty co-operation of all with whom he came in contact, by sheer strength of character and force of example.

The chapters dealing with the Indian Mutiny are among the most interesting in the book, and it is only by means of these private family letters that we are enabled to appreciate to the full the part which this daring and modest officer bore in the Siege of Delhi, even when incapacitated through a severe wound from leading the troops in person.

To the sportsman the description of Chamberlain's expeditions in South Africa in search of lion will especially appeal, and the account of the hairbreadth escapes he had show clearly that his utter disregard for personal danger was not confined to the field of battle.

Mr. Forrest, in his concluding paragraph, says of Sir Neville Chamberlain: "His own letters and diaries through the long series of his years show how great personal valour was combined with a true spirit of kindliness, and humanity and skill in war were intertwined with a love of culture and a serious interest in great questions." The best word said of him was by another Warden of the Marches: "Chamberlain was the soul of chivalry." This opinion will be endorsed by all who read this interesting narrative.

NAVAL.

THE NAVAL ANNUAL, 1909. By T. A. Brassey. 426 pp., with numerous plates and diagrams and index. 8vo. London, 1909. Griffin. 10s. 6d.

In view of the recent course of events and the interest which has been evoked in the progress of the navies of the world, this year's *Naval Annual*, which is as usual divided into four parts, is of especial interest.

Part I. commences with a review of the year's work in British and foreign navies, with their comparative strength in tabular form. It also contains chapters on dockyard administration, alternative systems of propelling machinery, naval volunteers, the naval expansion of gunnery, and manœuvres carried out during the year.

In Part II., which contains alphabetical lists of British and foreign ships with plans, the leading particulars of ships are, for the first time, given on the plates.

Part III. gives armour and ordnance tables, and reviews, as far as is possible, the progress made in production and development, and the general trend of opinion as regards advance in this section.

Part IV. contains the First Lord's statement, the Navy Estimates at home and abroad, the programme of shipbuilding, and a return of gunlayers' tests and battle practice. Lord Brassey contributes a paper on recent naval construction and a note on the Forth and Clyde Ship Canal. A letter on national defence, written by Mr. Frederic Harrison to *The Times*, in March, 1909, is also included. The other contributors are Mr. J. Leyland, Mr. A. Richardson, and the Marquess of Graham.

As a book of reference on naval matters this volume maintains the high standard of previous years.

FIGHTING SHIPS. By F. T. Jane. 491 pp., with numerous plans and illustrations. Fol. London, 1909. Sampson Low. 21s.

In this year's issue of *Fighting Ships* special attention has been paid in Part I. to the German fleet, and the present appearance of many of its ships is shown by means of photographs. As far as possible particulars of the new German warships are given, and they vary considerably from those hitherto published. The editor, whilst admitting that the exact correctness of these cannot be guaranteed, considers that in the main they will be found to be approximately accurate.

Every type of man-of-war to be found in the world's fleets is represented, with particulars of its construction, armament, and speed, and photographs of auxiliaries take the place of the representations of fast liners in former issues. Part I. also contains plans of destroyers and torpedo boats, and generally deals with these craft in greater detail than formerly. The illustrations throughout this part of the book, which are very numerous, are extremely clear and interesting.

Part II. contains a valuable article on "Protection of Battleships against Submarine Attack," by Professor W. Hoogaard, and Mr. C. de G. Sells again contributes a paper on "The Progress of Warship Engineering." A silhouette index of merchant ships concludes this useful book of reference.

ORGANIZATION AND ADMINISTRATION.

SUPPLY SERVICES IN THE FIELD (Alimentation en Campagne). Official. 76 pp. 8vo. Paris, 1909. Charles Lavauzelle. 6d.

This publication replaces that issued in June, 1900.

After giving a general summary of the respective responsibilities of the higher commanders and of officers of the supply corps, it deals with the question of supply under the two broad headings of "Organization" and "Work in the Field." Special orders and instructions for general officers commanding divisions and larger units follow, whilst at the end of the volume are appendices giving the scale of rations, forage, and fuel under varying conditions.

As regards arrangement, the new volume differs but little from its predecessor of nine years ago, but the trend of modern ideas has necessitated the introduction of material alterations under the old headings, and the embodiment of fresh instructions to meet altered conditions of organization. As regards the "general summary of responsibilities," the respective duties of commanders and of supply officers are far more clearly defined than formerly, but the regulations, though emphasizing the importance of commanders and their supply officers being in close touch, empower the latter to act largely on their own initiative, and authorize them to depart, if needs be, from the instructions issued by the former.

Under the heading of "Organization" the chief innovation is the introduction of fixed supply units for an army, in addition to, but apart from, those belonging to army corps. These are: An administrative convoy, composed of two sections for each army corps; an army bakery, consisting of one field bakery per army corps; a cattle park, and various auxiliary convoys. The organization of supply units for army corps and divisions is practically the same as formerly. The rations and forage now to be carried for all arms (except cavalry) are:—

	Rations. Days.	Oats. Days.
(1). Reserve	2	1
(2). Regimental wagons	2	2
(3). Army corps administrative park	2	2
(4). Army administrative park	2	2
Total	8	7

In addition to the eight days' meat ration included in the above there will be four days' meat supply on the hoof.

The old regulations provided for rations of two descriptions only, viz., the increased scale ration and the normal ration. The new regulations include a third, namely, the reserve ration, which is not to be consumed without special orders. This reserve ration comprises 10½ ozs. of "galetta" (special bread biscuit), 10½ ozs. of preserved meat, 3 ozs. of sugar, 1¼ ozs. of coffee in tablet form, 1⅔ ozs. of soup, and ⅔ dram of brandy. These are issued to the troops prior to their departure from the place of mobilization, and are carried partly on the man and partly in the first line transport.

In the cavalry the following reserve rations are carried:—

"Galetta"	1 day
Sugar and coffee	3 days
Meat and soup	1 day
Brandy	1 ,,
Oats	4½ lbs.

The 4½ lbs. of oats may be consumed as soon as camp is reached, but in this case they must be replaced from the daily issue. Mention is made of the new mobile field kitchens, which may be issued to certain army corps at the rate of one per unit, and instructions as to their use are given.

Under the second main heading of "Work in the Field" are included additional instructions for officers entrusted with supply duties, and for the employment and re-victualling of the new army administrative convoy.

The special instructions to divisional and higher commanders are amplified, and the points with regard to which supply officers should act in consultation with general officers commanding are more clearly defined.

Appendix I. gives as formerly the number of rations allowed for all ranks, but the scale of substitutes has been much increased.

Appendix II. deals with the forage. The scale of issue remains unchanged, but, apparently through an oversight, the scale of substitutes has been omitted.

Appendix III. gives the fuel ration. The issue of wood has been diminished, that of coal has been increased.

Appendix IV. gives the tobacco issue.

Several appendices which appeared in the old regulations, notably that dealing with the rations to be issued prior to entraining, etc., have not been reproduced in the new volume.

THE COLONIES AND IMPERIAL DEFENCE. By P. A. Silburn, D.S.O., M.L.A., Natal, late Major, Natal Permanent Forces. 360 pp. 8vo. London, 1909. Longmans, Green. 6s.

The author has carefully studied the question of Imperial defence, and his views as a late member of the Natal Permanent Forces and as a practical politician are entitled to consideration. Roughly speaking, Mr. Silburn is against small colonial and self-owned navies, and also against the existing system of monetary grants. The former, he considers, are likely to lead to secession, while the latter, unless the amount granted (and that, in his opinion, is quite impossible) is surplus to the Colonial Defence Vote, means the weakening of the Empire's defences. Mr. Silburn believes that the withdrawal of such grants will be more than compensated for by the strengthening of colonial militias and by adequate defences for colonial harbours. He is in favour of a proportion of the colonial militias being available for service in other parts of the Empire, and estimates that more than 115,000 men for this purpose could be raised in the different large self-governing colonies.

Finally the author urges the desirability of establishing an Imperial Council of Defence consisting of:—

3 members	to represent	the	Navy;
2 ,,	,,	,,	,, Home-Serving Army;
2 ,,	,,	,,	,, Indian Army;
1 member	,,		Australia;
1 ,,	,,		Canada;
1 ,,	,,		South Africa; and
1 ,,	,,		New Zealand.

To follow the arguments in favour of the various conclusions arrived at is impossible in the limited space available, but it may be noted that Mr. Silburn apparently has a special predilection for coast defences, which he occasionally describes as "commanding" certain seas, which he believes would go far towards rendering secure the Imperial trade routes. Many of these defended ports might, he thinks, be cheaply garrisoned by training the natives of Africa as garrison gunners.

UNIVERSAL SERVICE. By Colonel Sir C. M. Watson. 31 pp. 8vo. London, 1909. Rees. 6d.

This little pamphlet is a *résumé* of some of the arguments for and against the system of voluntary service, conscription, and universal service, with special reference to our requirements. The principal advantages and disadvantages of each system are first briefly discussed and summarized. *Universal* service as applied in Germany and Switzerland is then shortly described and its application to Great *Britain* considered.

The author considers that the advantages accruing from universal service, both to the army and to the nation, far outweigh the few minor inconveniences that might be experienced by individuals, and puts his case forward in a very succinct manner.

POLITICAL.

AUSTRIA-HUNGARY. By Geoffrey Drage. 846 pp., with numerous maps and statistical tables. 8vo. London, 1909. Murray. 21s.

This book is the result of data collected by the author during a period extending over many years. It is not produced merely as a result of the present position of affairs in the Near East, but to meet a permanent demand for a clear authority on the numberless economic and political problems peculiar to Austria-Hungary.

The political, commercial, financial, and industrial aspects in Austria are first dealt with, followed by a similar presentation of these subjects in respect to Hungary. Affairs "common" to both portions of the Monarchy are then discussed, followed by chapters on the racial question, the annexed provinces, and finally the Balkan position.

There are probably not many individuals in this country, military or otherwise, who have any very clear knowledge as to the meaning or possible consequences of the statements, which appear daily in the newspapers, on the varied questions of the racial problem in Austria-Hungary, the parliamentary crisis in Hungary, the independence party, the Pan-Slavist agitation, the agrarian and bank movements, and so on.

The present book will give to the reader an easily understandable representation of all these exceedingly complicated points.

FROM THE TREATY OF FRANKFORT TO THE ALGECIRAS CONFERENCE (De la paix de Francfort à la conférence d'Algésiras). By André Mévil. 328 pp. 8vo. Paris, 1909. Plon-Nourrit. 3s.

M. Mévil's work is almost exclusively a denunciation of the foreign policy pursued by Germany since the war of 1870, a policy which, in the writer's opinion, has always had for its one aim and object the isolation and subsequent annihilation of France. M. Mévil seeks to show how Bismarck, as the originator of the anti-French policy, directed all his efforts towards ensuring that France should find herself standing alone and unaided by any other Power did she enter on a fresh conflict with Germany, and also how the Chancellor's successors have followed in his footsteps. The means used to further this policy meet with the writer's severest condemnation.

The Franco-Russian Alliance was a set-back to Germany, and she has tried ever since to find means to weaken Russia's power; it was, indeed, mainly German influence which induced Russia to adopt an attitude which left Japan no alternative but a declaration of war.

The alliance of France with Russia is not however regarded in Germany as militating against the isolation of France to nearly the same extent as does the Anglo-French *entente*. England is, in reality, the only nation seriously feared in Berlin, because against her alone of all the nations Germany is powerless to take aggressive action, and she alone can pit against Germany a real offensive force—namely, a predominating navy. The cementing of this *entente* more than compensates for the severe political defeat sustained by France at the hands of Germany at the Algeciras Conference, a defeat which should never have been experienced, seeing that Germany had no intention of and no object in declaring war at that time.

With England at her back France can afford to ignore German bluff and attempts at intimidation. A triple *entente* between England, France, and Russia forms a safeguard against German aggression, and were Italy to throw in her lot definitely with these three, the peace of Europe would be ensured.

Such are the opinions of M. Mévil, whose book serves at least to throw many side lights on the political history of Europe during the past 38 years.

STRATEGICAL AND TACTICAL.

SOME REMARKS ON THE BATTLE OF REZONVILLE, 16TH AUGUST, 1870 (En marge de la bataille de Rezonville). By General Cherfils. 44 pp., with 4 maps. 8vo. Paris, 1908. Berger-Levrault. 1s. 11d.

This pamphlet contains some interesting notes on the Battle of Rezonville, especially in connection with the action of the cavalry. These are followed by an imaginary description of the lines on which the battle would be fought at the present time.

The most valuable part of the work is however the last chapter, in which the author deals with the moral aspect of the battle; he calls Rezonville the "bataille morale par excellence" of modern battles, and shows the great influence exercised by *moral* on the course of the fighting, which alone saved Alvensleben from a crushing reverse. Though he criticizes Alvensleben's action as rash, he admits that his conduct was that of a bold and determined leader, and says that he is really the man who, by his daring rashness, made the German Empire a reality.

The last three pages give a good description of the German conception of modern war, showing the enormous importance which should be attached to the moral qualities, to patriotism, sense of duty, and self-abnegation. General Cherfils agrees with the German view that an army "rotten with love of comfort and luxury, whose training and education are not imbued and thoroughly impregnated with the spirit of abnegation and self-sacrifice, is incapable of gaining victory and is ripe for defeat."

TACTICS OF TO-DAY. By Colonel C. E. Callwell, C.B. 162 pp. 8vo. London, 1909. Blackwood. 2s. 6d.

This is the second edition of this book, which was originally published in 1900. Some important alterations have been introduced as a result of experiences during the later stages of the South African War, and of lessons learnt from the Russo-Japanese War.

The object of the volume is to point out how existing conditions necessitate sweeping modifications in the rules and principles of conducting combats which have been accepted up to recently. Branches of tactics which are not greatly affected by the introduction of modern weapons are but cursorily touched on, and a complete picture of tactics is not attempted.

The author deals in successive chapters with the principles of attack and defence, the tactics of infantry, mounted troops and artillery, and defence works. His conclusion with regard to attack and defence is that the latter has gained to a much greater extent than the former by the improvement in modern arms, owing to the larger proportion of the defending side which can be kept in reserve for offensive purposes, without unduly weakening the force allotted to the passive defence of a position.

INVASION AND DEFENCE. By "Fabius." 200 pp. 8vo. London, 1909. Treherne. 2s.

In the preface it is stated that the object of this book is to draw attention—

(1). To the probability of German invasion in the immediate future in much greater force than is generally supposed.

(2). To the false position in which our fleet is placed by being tied to our shores.

(3). To the fatal mistake it would be to employ our Territorial troops, while still imperfectly trained, to oppose disciplined armies in the open field.

(4). To the necessity for constructing fortified and entrenched positions, as a means of gaining time for the organization of our reserves, the reception of reinforcements and the training of untrained troops, and for the purpose of protecting vital points of the kingdom, which are at present defenceless on the landward side.

(5). To the very great possibilities which might result from adopting at the outset this policy of defence.

The author gives an outline of the naval and military situation, and of the present plan of defence, and then enlarges on his proposed alternative scheme, which he has worked out in some detail. He assumes that the position of Great Britain in the case of a really serious invasion would be exactly the same as that of the allied forces in Portugal during the Peninsular War, and bases his conclusions on the success which attended the defence of the lines of Torres Vedras. The imaginary siege of London is described, and about three months after the outbreak of hostilities, during what is called the third stage of the siege, the offensive is adopted and the invaders are defeated.

TRAINING AND EDUCATION.

STRATEGY OF THE FRANCO-GERMAN WAR. By Brevet Major W. D. Bird. 126 pp., with maps, sketches, and tables. 8vo. London, 1909. Rees. 6s.

The lectures on this subject, which the author delivered at the Indian Staff College, are here presented in book form. After shortly describing events leading up to the outbreak of hostilities, he deals fully with the operations up to and including the Battle of Sedan, from a strategical point of view.

The facts have been taken from the official accounts of the war, and have been so arranged that the campaign can be studied from either the French or German side. A number of sketches show clearly the "supposed" and "real" positions of the opposing armies at various dates between 26th July and 1st August, and these, together with discussions on alternative plans of operations at critical junctures, greatly facilitate a close study of the campaign.

The volume concludes with twelve "Problems suggested by the Operations," and the Appendices include tables showing the "Organization of the French and German Armies in 1820," and the daily dispositions of the forces engaged.

AN INTRODUCTION TO THE HISTORY OF TACTICS, 1740—1905. By Capt. A. F. Becke. 104 pp. 8vo. London, 1909. Rees. 3s. 6d.

This short study of the history of tactics is published with the object of assisting candidates for examination. It is not intended to be an exhaustive treatise on the development of tactics, but merely to furnish the foundations for a more extensive study of the subject.

The author deals generally with the evolution of tactics from the time of Frederick the Great up to the present day, and divides these two and a-half centuries into six periods.

The principal changes in each period are first generally described, and their effect is then briefly considered by individual arms, suitable battles being cited in illustration of the developments of the period.

In the Appendices, which comprise the last thirty pages of the book, Capt. A. Becke discusses more fully the employment of column and line between 1725 and 1815, and maintains that the column formation, as adopted by the French at this time, was only a formation of readiness and manœuvre, and not one for the decisive attack. He then deals in greater detail with the more important points in the tactics of the Russo-Japanese War, and in conclusion gives a series of questions, many of which are taken from papers that have been set at militia competitive examinations, but all of which do not appear to be fully answered in this volume.

THE PRACTICAL TRAINING AND EDUCATION OF A COMPANY (Die practishe Ausbildung und Schulung der Kompagnie). By Capt. Rucker, German Army. 142 pp. 8vo. Berlin, 1909. Mittler. 3s.

This is the first part of a work of which the second part (dealing with musketry and field training) is in course of preparation.

In an introduction the author advocates that drill and instruction in field duties should proceed concurrently, since an undue preponderance of drill in the early stages gives false impressions to men. Conversely, a man who realizes the demands of a modern battle will appreciate the importance of strict drill.

The book contains two sections devoted respectively to drill and the combat. In dealing with the former the author warns against undue repetition with a view to correcting mistakes, and against undue prolixity in giving explanations. The less marching past is practised the better will it be carried out.

In the section on field duties the author, amongst other things, lays down the following :—

Tactical discussions are a good means of instructing N.C.O.'s. Instructions at field exercises should give every possible latitude to subordinate commanders, whilst clearly indicating the object in view. Full information should be given concerning neighbouring units whether real or imaginary. Great attention should be devoted to the wording of all orders.

All ranks must be trained to fill positions higher than those normally assigned to them. Men should constantly be trained to watch distant objects with a view to improving their sight. When practising firing exercises, living targets are preferable to points in a landscape. In order to simulate the noise of the battlefield, drums should be beaten and bugles blown immediately in rear of the unit. As an aid to judging distance the exact distances between various points on a drill ground should be known to the men. Volleys should not altogether be neglected. To inculcate economy in ammunition, all rounds with a company should be distributed amongst a small proportion of it, the rest noting the time taken to expend it. In extended order sections of a company should be directed independently by commanders instead of marching by a section on a flank—valuable training is thus afforded to leaders of smaller units.

Thorough reconnaissance is a necessary preliminary to all good leading. Every commander should, when approaching unknown ground, move well in front of his command. This "hasty reconnaissance" is characterized as most important. A few men should constantly be sent out to reconnoitre *during a fight*.

"Schemes" for field days need not end in "fights." In peace exercises account must be taken of the reconnoitring activity of an enemy who is not represented by troops.

At field exercises things should be allowed to take their course. Instructions can be gathered from any kind of situation. The handling of units at war strength is essential for all leaders.

Reinforcements should, if possible, adjust sights before joining a firing line, but men firing should be trained to call out the range to newly-arrived men or parties. Each man must know his fire-unit commander, but men's attention should not be distracted by too much "re-forming."

Commanders joining a firing line should not assume command until a situation has been thoroughly grasped. Engagements must not terminate with the capture of a position. Rallying and pursuit should be practised. In pursuing through a wood, much noise should be made, with a view to alarming a retreating enemy.

The work is full of valuable hints for infantry officers.

WHAT TO APPLY IN TACTICAL PROBLEMS. By Capt. A. F. Becke. 173 pp. 8vo. London, 1909. Paul, Trench, Trübner. 3s. 6d.

The object of this book is to help officers studying for promotion examinations and those who are called on to see and criticize simple tactical schemes, and for these purposes it should prove of assistance.

The author lays stress on the application of the general principles contained in the official regulations and deprecates a rigid adherence to the wording of those publications, even for examination purposes.

The instructions under each subhead are concise, well arranged, and appear up to date.

THE ENTRANCE EXAMINATION PAPERS FOR THE STAFF COLLEGE FOR 1909 (Die Aufgaben der Aufnahmeprüfung 1909 für die Kriegsakademie). By Major Krafft. 62 pp., with 9 figures in the text. 8vo. Berlin, 1909. Mittler. 1s. 6d.

The papers are set on the following subjects:—Military history, minor tactics, applied tactics, arms and ammunition, fortification, reconnaissance, sketching, history, strategical geography, languages, and mathematics. Solutions to all questions are given.

TRAVEL AND TOPOGRAPHICAL.

GEOGRAPHICAL PHOTOGRAPHS FROM ASIATIC TURKEY (Geographische Charakterbilder aus der asiatischen Türkei). By Hugo Grothe. 10 pp., with 176 photographs and 3 coloured maps. 4to. Leipzig, 1909. Hiersemann. 15s.

In this book the author gives to the public the first result of his journey of 1906—1907 through Asia Minor, Mesopotamia, and Persia. A large selection of photographs, with the necessary explanations added, illustrate the districts traversed by him, which, in view of the projected Baghdad Railway, are of especial interest.

The photographs selected illustrate the nature of the country, of the population, and of the various forms of dwellings, and a series is devoted to subjects of historical interest both ancient and modern.

MISCELLANEOUS.

THE FRENCH OFFICER (L'officier français). By Jean d'Epée. 134 pp. 8vo. Paris, 1909. Lavauzelle. 1s. 8d.

This book deals with the provision of officers for the French Army, and it is interesting to note to how great an extent the reasons given by the author for the deficiency of suitable material are applicable to the present state of affairs in this country.

The author attributes the lack of candidates for the army to the increase of work, a demand for better education and greater aptitude than formerly, and the enhanced responsibility of the *rôle* of an officer as an educator of a great part of the nation, without a corresponding addition to pay. As a result, the old families of France furnish fewer candidates for the army, while business men, who realize that their sons will have to work hard, prefer that they should be adequately paid for doing so. Another factor which is pointed out is that, while the officers' pay has remained the same, the general standard of living has been raised, with the result that money does not go so far as it used.

"SHALL WE BE INVADED?" ("Serons-nous envahis?") By "un Belge." 62 pp. 8vo. Brussels, 1909. Dewit. 10d.

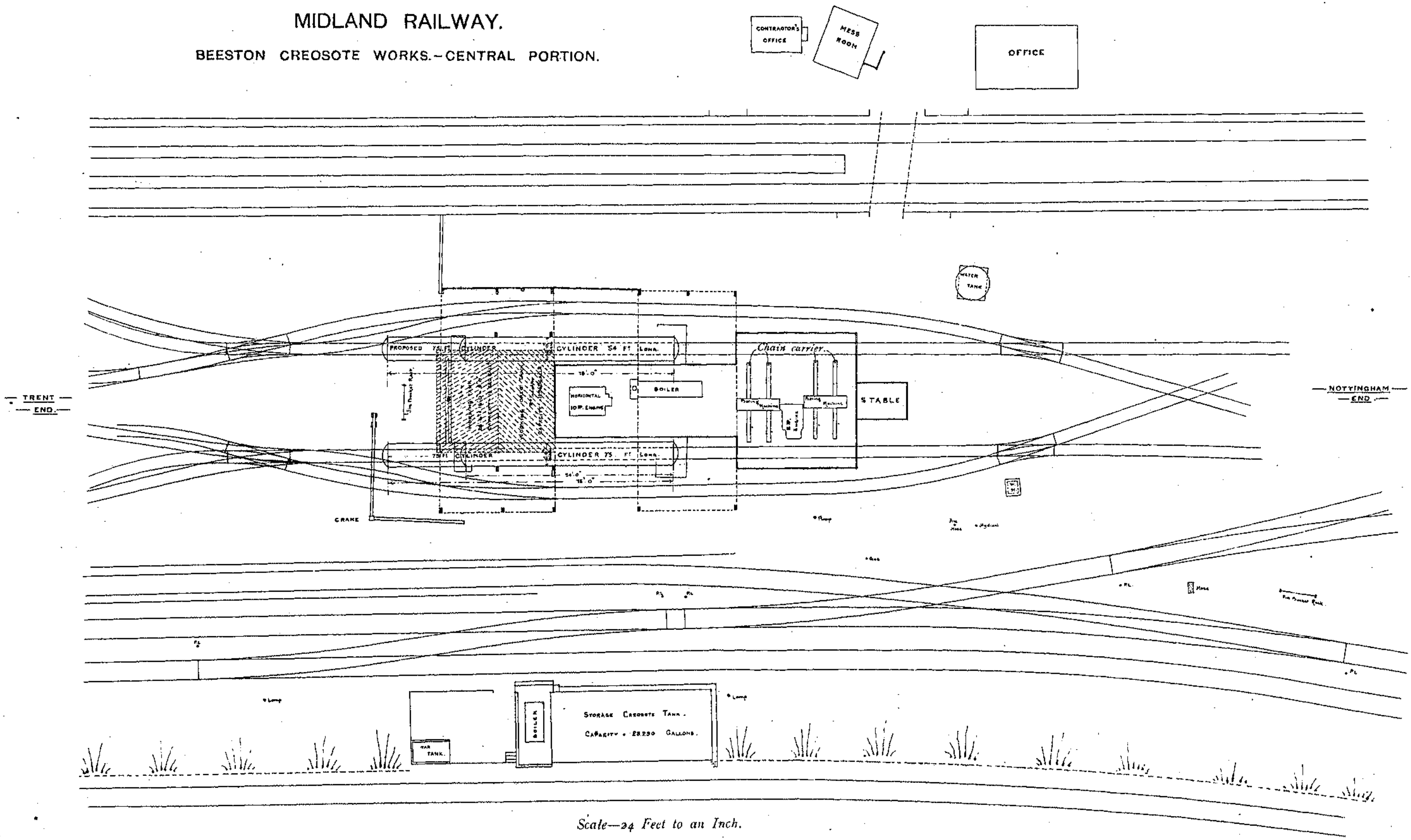
This little brochure contains a considerable amount of valuable information on the question of the invasion of Belgium. In the first part the author shows in a convincing manner that a country, even if its neutrality is guaranteed by the European Powers, is nevertheless insecure without means of defence of its own. In the second part the various schemes of army reform in Belgium are examined, and the author states with lucidity his solution of the problem.

STATISTICS OF ARMAMENTS, POPULATION AND COMMERCE OF THE GREAT POWERS DURING THE LAST THIRTY YEARS (Kriegswesen und Volkswirtschaft der Grossmächte während der letzten 30 Jahre). By W. Ahr. 16 pp., with 21 statistical graphics. 8vo. Berlin, 1909. Vossische Buchhandlung. 2s.

Herr W. Ahr is an assistant in the Imperial Statistical Department, and this little work is probably of greater value in consequence. The graphics of the growth of population of the Powers from 1800—1908, of the existing peace and war strengths of their armies, and the number of ships in their fleets are the most instructive.

MIDLAND RAILWAY.

BEESTON CREOSOTE WORKS.—CENTRAL PORTION.



Scale—24 Feet to an Inch.