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ROYAL ENGINEERS

Field-Service Pocket-Book.

By LT.-COL. G. K. SCOTT-MONCRIEFF, R.E.

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Authors alone are responsible for the statements made and the opinions expressed in their papers.—(G. 5281).

DEEDS OF THE ROYAL ENGINEERS.*

(Continued from the March number of the "R.E. Journal").

CHAPTER IV.

THE ROYAL SAPPERS AND MINERS IN THE CRIMEAN WAR.

THE war with Russia which broke out in 1854 consisted of three phases, the last and most famous of which was the invasion of the Crimea by the allied British, French and Turkish forces.

The cause of the war was briefly as follows :—

The European portion of the Turkish Empire had been in an unstable condition for many years; the growing strength and unruliness of the Balkan provinces fomented by dissatisfaction with Turkish rule caused Turkey to be designated "the sick man of Europe." Russia having a large seaboard on the Black Sea, the only outlet of which is through the Bosphorus and the Dardanelles, had long coveted this portion of Turkey and seized the opportunity by adopting a threatening attitude with a view to obtaining a religious protectorate over Turkey. The entrance of such a powerful nation into the Mediterranean was looked upon at that time as detrimental to British and French interests, but as both nations were then absorbed in domestic difficulties and internal politics, the Czar appears to have reckoned on their limiting their objection to diplomatic pressure. He therefore persisted in his pretensions by occupying with a belligerent army the Danubian principalities—now the kingdom of Roumania—with the result that Great Britain and France declared war and at once despatched expeditions to the Baltic and to the East.

To the Baltic fleet were attached, on the 9th March, 1 sergeant and 19 rank and file of the 2nd Company, Royal Sappers & Miners, under the command of Lieut. Nugent, of the Engineers. The object of sending the party with the fleet was, that it might lead the seamen and marines in any escalating operations ashore. No occasion, however, offered itself for resorting to such an expedient. Cholera broke out in the fleet and several of the detachment were seized with the malady.

It was then decided to attack the Aland Islands in the Gulf of Bothnia and a division of the French Army was despatched from

* Compiled in the R.E. Record Office.

Calais to carry out this enterprise. The 2nd Company, Royal Sappers & Miners, 80 strong, under Capt. F. W. King, R.E., was detailed to accompany this force and sailed from Deptford on 15th July.

Before daylight on August 8th the Sappers, 600 of the Royal Marines and 2,000 French troops landed near Bomarsund. The leading troops consisted of Sappers carrying besides their carbines an assortment of billhooks, hand saws, and axes. The British operations were wholly carried out under the direction of Brig.-General Harry Jones, R.E., who had seen much service in the Peninsular War.

Nearly five days were employed in collecting tools, cutting roads, making preliminary reconnaissances, preparing a hospital, and making huts of branches of fir trees for sheltering the troops, while a strong party worked with unflagging zeal in making fascines and filling sand bags.

Meanwhile two or three attempts had been made by some officers of the Corps, attended by a few intrepid Sappers, to trace a battery for the purpose of reducing Fort Tzee which was strongly held by the enemy; but so heavy a fire was opened on them that these attempts were unsuccessful at first. Determination and a fine disregard for danger however got over the difficulty. No trace was used, but a simple alignment struck, from which on 13th August, under the cover of darkness, Serjt. John Jones and 24 rank and file, began to construct the battery under the orders of Capt. Ord. Without the chance of digging a shovelful of earth to give solidity and strength to the cover, the battery was built on the bare rock entirely of fascines and sand bags.

The Sappers erected the structure unassisted and practically completed it in 10 hours. Fort Tzee surrendered however at once so the direction of the battery was changed so that it bore on Fort Nottich. Speedily the epaulment which flanked the battery was prolonged, the platforms promptly laid and three 32-pounders having been placed in position, the embrasures were unmasked by some daring Sappers and the firing which lasted about nine hours ended in the surrender of the garrison. Two Sappers were allotted to each gun to keep the embrasures in good order and it was largely owing to their energy and courage that the guns were able to maintain their fire under the enemy's heavy bombardment. Lieut. the Hon. Cameron Wrottesley, R.E., was killed in this action.

When the French had captured Fort Tzee, Serjt. John Jones and Ptes. John S. Rowley and George Peters were told off to make a plan of it. The French however had abandoned the work which had been set on fire by the heavy Russian shell fire. Going through one of the embrasures, which was on fire and the gun

carriage burning, the little party of three pushed on into the tower. Loose powder, broken cartridges and live shells were lying about ; the flames had nearly reached the principal magazine, the remainder of the building was on fire in every casemate and the smoke was streaming from apertures everywhere. From floor to floor and embrasure to embrasure they moved but their efforts were unavailing ; and being forced to return they had barely reached safety when the magazine exploded and the fort blew up.

Without attempting to chronicle the different incidents of the campaign it will here be sufficient to note that Bomarsund, the principal fort in the Aland Islands, capitulated without material opposition and the work of demolition was carried out entirely by the Sappers. Forts Prasto, Nottich, and Bomarsund were blown up in turn and Brig.-General Jones satisfied himself that the erstwhile formidable defences presented nothing but a scene of ruin and desolation.

Quitting the Baltic Sea the company rejoined the Corps at Woolwich on 16th October and, before two months had intervened, was despatched in all haste to Turkey.

We may now turn to the operations in Turkey. The van of the Army sent thither under the command of Lord Raglan was a small party of 6 rank and file of the Sappers & Miners under Capt. Chapman, of the Engineers. They belonged to the 4th Company, at Malta.

The Corps at this time had been increased to a total strength of 2,658 of all ranks and consisted of the following details :—

	Colr.- Sjts.	Sjts.	Cpls. & 2nd Cpls.	Bgls.	Ptes.	Total.
17 General Service Companies each	1	5	12	2	100	2,040
1 Company at Corfu	1	3	8	2	68	82
3 Survey Companies each	1	7	16	2	99	375
1 Survey Company	1	5	12	2	100	120
Sydney Mint Detachment	—	1	4	—	11	16
Van Diemen's Land Detachment ..	—	1	2	—	12	15

Staff.—1 Brigade Major, 1 Adjutant, 3 Quartermasters, 2 Sergeant-Majors, 2 Quartermaster-Sergeants, and 1 Bugle-Major

2,658

To concentrate the force for active service the 7th Company was removed from Hurst Castle to Woolwich.

On the 24th February, 1854, the 11th Company, under Capt. Hassard, proceeded to Malta where they were joined on the 27th March by the 7th Company, Capt. Gibbs, who brought with them a further supply of tools and implements. Two days later

both companies sailed with the Rifle Brigade for Gallipoli. A detachment of about 40 non-commissioned officers and men of the Corps was left at Gallipoli where they erected piers for landing stores, guns, etc., and prepared hospitals. The remainder marched to Boulair where they assisted to form the lines on the left of the position allotted to the British troops. When Sir George Brown, who commanded the division, took his departure for the frontier he published in orders of the 6th May, "his entire approbation of the general conduct, zeal and industry of the Royal Sappers & Miners on the works, both at Gallipoli and the camp at Boulair."

Two other companies were now reorganized to reinforce those in the East. These were the 10th, under Capt. Bent, to form the pontoon train, and the 8th from Gibraltar, under Capt. Bouchier.

To form a connection between the Sappers & Miners and the Army the four companies with the expedition were attached to the divisions as follows:—

1st Division.—11th Company, Capt. Hassard.

2nd Division.—8th Company, Capt. Bouchier.

3rd Division.—7th Company, Capt. Gibbs.

Light Division.—10th Company, Capt. Bent.

On the 27th May the 11th Company proceeded to Varna which for a few months was the principal frontier station and dépôt for Engineer stores and pontoons, from whence parties were thrown out to Devno, Aladyn, Monister, Rustchuk, etc.

About 70 men of the 10th Company marched to Devno on 29th May where they worked very hard to render the place fit for the occupation of troops. The correspondent of *The Times*, in speaking of this work, termed the Sappers "a most utilitarian Corps," while Capt. Gordon in a letter to a brother officer remarked with respect to its general services "that the men work well and behave well. To be with them is a pleasure."

The 7th Company at Gallipoli and Boulair, in addition to their duties on the lines, constructed a number of log huts, stores, etc., for use in case the army had to fall back on the isthmus. On the 19th June the 8th Company joined the frontier companies.

Lance-Corpl. William Swann and Pte. Andrew Anderson accompanied Capt. Bent and Lieut. Burke to the beleagured fortress of Silistria and from thence to Rustchuk where a hazardous attack on the Russians holding the opposite bank of the Danube was undertaken by the Turkish troops. The attack was made on three points, Capt. Bent leading one of the divisions. Lieut. Burke also led a detachment of Turkish troops across the river in boats. The two Sappers were attached to him and their conduct added considerable lustre to the Corps. In a fierce hand-to-hand

struggle Lieut. Burke was killed after laying out six of the enemy. The two Sappers stood by their officer and fought like tigers but were slowly driven back. Corpl. Swann was soon disabled and narrowly escaped drowning, leaving Anderson the only British soldier with the batch.

He reorganized the Turks, killed no less than 14 Russians with his own hand and successfully withdrew the party as soon as their mission had been accomplished. Next morning Anderson crossed the river again alone and recovered the body of Lieut. Burke. This Battle of Giurgevo was won by the Turks after 10 hours' fighting but the losses on both sides were considerable. For their gallantry Swann was promoted to be 2nd Corporal and Pte. Anderson decorated, by Omar Pacha, with the Order of the Medjidie. In the *London Gazette* of January 12th, 1855, appeared the following :—

“The Queen has been pleased to grant unto Pte. Andrew Anderson, of the Sappers & Miners, her Royal license and permission that he may accept and wear the Order of the Medjidie, which the Sultan has been pleased to confer upon him, in approbation of his distinguished bravery and good conduct at the passage of the Danube on 7th July last and subsequently in rescuing the body of his Commanding Officer, Lieut. Burke, after he had fallen ; and that he may enjoy all the rights and privileges thereunto annexed. And also to command that Her Majesty's said concession and especial mark of her Royal favour be registered, together with the relative documents, in Her Majesty's College of Arms.”

The 4th Company from Malta, under Capt. Craigie, and a detachment of the 3rd Company at Corfu were sent to reinforce the Corps at Varna and arrived at headquarters in August.

The Russians about this time withdrew their forces from the Danubian provinces and the second phase of the war came to an end. The Russians however still maintained Sebastopol, an important port in the Crimea on the Black Sea. This place had been very strongly fortified and was believed to be impregnable.

The Allies realized that so long as this fortress and arsenal was allowed to exist it would be difficult to ensure the continuation of the Turkish Empire as the guardian of the Bosphorus and the Dardanelles against Russian expansion towards the Mediterranean. It was consequently decided to attack it and early in September the invasion of the Crimea commenced. Since those days, our policy towards Russia has changed, and we now realize that in backing Turkey against Russia—to quote the late Lord Salisbury's phrase—“We put our money on the wrong horse.”

Preliminary to the invasion, the companies of the Corps at Varna superintended contingents of the line in preparing a park of gabions, fascines, sand bags and platforms for siege purposes.

On the 14th and 16th September the expedition landed in the Crimea near Lake Tuzla in Kalamita Bay, the force of Sappers & Miners totalling 308 of all ranks. These men performed an enormous amount of work in connection with the landing of men, guns and stores on a shelving beach in a rough sea but thanks to their efforts the matter was accomplished in record time and without mishap.

The Russians elected to oppose the progress of the Allies from the heights of the Alma and a great battle was fought here on the 20th. The British casualties amounted to 2,000 but the Russian losses were much heavier and being defeated they were compelled to retire. For this action the Sappers & Miners were distributed as follows:—

Headquarters.—3rd Company, 36.
Light Division.—10th Company, 62.
1st Division.—11th Company, 62.
2nd Division.—8th Company, 77.
3rd Division.—4th Company, 34.
4th Division.—4th Company, 35.

The outstanding feature of the invasion of the Crimea and the one that most affected the popular mind was perhaps the terrible sufferings and privations endured by the British troops. The whole story of the Crimean War is an imperishable monument to the sterling qualities of the British soldier. The military machine of England in 1854 as of France in 1870 proved grossly defective, and, as in 1870, it was lack of organization which accounted for the melting away of our splendid troops from unnecessary exposure, privation and overwork. Many thousands perished miserably in the pesthouse, misnamed a hospital, at Scutari.

Three R.E. names stand out pre-eminently in the campaign, Sir John Burgoyne, Lieut.-General Sir Harry Jones and Sir William Gordon and it may be of interest here to give some details of their careers.

Sir John Burgoyne was born in 1782 and was consequently 71 years of age when he was sent out to Turkey in 1853 to examine and report on the theatre of operations before the coming war in the East. He superintended the disembarkation of the Army on the Crimean Peninsula, chose the spot and advised the flank march after the Battle of the Alma to the south side of Sebastopol. Once in camp before Sebastopol, Burgoyne insisted on the necessity of reducing the Malakoff in order to take the city and he became more than ever the second man in the British Army and Lord Raglan's right-hand man. He underwent all the rigours of the winter campaign but was recalled to England in February, 1855. On 19th October, 1854, Lord Hardinge, on behalf of the Government, wrote as follows:—

"You have been placed on the Staff of the Army in the East as a Lieut.-General, and in case of the absence of the Commander of the Forces, would be in command of the Army. You will, of course, name your own staff, etc., etc."

Sir John's recall was referred to by Lord Panmure, the Secretary at War in the House of Lords, who stated that he "wished to make it clear that the recall of this officer is not from any fault found with him by the Government, but arises from the fact that a younger officer has been sent out to assume the duties of Commander of the Royal Engineers and to assist Lord Raglan with scientific advice and that it has therefore been thought right to recall Sir John Burgoyne, a man now far advanced in years, from the sufferings of a Crimean winter, to resume his duties as Inspector-General of Fortifications."

The Marquis of Lansdowne followed this by stating that he "had occasion to know that Sir John had, at the earnest request of the noble Lord, the late head of the War Department, unhesitatingly sacrificed his own comfort and every other consideration for the discharge of the important duties which were confided to him. In doing so, however, Sir John Burgoyne had only acted in accordance with the whole tenour of his life which had been a continual sacrifice of his private convenience to the public service."

On September 15th, 1855, Sir Harry Jones wrote him a letter which commenced as follows:—"Sebastopol was taken by the point you always indicated—The Malakoff."

Lieut.-General Sir Harry Jones had seen a considerable amount of service in Holland, Spain, Portugal, America and France when the war with Russia broke out in 1854. He commanded the land forces in the Baltic Expedition and after demolishing the fortifications on the island of Bomarsund he was despatched to the Crimea to relieve Sir John Burgoyne. On his arrival he found the Siege of Sebastopol almost at a standstill owing to the extraordinary difficulties that had arisen through the extreme severity of the winter and the deficiency both of men and material. His untiring energy and zeal proved of the utmost value in this important post and from the moment of his arrival he became the life and soul of the attack.

He was severely wounded in the forehead by a spent grape-shot on June 18th during the unsuccessful assault on the Redan and received the special notice of Lord Raglan on that day. The result of his wound and of the exertions he had made was a severe attack of illness from which he was still suffering when the final assault on the fortress was made on September 8th. Being unable to stand he caused himself to be carried to the trenches on a stretcher in order to be present on the occasion and to give the General in Command, Sir James Simpson, the benefit of his advice. The

result of the day's exposure was an aggravation of his illness which necessitated his removal to hospital at Scutari and subsequently to England.

Major-General Sir J. William Gordon was a Captain of some standing and fifth in seniority of the Royal Engineers selected for service in the East. But when the Siege of Sebastopol was a month old casualties had already made him the Commanding Royal Engineer of the Army. Gordon carried on his duties under the superintendence of Sir John Burgoyne and afterwards as second to Sir Harry Jones.

To write the story of the duties of Gordon of Gordon's Battery and how they were performed would be to write the history of the siege. His long-practised endurance now enabled him to do without difficulty far more than any other man would have attempted in the way of personal supervision of the works as they went on unceasingly; and during one bombardment it is reported of him that he never sat down to take a meal for three days and three nights and at its close was seen still walking along the trenches sound asleep though refusing himself rest. His valour was not so much mere courage as a perfect indifference to danger, which became a proverb in the lines. It won for him the special favour of the Naval Brigade whose soubriquet of "Old Fireworks" expressed their keen sense of his constant readiness to give the example of facing the enemy's fire whenever personal example could be of use.

A severe wound received in the right hand and arm in the great March sortie, and much neglected afterwards, broke down his health just before the siege closed, and he was absent at the surrender of the stronghold which, more than any other single man, he had contributed to make our prize. In the following year being still regimentally a Captain of Engineers but a Colonel by brevet and Aide-de-Camp to the Queen he was called suddenly to be practically the military head of his Corps as Deputy Adjutant-General; but his subsequent appointment to the important charge of the great fortifications of Portsmouth, the largest Engineer command in the country, gave his engineering abilities better scope. The irritation of his severe Crimean wounds acting on the nervous system preyed on his brain. The pain in his arm had gradually increased and latterly never left him. His very efforts to suppress outward signs of suffering served but to increase the mischief that was working within. Traces of aberration of mind were observed by his friends and a few weeks later he suddenly laid violent hands on his own life—a tragic end to a glorious career. A fine portrait by Lutyens in the R.E. Officers' Mess at Chatham fittingly commemorates "Gordon of Gordon's Battery," one of the finest heroes of the Corps.

On 27th September all the companies were sent up to Balaclava

and were at once detailed for road making, sinking wells and repairing shattered wagons, while the 3rd Company made good a rough pier at Balaclava, at which were landed the heavy ordnance, ammunition and siege stores.

Charged with the right attack, the British held the position which approached the Tchernaya Valley, while the French spread in a curve to the left, as far almost as Chersonese Bay. The ground was a sterile waste, wild, rocky and undulated; bleak in winter, burning in summer. Sir John Burgoyne conducted the British portion of the siege, supported by Colonel Alexander, Major J. W. Gordon and many other officers of the Corps. Colonel Alexander, from overwork and anxiety, soon died, and the executive direction of the work devolved on Major Gordon.

The British force was divided into two sections, called "right" and "left" attacks respectively, their continuity being broken by a deep ravine through which passed the Woronzoff Road. The right attack was familiarly called Gordon's Battery or parallel and the left Chapman's Battery or parallel. The right abutted on the heights overlooking the middle ravine and the left curved away to the position held by the French but separated from it by the precipitous sides of the Picket House Ravine which debouched on the head of the inner harbour. No longer attached to divisions, the 4th, 8th and 10th Companies of Sappers were detailed to the right, and the 3rd and 11th Companies to the left attack. The Engineer dépôt for the right attack was stationed near the windmill on the high road leading from Sebastopol while that for the left occupied an area in rear of the 3rd Division on a plateau. At both parks the carpenters, sawyers and blacksmiths of the companies carried on their work unprotected from the weather. In order that the Sappers might be easily distinguished in the trenches, they were ordered to wear a band of white tracing tape round the forage cap.

Everywhere the lines continued to be prosecuted with commendable rapidity. Acting as overseers it was the province of the Sappers & Miners to instruct the infantry and the Turks in forming the trenches and batteries, attending themselves to those portions of the works requiring technical skill; such as laying the gabions, fascines, sand bags and platforms; erecting the splinterproof magazines and sloping and lining the embrasures. Formidable obstacles occasionally offered serious impediments to the progress of the excavation, for the soil was rocky; to overcome the difficulties, the Sappers led the way with an earnestness and zeal that stimulated the workmen to activity and exertion. Such was their energy and exertion that many a brave fellow, already enfeebled by overwork, scanty rations and hard weather, succumbed.

Although harassed by the fire of the enemy no firing was indulged

in by the Allies until the batteries had been completed and then a vigorous bombardment commenced which was hotly returned by the Russians.

After the first day's firing Sir John Burgoyne wrote to the Commander-in-Chief: "I would call Lord Raglan's attention to the great and successful exertions of the Royal Engineers and Sappers under very trying circumstances. The very rocky soil presents the extreme of difficulties to the establishment of trenches and batteries; the very act of obtaining cover in one night in such soil, which was done on every occasion, requires a great effort, and to construct in it substantial batteries, still more. The proportion of good platforms and stuff for magazines embarked, was too insignificant to be worthy of notice; these objects had to be prepared (and for a very heavy description of ordnance) from the irregular masses of timber and plank that could be procured from buildings pulled down. Notwithstanding all these difficulties, the work has been pushed on with rapidity, the substantial nature of the parapet has been proved by the few casualties incurred, and the embrasures and platforms have required, during the very heavy cannonade of yesterday, less repairs and adjustment than I have ever been witness to on similar occasions; and no accident has occurred to any magazine, although some shells have been observed to explode on them, all proving the substantial goodness of the works performed."

Among the numerous instances of energy and bravery that occurred in this bombardment was one in which Privates Jenkins and John Wallace signalized themselves under the eye of Major Biddulph, of the Artillery, Assistant Engineer. They were stationed on the 22nd October in No. 3 Battery left attack, against which the fire of several guns was concentrated with such ruinous effect that a length of about 14 ft. of the parapet was broken down before 10 o'clock in the morning. To venture into so exposed a gap in broad day, under a frightful fire, needed a considerable amount of courage but with a willing promptitude these two privates of the Sappers & Miners passed into the breach, each working for a quarter of an hour at a spell. In seven hours the damage was repaired and during the whole time the battery continued in action.

On the 25th October was fought the memorable Battle of Balaclava. Eighteen Sappers were engaged in the battle zone and subsequently received the Balaclava clasp.

On the 5th November was fought the Battle of Inkerman. The Russians some 60,000 strong sallied out from the fortress under cover of night. They were at once attacked by the British and French whose numbers totalled 14,000 only. The losses in the Anglo-French ranks were heavy but after 10 hours' fighting the Russian casualties exceeded the total force of the Allies engaged, and driven

from the hills at all points the enemy took refuge in flight. 341 non-commissioned officers and men of the Corps received the Inkerman clasp for this battle.

After this the Siege of Sebastopol was carried on under ever-increasing difficulties. On the 14th November commenced the memorable storm which swept over the Black Sea and the Crimea. Terrific havoc was committed on land and sea. The tents were blown away, ships wrecked and driven ashore. In common with the rest of the army the Sappers & Miners felt the shock of the storm but continued their labours in the deluging rain and raging wind with uncomplaining fortitude. The road to Balacava, the British base, soon became one long morass, and both man and horse in travelling to the port had to wade the distance up to their knees in mud. The storm was followed by snow and frost of great severity.

As the siege wore on, it was found advantageous to make each relief commence its allotted labour at the most advanced point and work backwards. The infantry parties usually opened ground as far as practicable, using straw baskets to gather earth for cover in places where it was insufficient. Wherever the pick was used it struck upon rock, which offered an unfailing obstruction to the progress of the lines. The Sappers invariably followed these surface pioneers and blasted or removed the stony portions. "In this service," it is recorded, "these men's exertions have been altogether invaluable and such as could not be supplied from any other part of the Army."

On 1st December the strength of the Corps in the East was as follows:—

Present at the siege and effective	..	..	..	401
Sick in field hospitals..	..	..	..	40
Balacava	..	..	..	23
Bucharest	..	..	..	14
Varna	..	..	..	17
Gallipoli	..	..	..	11
Constantinople and Scutari	..	..	..	18
Total	..	..	..	524

A tiny force for the extreme exigencies of the case.

Two Sappers in charge of the field electric telegraph for service in the Crimea, arrived at Balacava on the 7th December, bringing with them the instruments, batteries, insulated wire and appliances packed in two waggons. Twenty-four coils of wire each a mile long were packed in them. The apparatus, only available for short distances, was worked by six or eight men.

The 2nd Company of 113 strong, under Capt. King, reinforced the Corps in the Crimea on the 20th December and on Christmas Day moved up to assist in the right attack.

In January the small detachment under Major Bent, of the Engineers, proceeded to the Crimea from Bucharest, and the following despatch from Colonel Simmons, R.E., Commissioner with the Turkish forces, was communicated by Lord Raglan to the Minister of War:—

VARNA,

January 8th, 1855.

MY LORD,

His Highness Omar Pasha has requested me to write to your Lordship, to return his best thanks for the services rendered to his army by Major Bent, of the Royal Engineers, and the detachment of Sappers under his command.

His Highness desires me to express his regret at the losses which have been sustained by this small detachment, who, under the direction of Major Bent, have well sustained the character of the British Army.

His Highness has already expressed to your Lordship his regret at the loss of Lieut. Burke, of the Royal Engineers, whom his Highness considers to have been an officer of much merit.

His Highness desires me to inform your Lordship that he has done himself the honour to write to the Turkish Ambassador at the Court of St. James's expressing the desire of His Majesty the Sultan that Private Andrew Anderson, of the Royal Sappers & Miners, may receive and wear the decoration of the fourth class of the Order of Medjidie, in commemoration of his gallantry in recovering the body of Lieut. Burke after he was killed at the passing of the Danube on the 7th July last. In the meantime he has presented Private Anderson with the decoration and trusts your Lordship will allow him to wear it until the commands of Her Majesty may be received.

His Highness further desires me to express to your Lordship his entire approbation of the manner in which Major Bent has conducted his duties.

He desires me to inform your Lordship that this officer showed great energy in his endeavours to enter Silistria before the siege was raised; that he subsequently showed great gallantry at the passage of the Danube, when he was the first to land on the left bank and covered the landing of the Turkish troops with a detachment of riflemen, who maintained their ground under a heavy fire until the disembarkation of the supports was effected.

Major Bent and his Sappers were subsequently of great service in throwing up the *tête de pont* at Giurgevo and in the construction of the bridge across the Danube.

* * * * *

His Highness desires me to add, that it would be very gratifying to him if Her Majesty could in any way reward these officers for the able services they have rendered to the Ottoman Army and the common cause.

I am, etc.,

(Signed) J. L. A. SIMMONS, *Lieut.-Colonel.*

Field Marshal LORD RAGLAN, G.C.B., etc.

For some period in the new year, the weather continued so inclement that very little progress was made in the works. On several occasions the line parties could not be employed for this reason. Directed by their officers, the Sappers only held their posts and laboured as best they could against the stinging storms and winds which swept over the frosted hills. Many were frostbitten and several died, yet amid all this severity they blasted the rock, made loopholes, erected gabion revetments, and where the drift had piled the snow in the more important excavations, removed it with incredible energy.

It is recorded in the trench Journal for the night of January 7th Right Attack, "All the work was done by the Sappers, the bad weather preventing the employment of working parties of the Line." And again for the night of January 16th Right Attack, "The Sappers cleared away the snow from the left approach. As the weather was very bad neither Turks nor Linesmen could be employed."

Up to the 3rd February the staple work in the trenches was the removal of snow, and then followed an interval during which the men were up to the knees in mud. To remove this obstruction the drainage was improved and otherwise facilitated by making additional openings in the parapets to carry off the water and convey it by natural channels down the slopes of the hills into the ravines. These impediments, though they greatly interfered with the general progress, did not slacken the exertions of the Sappers, who were everywhere seen blasting rock, building magazines, making traverses, etc. So far it was found impracticable to do more than keep the current constructions in tolerable repair. To advance was out of the question. Some French officers of Engineers who had observed from the beginning the firm and laborious activity of the Sappers spoke of them with admiration, and Sir John Burgoyne in a letter dated 5th February, 1855, quotes them as constantly saying "*Des Braves Soldats, et des bons Sapeurs et Travailleurs.*"

The 1st Company, 101 strong, under the command of Capt. J. M. F. Browne, of the Engineers, landed at Balaklava on the 7th February and it was soon moved up for trench duty.

With an improvement in the weather considerable progress was made. Both right and left attacks were developed but so great was the strain that was thrown on the Sappers that it was decided to augment the Corps. Accordingly on 22nd March authority was given for forming four new companies which were designated the 23rd, 24th, 25th and 26th. The first two were raised on 1st April and the others were not embodied before September and October.

Hitherto the Engineers had to depend for transport on the resources of other departments but as this caused considerable trouble and delay the 23rd Company was constituted a driver troop for the conveyance of the Royal Engineer field equipment.

In April the exertions of the Allies were beginning to bear fruit. Everywhere in various forms were rising works, which, had it not been for the wide expanse of stony clay and rock which covered the hills, would by this time have almost intermingled with the advanced positions of the Russians. Where the pick could not penetrate, blasting was commonly resorted to for dislodging the stones. At particularly hard and exposed work it was impossible to employ any but Sappers.

On the 9th April, as most of the works were ready, the second bombardment of Sebastopol was commenced with 101 guns and mortars on our side. The enemy had the exact range of our batteries and trenches and as they had a preponderance of heavy guns our bombardment was carried on at a serious disadvantage. Very extensive damage was caused to our works by the enemy's fire but the extraordinary efforts of the Sappers enabled the guns to keep in action. The *Times* of 26th April, 1855, referring to the officers and men at this date says :— "It is impossible to deny to the Russian Engineers great credit for the coolness with which they set about repairing damages under fire ; but words cannot do more than justice to the exertions of our own men and to the Engineer officers and Sappers engaged in this most perilous duty. When an embrasure is struck and injured it is the business of the Sappers to get into the vacant space and repair the damage, removing the gabions, etc., under fire, and without the least cover from shot, shell or riflemen. Our Engineer officers have frequently set the example to their men in exposing themselves when not called upon to do so ; and I believe that, as yet, there has not been a single instance in which a gun has been silent owing to damage done to an embrasure. The officers and men charged with this dangerous work have not waited for the cover of night to effect repairs but have carried them on in the face of the enemy."

The rifle pits on the left advance sap of the right attack had fatally annoyed the besiegers in their foremost works, and it was determined either to destroy or seize them. 600 men of the 77th Regiment were told off for the assault and at 9.30 p.m. on the 19th April they attacked and captured the pits. The Sappers with a working party, under the command of Capt. H. C. C. Owen and Lieut. Baynes, of the Engineers, at once started to consolidate the position. The Russian gabions were quickly faced about, sand bags thrown down, and in a short time the enemy's pits were incorporated with a communication which led to the boyau in the rear. The lodgment was achieved in about two hours under a roar of missiles from rifles and guns. Two attempts were made by the enemy to recover possession of the pits. The first was very nearly successful. The covering party were driven in, Capt. Owen was dangerously wounded and Lieut. Baynes was killed. Colour-Sergt. McDonald, of the Sappers,

then took charge of the discomfited British troops. Seeing the Russians still advancing over the works he ordered the working party to kneel, fire a volley and charge. These orders were implicitly obeyed, and McDonald with drawn sword backed by the other Sappers with bayonets drove the enemy back and retook the pits. A portion of the covering party was now distributed in front of the works under the direct command of Lieut.-Colonel Tylden. The second attempt to recover the pits was made by the Russians about three hours after they had first been captured by the British but this time, although the covering party were driven in, the lodgment had been so well completed that the troops holding it made sure work of the defence and the Russians hastily retreated.

The following order was subsequently promulgated to the troops:—

“ BRIGADE ORDERS BEFORE SEBASTOPOL,

“ *April 23rd, 1855.*

“ It was with much satisfaction that the Major-General Commanding received Lieut.-Colonel Tylden's report of the able manner in which, on the night of the 19th instant, a lodgment was effected in the enemy's rifle pits immediately in front of the left advance 'right attack' under Capt. Owen and Lieut. Baynes, R.E., whose zeal and gallantry were most conspicuous, while the conduct of Colour-Sergt. McDonald, Royal Sappers & Miners, on the same occasion, when, in consequence of the above-named officers being severely wounded, he was left in charge of the working party, was not only highly creditable to that non-commissioned officer, but so distinguished as to attract the notice of the Field Officer Commanding in the trench, and the Major-General is glad to find that the Sappers engaged exerted themselves with their accustomed energy.”

So effective an adjunct of the siege did the rifle screen become that pits were made in the left attack. The chain of pits consisted of 40 holes distributed over the ground with light troops in commanding positions. These were commenced by Lieut. C. G. Gordon, of the Engineers. In time the pits became an enlarged item in the system of attack, and formed occasionally the starting points from which new zigzags or parallels were struck out. Old pits, moreover, which had been abandoned by the Russians—as the besiegers' works compressed their circumvallation—were taken advantage of and turned against them.

Major-General Jones reviewed the Corps in the Crimea on the 25th May. Seven companies were on parade, one company being at that time with the Kertch Expedition. Owing to casualties, sickness, etc., the parade hardly exceeded 400 bayonets, but the General, in reporting on the parade, to Sir John Burgoyne, wrote:—

“ It affords me great pleasure to be enabled to state that the appearance of the men was most satisfactory and more so than

might have been expected after the severe trials they had to undergo during the severity of the winter and their constant and very laborious duties in the trenches since October last, and which they have performed with a zeal and readiness which reflects the highest credit upon them."

A French officer of high rank who had served before Sebastopol wrote to a brother officer on the soldierly qualities of the British Army and a translation appeared in the *Daily News* on the same day that the Major-General's inspection was held. "I will begin," says the writer, "with the English Engineers, a Corps which, from what I have seen of its working, can never have been excelled and seldom equalled in any army in the world. The education of the officers, the training and intelligence of the men, the activity of the whole Corps, and the manner in which they carry on their works, are fully equal to the same qualifications in our own regiments of Engineers. Of the courage of these troops I need not speak—they are like the rest of the English brave almost to a fault. If ever there was a corps of which a nation should be proud it is that of the English Engineers, or Sappers & Miners, as the men are called, whilst the regiment itself and the officers are called the Royal Engineers."

June, the ninth month of the siege, arrived but the end of the struggle was not yet in sight. As the works were spreading it was clear that a reinforcement of Sappers was essential, and on 4th the 9th Company landed at Balaclava under Capt. Dawson 118 strong. This reinforcement was added to the "right attack."

It was arranged at headquarters to make another assault preceded by an uninterrupted cannonade of some hours' duration. Accordingly at 3 p.m. on the 6th June the third bombardment started. Eventually the infantry rushed forward and after extremely heavy fighting against overwhelming odds succeeded in capturing the Quarries and the appended work, while the French had been equally successful against the White Works and the Mamelon. The Engineers, Sappers & Miners, again distinguished themselves in this attack, and it was owing entirely to their extraordinary efforts that the besiegers were able to repulse the repeated and determined counter-attacks which the enemy launched against the captured works.

Lord Raglan in writing of this action under date of 9th June, said: "Notwithstanding the frequency of the endeavours of the Russians to regain possession of the Quarries, and the interruptions to the work to which these attacks gave rise, Lieut.-Colonel Tylden was enabled to effect the lodgment and to establish the communication with the advanced parallel; and this redounds greatly to his credit and that of the officers and men employed as the working party; and I cannot omit this opportunity to express my approbation of the conduct of the Sappers throughout the operations."

At 1 o'clock on the morning of the 17th June the fourth bombardment began when it was decided to assault the Redan and the Malakoff. To the French was assigned the attack on the Malakoff; to the British that on the Redan. Four columns of the latter were formed up, the first to enter the left face between the flanking batteries; the second the salient angle of the work; the third the re-entering angle formed by the face and flank, and the fourth, moving towards the Woronzoff Ravine to enter the right flank of the Redan.

The right column to scale the re-entering angle was formed up in the trench leading out of the right of the Quarries in the following order:—

100 Riflemen as skirmishers.	}	Under Lieut. Fisher, R.E., with Sergt. John Landry, of the Royal Sappers & Miners.
8 Sappers & Miners.		
4 carpenters with cutting tools, powder bags, etc.		
50 Riflemen, each with a wool bag.	}	Under Lieut. Graves, R.E.
60 " carrying ladders.		
60 seamen " "		
400 storming party.	}	Under Capt. Jesse, R.E.
800 supports.		
2 detachments of Sappers for the lodgment.	}	Under Lieut. Somerville, R.E.
400 working party with 200 picks, and 200 shovels and gabions.		

The other columns were marshalled in similar sequence, and the officers allotted to the left column to attack the right flank of the Redan were as follows:—

Lieut. Murray, R.E., to lead skirmishers and Sappers with Sergt. John Coppin.

Lieut. Graham, R.E., to lead the parties with wool bags and ladders.

Major Bent, R.E., to lead the storming party and supports.

Lieut. C. G. Gordon, R.E., to control the working party with two detachments of Sappers.

At 3 a.m. the right column debouched from the Quarries and advanced steadily on the Redan. Simultaneously the left column advanced under the command of Sir John Campbell. Both columns were met with an appalling cross fire, and in spite of the most heroic efforts of both leaders and men the attack withered away and the few survivors retired to the trenches. Again the attack was organized in the same order as before. Steadily and firmly they advanced, but were met with a crashing and annihilating fire. A few more rushes were attempted, succeeded by a halt that

showed the enterprise was impossible ; and swept back by a continuous roll of musketry and shells which no troops could have withstood, the attacks were driven back into the trenches.

Under Lieut. Neville 30 Sappers with destroying implements and powder bags were detailed to act with Brig.-General Barnard's Division which was to move forward and capture the Barrack Battery as soon as the Redan and Malakoff had been taken. A short reconnaissance showed Lieut. Neville that the attackers were not succeeding and he sent Corpl. Jenkins with a message to General Barnard, which was duly delivered. Standing near was Colonel Waddy, of the 50th Regiment, who had been appointed to lead the stormers of General Barnard's column, and he expressed a keen desire to go to the front, and see how things were for himself, if anyone would show him the way. "Follow the Sapper," said Jenkins, using the catch phrase of the trenches, and Colonel Waddy duly following was conducted to the Quarries where he was able to see the utter impossibility of carrying out his part of the business.

Of 2nd Corpl. Wm. Baker, 3rd Co., the following story has been told :—He was on duty in the third parallel and left it without orders, attaching himself to the 38th Regiment. Oblivious of the fact that he was not in charge of a working party in the saps, he cheered on the men with the inspiring cry "Now, my boys, follow the Sapper." In the excitement of the moment he caught up the expression because it had become a settled byword of the trenches. Baker was killed.

The casualties amongst the English troops this day were very great. Both officers who led the columns on the Redan were killed. Nearly all the Engineer officers were hit and Major-General Jones was wounded in the head. The French in their attack on the Malakoff lost 2 generals, 37 officers and 1,544 men killed, wounded, and missing, while the Russians lost 5,776 of all ranks killed and wounded.

Lord Raglan, weakened by disease and ill-able to bear the defeat, survived it only a few days, and the command of the British troops then devolved upon General Simpson, the chief officer of Lord Raglan's Staff.

Following this abortive attack the siege was prosecuted with even greater vigour. New and more advanced trenches were opened up, and bombardments of varying intensity carried out by the Allies. The Russians made several sorties, all of which were unavailing.

Privation, hardship, and danger continued to be the lot of all ranks until orders were again given to assault the Redan and Malakoff. The former was assigned to the British and the latter to the French. The assault was ordered to take place at mid-day on 9th September.

For the assault a column from the 2nd and Light Divisions was formed as follows :—

		Men.	
Covering party	..	200	To keep down enemy's fire.
Armed party	.. ..	320	To carry and place ladders, under Lieut. Ranken, R.E.
Main body	.. ..	1,000	
Armed working party	..	200	With entrenching tools, under Capt. Sedley, R.E.
Supports	.. ..	1,500	
Gunners	.. ..	20	With spikes to spike guns.
Additional supports	..	3,000	Drawn up in 3rd parallel com- municating with French right attack.

The storming party was directed by Brig.-General Windham. Sir Harry Jones, the Chief Engineer, though suffering from an attack of sciatica, and barely recovered from his wound, was borne to the sap on a litter to witness the assault. The assault was partly successful. Assailed by a terrific fire the French captured the Malakoff and the Little Redan, were driven out again, but recovered and held on to the Malakoff at a fearful sacrifice. The British also advanced and certain units succeeded in reaching the ditch surrounding the Redan. Ladders were placed and the remnants of the storming party who had been carefully selected for their proved courage endeavoured to obtain a footing in the work. Earth was thrown from the parapets above, and the gabions by extraordinary exertions were loaded with sand and stones dislodged from the revetment and grubbed up from the bed of the ditch. In this way partial cover was obtained, but it was yet too shallow to protect the troops from the overwhelming musketry that enfiladed the ditch. While these engineering details were being stubbornly executed the troops in the Redan, vainly waiting for two hours for an opportunity to dash into the town and rapidly diminishing in numbers, were forced to evacuate the work. With them retired the working party, the ladder men and Sappers, but in crossing the open again, so fierce was the fire on the repulsed stormers that the casualties were enormous. The assault having failed, Capt. Montague who was in command of the Royal Engineer department for the day, employed in the afternoon such Sappers as were available in continuing the right advance sap. So wearied and stricken were the Russians by their exertions and losses that they permitted the approach to proceed unmolested.

During the next few hours fires broke out in several places in Sebastopol, and magazines blew up. As soon as it was night Corpl. John Ross went out to look for a fallen comrade who had last been

seen near the ditch of the Redan. Having found the wounded soldier he was in search of, Ross proceeded to make a closer inspection of the famous outwork and creeping warily up the ramp made during the unsuccessful assault he discovered that the position had been evacuated by the enemy. Returning and reporting his discovery Ross was received with incredulity, but he was able to convince his officers of the truth of his statement, and General Simpson, who had intended to renew the assault at daybreak, gave orders for the occupation of the place. At dawn the troops marched unchecked into the Redan and took possession of the town which the enemy had evacuated. So ended a conflict carried through a period of 337 days made up of a freezing winter and a wasting summer. The fieldworks were of colossal magnitude and masterpieces of field art reared in rocky ground amid hardships and catastrophes, harassed by sorties, surprises and alarms, opposed by tempests of shell and shot, grape canister and Minie's. Out of a force of 935 of all ranks of the Sappers & Miners there were 445 casualties.

The field electric telegraph used for the first time in any campaign came first into operation a few months after the great storm of November, 1854, and was placed under the direction of Lieut. Stopford. From him it passed to Capt. F. Du Cane, and in September, 1855, to Lieut. Fisher. The completed system made up a length of nearly 24 miles and connected up eight stations.

Sebastopol had been attacked in order to cripple Russian sea power in the Black Sea. The fall of the fortress enabled the work of demolition of the harbour and docks to be completed at leisure. This was a work of considerable magnitude and was carried out by Sappers & Miners under their R.E. officers. By the 6th February the last explosion took place and the famous docks of Sebastopol, which were one of the wonders of the Russian Empire, were a thing of the past.

National policy changes with the international political situation. Since the Crimean War of 1854-56, the wars of 1864, 1866 and 1870 raised Prussia to a predominant position in Europe, and the foundation of the German Empire in 1871 completely altered the old European equilibrium. Slowly but surely—as England recognized that German philosophy and German sea power threatened the foundations of European civilization—has the policy of this country changed towards Russia. No longer do we fight to uphold the Turkish Empire and to deny to Russia the entrance to the Mediterranean. But although the policy that led to the Crimean War is an obsolete one, never can Englishmen forget the stubborn gallantry of the men who held their ground on the bleak upland of the Chersonese, and who proved once more—as so often in our "rough Island story"—that although the least military, England is one of the most warlike of the nations of the earth.

FERRO-CONCRETE BRIDGE, HIGH WYCOMBE.

IN the February number of *Ferro-Concrete* an account is given of the testing of a highway bridge built in Mouchel-Hennebique ferro-concrete at High Wycombe.

The bridge consists of a single arch span of 30 ft. between the abutments and measures 36 ft. wide between the parapets. The carriage way is 24 ft. wide, having a 6 ft. foot-walk on each side.

The total test load was 35 tons (a steam roller, 10 tons; a traction engine, 15 tons; and a laden lorry, 10 tons).

For the purpose of registering deflection of the arch under load three sensitive deflectometers of the Mouchel type were placed on trestles in the stream beneath the bridge, instrument No. 1 being at the centre, instrument No. 2 midway between the centre and the springing on the south side, and instrument No. 3 midway between the centre and the springing on the north side. Particulars and results of the tests are as follows:—

No. 1, *Steam Roller (10 tons), on Centre of Bridge.*—No deflections.

No. 2, *Traction Engine (15 tons) on Centre of Bridge.*—Deflection of three-tenths of a millimetre, or $\frac{1}{85}$ inch, at the centre of the span, but no deflection at the sides.

No. 3, *Traction Engine (15 tons) with Lorry (10 tons) behind.*—Deflection of two-tenths of a millimetre, or $\frac{1}{128}$ inch, at the centre of the span, and a deflection of one-tenth of a millimetre, or $\frac{1}{256}$ inch at the sides.

No. 4, *Traction Engine (15 tons) with Lorry (10 tons) on centre with Steam Roller at side on centre line.*—Deflections of one-tenth of a millimetre, or $\frac{1}{256}$ inch, at the south side; one-tenth of a millimetre, or $\frac{1}{256}$ inch, at the north side; and three-tenths of a millimetre, or $\frac{1}{85}$ inch, at the centre of the span.

No. 5, *Traction Engine, Lorry and Steam Roller side by side across the centre of the Bridge. Total load—35 tons.*—Deflections of three-tenths of a millimetre, or $\frac{1}{85}$ inch, at the south side; three-tenths of a millimetre, or $\frac{1}{85}$ inch, at the north side; seven-tenths of a millimetre, or $\frac{1}{36}$ inch, at the centre of the span.

The results testify to the highly conservative nature of the design, for the maximum deflection of $\frac{1}{36}$ inch under the full test load is only a shade more than $\frac{1}{13000}$ of the span of the arch. This implies a very high factor of safety and a reserve strength far greater than that specified by the Local Government Board.

The excess of elastic strength possessed by the bridge over that stipulated should not be regarded either as an accidental occurrence or as an evidence of wasteful design. On the contrary, it is the result of a theory entertained by the Local Government Board to the effect

that a monolithic ferro-concrete bridge structure must be considered as if it consisted of an indefinite number of longitudinal strips, each capable of acting quite independently of all other longitudinal strips making up the width of the structure. It is well known to engineers who have studied the subject of applied mechanics that a condition such as this cannot exist in an arched or other framed structure of iron or timber, and it is still more impossible in the case of monolithic ferro-concrete construction, where the absolute continuity of the material in every direction results in a condition of perfect interdependence and enables parts of the structure not under the direct influence of the loading applied to contribute effectively to the resistance of those parts which are loaded or are subject to strain of any kind. An interesting proof of the above is afforded by a comparison of Tests No. 1 and No. 5. Thus, in Test No. 1, when the 10-ton steam roller was placed at the centre of the span the deflection was so small that it could not be measured on the highly sensitive instrument employed. But in Test No. 5, when the 10-ton steam roller, the 10-ton lorry, and the 15-ton traction engine were placed side by side in parallel across the centre of the span, the maximum deflection on the centre line reached seven-tenths of a millimetre.

In the first case, the 24 ft. wide roadway had one load of 10 tons on the middle third, and if that part of the arch carrying the roadway had been capable of acting, in accordance with the Local Government Board theory, as if it were made up of three independent longitudinal strips, each 8 ft. wide, it is obvious that the load would have caused a very perceptible deflection. The reason why no deflection could be detected was that the strain caused by the 10-ton load was distributed right and left to a far greater distance than that fixed by the arbitrary limit imposed on the designers, the result being that the assistance afforded by the outer portions of the arch to the portion immediately under the load was so important that the load made practically no impression on the bridge.

On the other hand, when the three vehicles were placed side by side at the centre of the bridge, the two outer thirds of the arch were engaged in withstanding the stresses due to the two outer loads, and it must be borne in mind that each of the two outer thirds had the assistance of a strip of the arch beneath the footpath and curb, and also beneath part of the roadway outside the outer wheels of the load. The only part of the structure then available for withstanding the stresses due to the 10-ton load over the middle third was the strip immediately beneath the load. Consequently the deflection was more perceptible than in the case of Test No. 1, and for the reasons stated above, it was greater under the middle load than under the two outer loads. Thus the comparison of the tests mentioned absolutely contradicts the theory to which allusion has been made, and throws useful light upon the question of the stresses in ferro-concrete.

REVIEW.

PAGES D'HISTOIRE, 1914—1916.

(Librairie Militaire Berger-Levrault, Paris : 5, Rue des Beaux-Arts).

The first review of the *Pages d'Histoire* series appeared in the *R.E. Journal* for February, 1915 ; in that and in subsequent numbers of the *Journal* have been published reviews and notices relating to the first hundred numbers of the series, the last of them in the *Journal* for March, 1917.

The 101st number of the series is entitled *Le Nerf de la Guerre* ; in it Monsieur G. Cerfberr de Médelsheim deals with the important question of the financial measures adopted by the French Government to obtain funds for the successful prosecution of the War. In an introductory section, Monsieur de Médelsheim briefly reviews the financial situation in France in pre-war days, the resources of the French Treasury and matters connected with the floating of loans. He states that he is not concerned here with the political, diplomatic, naval and military mistakes made by his government ; they were numerous, and many of them brought terrible consequences in their train. Turning to the subject dealt with in this volume, he remarks that if the history of the financial measures adopted in France, after the declaration of War by Germany and Austria, be passed in review it will be found that the French Government adopted an unfortunate vacillating attitude and further aggravated an already difficult situation by the several false moves which it made. He further tells us that for the past ten years the financial and fiscal policy of France has been governed by the popular cry : No loans, no new taxes. The wisdom of the policy indicated by the cry in question is not challenged, particularly in view of the abuses which crept in in connection with the borrowings of the French Government by way of loan on various occasions since 1871. Between the year last mentioned and 1894, the Government had raised loans amounting to over 452½ millions sterling ; in respect of more than one-half of the above amount, representing the War indemnity paid to Germany and sums spent on the reorganization of the Military and Civil Services, the interest payable was 5 per cent. per annum.

These loans were of little or no profit to the country, since the money was spent either outside France or in respect of services which were unproductive.

In view of the policy forced on the Government, that no loans should be raised and no new taxes levied, the French Government has had recourse to the expedients similar to those often resorted to by those in embarrassed financial circumstances, namely, the issue of Treasury scrip.

for short terms, borrowings from banking houses against future revenue, raising of money by mortgage on Government securities, etc. In ordinary times no difficulty was experienced in carrying through operations of the kind referred to; nevertheless, many inconveniences attached to these methods of finance, one of the most serious being the possibility of the lenders, in large bodies, suddenly demanding the immediate return of the amounts advanced by them at the expiration of one or other of the short periods for which their money was lent.

Just before the declaration of the present War the needs of the French Government were increasing and it was recognized that the raising of a loan could no longer be avoided; and at the end of June, 1914, the Government decided to invite subscriptions for a loan of 32 millions sterling at $3\frac{1}{2}$ per cent. per annum, repayable in 25 years. Applications for allotment closed on the 7th July, 1914, and by that date, the loan had been subscribed forty times over. But it was the banks, and not the public, that largely held this loan, and, in consequence, on the outbreak of war a somewhat embarrassing situation arose which was only removed by the resort to costly expedients. The fixed National Debt of France at the outbreak of war was 1,600 millions sterling, and in addition there was a floating debt of 64 millions sterling.

The War produced other complications; many people desired at once to realize their capital, difficulties were created owing to the international character of modern finance, the Government had on hand a large stock of paper in connection with the unplaced portion of the loan and, in the meantime, the Treasury was calling for the cash which this represented, etc. To meet the situation the French Government had to declare a Moratorium and this eased the situation to some extent.

In the second section of this volume Monsieur de Médelsheim deals with the facilities which the French Government possesses for obtaining funds immediately on the outbreak of a war. He tells us that it is on the Banque de France that the French Government relies for financial assistance in emergencies. This bank was established by Napoleon I. on an excellent monopolistic basis; in peace time it is a private institution, but on the outbreak of war it becomes a cogwheel in the governmental machinery.

A great deal of interesting information is given by Monsieur de Médelsheim concerning this bank, the nature of its Charter, the agreements entered into between it and the Government in relation to loans to the latter, and its solvency at the present time.

One of the earliest methods adopted by the French Government to obtain financial support for the present War from the French masses was by the issue of the so-called *Bons de la Défense Nationale*. The *Bons* bear interest at 5 per cent. per annum payable in advance; the actual interest therefore is 55.26 per cent. per annum. The *Bons* are repayable at 3, 6 or 12 months; the subject is fully discussed in the third section of this volume. The banking institutions of France have played a most important part in connection with the placing of these *Bons*; six of the most important of these institutions took up, either for themselves or on behalf of their clients, no less than 3,195½ million francs worth of this issue during the first 15 months from the date of the crea-

tion of the *Bons de la Défense Nationale*, i.e. up to the 31st December, 1915. In a report dated 29th January, 1915, by Monsieur Aimond, it is stated that in the $3\frac{1}{2}$ months from 15th September to 31st December, 1914, the public took up about 1,687 $\frac{1}{4}$ million francs worth of these *Bons*; the denomination most greatly in demand being those having a face value of 1,000 francs, more than 723 million francs worth of certificates of this denomination being included in the figure last quoted. The measure of the support given to the *Bons* by the public may be further gauged from the record for the year ending 31st December, 1915; the total amount thus raised during the 12 months in question being no less a sum than 16,389,273,300 francs (i.e. over 655 $\frac{1}{2}$ millions sterling, at the normal rate of exchange).

In the fourth section of this volume Monsieur de Médelsheim points out that in creating the *Bons de la Défense Nationale*, the French Government chose a means for raising funds which was, to say the least, precarious.

As long as the military situation remained satisfactory perhaps no very great inconvenience was likely to be experienced by the Government in connection with this issue, but let the confidence of the public be shaken by a series of untoward events, then there would be no saying as to the nature of the difficulties which the Government might have to face. The danger always existed that the public might refuse to renew their short term advances, and, if they did so, the possibility of successfully raising the immense sums required for the prosecution of the War by means of a long term loan would, under such circumstances, probably become exceedingly small.

The duration of the War being an uncertain period, there was an advantage in raising funds by short period loans, bearing a relatively high rate of interest, loans which could be converted advantageously by issues bearing smaller rates of interest once peace reigned again and the markets were favourable for such a conversion. This was the policy which found favour with the French Government and, on the 10th February, 1915, it authorized the raising of a short term loan, known as *Obligations de la Défense Nationale*. These *Obligations* carried interest at 5 per cent. per annum and were repayable at par on the 16th February, 1925; the Government might, however, repay these *Obligations* at par at any date subsequent to the 16th February, 1920, with interest for the full original period of the loan. The price of issue was 96 fr. 50 c. per cent. These terms made the *Obligations* more attractive than the *Bons* for on the basis of the earlier repayment the actual interest worked out at between 5 $\frac{1}{2}$ and 6 per cent. per annum. During the year 1915, the public took up 3,500 millions worth of these *Obligations*. The issue of these *Obligations* has not superseded the issue of *Bons*; the French Government is accepting subscriptions in respect of both these issues concurrently.

Monsieur de Médelsheim deals in considerable detail with the work of issuing these *Obligations*. One of the features of the situation was the great amount of female labour which was employed in connection with this work; the experiment appears to have proved eminently successful. In this section of the volume Monsieur de Médelsheim deals

also with the financial relations of France with foreign countries, problems connected with monetary exchange values, and those connected with the drainage on gold reserves.

The fifth and last section of the volume deals with the third scheme by means of which the French Government raised additional funds for the conduct of the War, namely the 5 per cent. National Defence Loan authorized by an Act of Parliament of the 11th November, 1915. The expenses of the War had gone on increasing and the French Government found itself under a necessity of providing the sum of 120 millions sterling per mensem. Although the *Bons* and *Obligations de la Défense Nationale* had enabled the Government to raise exceedingly large sums of money, nevertheless it felt that, in the sixteenth month of the War, the time had arrived for the consolidation and conversion of a part of the *Bons* and *Obligations*, and also for asking the public to make yet another effort to provide further funds for a vigorous prosecution of the War. The new loan, although nominally only carrying interest at 5 per cent. per annum, was issued on such terms that the interest payable actually represents $5\frac{1}{2}$ per cent. per annum on the money invested in it. Full particulars of this loan and many details concerning the arrangements made for its issue are contained in the number under review. This loan like its predecessors was well received by the public. In a report made to the Chamber of Deputies on the 14th March, 1916, it was stated that the 1915 5 per cent. loan had up to the 29th February, 1916, brought in 11,460,430,000 francs (i.e. nearly 458 $\frac{1}{2}$ millions sterling, at normal rates of exchange); 1,200 million francs of this sum having been subscribed in America. Not only was this loan subscribed to in Great Britain and her Colonies, but it was also taken up in many neutral countries, notably in Switzerland, Holland, Spain, Norway, Portugal, and Denmark so far as Europe is concerned.

In conclusion, Monsieur de Médelsheim points out that France is in a better financial position than Germany at the present time; being richer than her adversary, she is to this extent the stronger of the two.

The 102nd number contains the *Reply of the Belgian Government to the German White Book of the 10th May, 1915*. The editors in an introductory note point out that the official publication containing the Belgian Government's reply to the German accusations against the civil population of Belgium concerning the alleged violation of the Law of Nations is dated 25th February, 1916, and was issued to the public in April, 1916. The original document is too bulky (consisting of 528 quarto pages), they say, to appeal to the masses either in belligerent, or in neutral, countries. It has been thought, however, that an analysis giving the main line of argument and an outline of the principal documents contained in the official publication could not fail to be well received; in consequence, the Belgian Minister for Foreign Affairs having sanctioned the adoption of the course referred to, Monsieur Fernand Passelecq has undertaken a critical examination of the official text which appears in the number of the *Pages d'Histoire* series now under review. The editors further call attention to the fact that a part of this analysis has already appeared in the *Revue de Deux Mondes* for 15th April, 1916. Monsieur

Passelecq points out that, having outrageously violated the neutrality of Belgium and having ruthlessly ravaged this little country, Germany now seeks, with deep hatred, to disparage the Belgian people. In May, 1915, the German Government published a series of accusations against the Belgians in a work entitled *Die Völkerrechtswidrige Führung des Belgischen Volkskriegs* (guerilla warfare conducted by the Belgian people in violation of the Law of Nations).

The appearance of this monumental official work consisting of 328 quarto pages naturally excited the popular imagination. It is one of those "scientific" productions for which German officialdom is renowned. In addition to an introductory memorandum prepared by the German Foreign Office and dated 10th May, 1915, it contains four reports purporting to deal with incidents at Aerschot, Andenne, Dinant, and Louvain. These reports were prepared by a Military Commission assembled at Berlin; they contain three main accusations:—

1. The civil population of Belgium offered armed resistance to German troops in an authorized manner and were guilty of horrible cruelties to the German wounded.

2. The Belgian Government not only took no steps to prevent this "Guerilla Warfare" contrary to the Law of Nations, but really secretly instigated it and supported it.

3. The Belgian Commission of Inquiry has disseminated calumnious reports against the German Army.

The Belgian Government was bound to take up the challenge thus thrown down, and in spite of the difficulties experienced, owing to the fact that the greater part of Belgium was in enemy hands, it has nevertheless collected a large volume of evidence which completely disproves the German accusation.

The Belgian reply to the German White Book is divided into three parts:—

The first part, which consists of a general statement, analogous to the introductory memorandum to the German White Book, is devoted to a logical and synthetic examination of the accusations directed by Germany against the Belgian Government (Chap. I.), against the Belgian people (Chap. II.) and against the Belgian Commission of Inquiry (Chap. III.)

The second part contains a detailed and critical examination of the four reports of the German Military Commission and the appendices attached thereto.

The third part is in the form of an appendix and contains copies of documentary evidence in support of the Belgian reply.

Monsieur Passelecq points out that the apologists for the conduct of the German troops have more than once shifted their ground. They commenced by systematically denying that any atrocities were committed, alleging that the accusations were attributable to the "collective hysteria" of the masses in Belgium; then, when a general denial was no longer tenable, they tried to explain away and excuse the acts committed by attributing them, in part, to excesses on part of individual soldiers or excusable mistakes on the part of combatants, but above all to acts of perfidious hostility on the part of the Belgian civil population.

The German White Book has adopted the last of these hypotheses and attempts deliberately to justify the atrocities by applying the term "necessary reprisals" to the acts of the German soldiers, and by endeavouring to saddle the Government and people of Belgium with all responsibility, alleging resistance was offered to the German Army in a manner not authorized by the Law of Nations.

The German White Book therefore endeavours to take its stand on the Hague Conventions. This is no doubt astute as a tactical manoeuvre. By passing directly to the question of the law governing the situation, the Germans have attempted to evade the issue regarding the facts of the situation. Germany, however, has to reconcile her present attitude on this matter with the doctrines laid down by the German Great General Staff in the famous *Kriegsbrauch im Landkriege*, issued in 1902, three years after the First Conference at the Hague, doctrines which are in serious conflict with the principles advocated and accepted at the Hague.

The Belgian reply contains a most energetic protest against the imputations made by Germany, imputations which are as false as they are odious.

The Belgian reply next goes into the question of the numbers of Belgians, men, women and children put to death by the German soldiery, the numbers deported, the burning and pillaging of private dwellings, etc. The value of the German evidence dealing with the alleged offences of these wretched people is analyzed and it is pointed out that out of 209 documents, attached to the German reports, bearing a determined or determinable date 60 only appear to have been prepared in or about the time at which the events they purport to record actually occurred.

It is only after the indignation of the whole world was roused against Germany that the majority of these documents came into existence. It is not difficult under the circumstances for any impartial person to assess the contents of these documents at their real value.

The German reports enlarge on the "numerous acts of aggression," the "traitorous attacks," etc., which are alleged to have imperilled the safety of the German troops, but, says Monsieur Passelecq, they do not deign to furnish figures with regard to the numbers killed or wounded in the alleged guerilla warfare.

Attention is drawn to the fact that Professor A. A. H. Struyken, of the University of Leyden, a recognized authority on International Law, has published a critical examination of the German case in the numbers of *Van Onzen Tijd* for July and August, 1915, and has definitely stated that, in his opinion, the German White Book provides no conclusive proof of the offences alleged and is devoid of value as evidence.

The rigorous method of examination of the German allegations followed in the Belgian reply, by meeting German documentary evidence with Belgian documentary evidence, completely exposes the hollowness of the German case.

This number concludes with five appendices; the first two contain statistical information relating to civilians killed, houses destroyed; a third disposes of the German statement that French troops violated Belgian territory on the 31st July, 1914; the fourth deals with the un-

successful attempts made to induce the German authorities to permit evidence to be collected to refute the statements relating to guerilla warfare in the German reports; the fifth is the reply of Professor J. Massart, an eminent botanist, to the appeal of the 93 German Intellectuals to the civilized world.

The 103rd number is entitled *La Bataille Marocaine* and contains a very interesting account by Monsieur Ernest Vaffier of the difficulties France met with in establishing her Protectorate in Morocco. The subject is treated in three short chapters, the first of which gives a short history of the events that led up to the situation resulting in the establishment of the French Protectorate, the second chapter deals with events subsequent to the establishment of the Protectorate, whilst the third chapter deals with Morocco and the present War.

Monsieur Vaffier informs us in his opening sentence that all that Morocco has done for France during the present War has been due to General Lyautey. In order to appraise General Lyautey's work in Morocco at its true value, the history of that country from the time that Mouley el Hassan was its Sultan, is briefly sketched.

Morocco was coveted by more than one powerful State in Europe; France and Great Britain were, however, the two principal rivals interested in this territory. They fortunately composed their differences and, in 1904, signed an agreement on the subject. Busybodies at once clumsily and prematurely began to discuss the question of a French Protectorate in Morocco. The immediate consequence was that Germany at once commenced to intrigue in this territory and soon made the Moroccans accomplices in the Franco-German quarrels to which the German intrigues gave rise.

Internal troubles arose in Morocco somewhat later, and the French Government lent its support to Mouley Abd el Aziz, who was soon defeated by his brother, Mouley Hafid; the latter was eventually recognized as Sultan of Morocco by the European Powers. Three prominent events stand out in connection with the ephemeral and unsatisfactory reign of this Shereef who was, it is said, thrown into Germany's arms by French diplomacy:—

(a). The case of the deserters at Casablanca, which brought France and Germany within an ace of war; a war only averted by the efforts and patriotism of Monsieur Clemenceau.

(b). The Agadir affair, which resulted in the signing of the Franco-German and Franco-Spanish Treaties and in the recognition of the French Protectorate in Morocco, but under conditions not to the liking of France.

(c). The massacres at Fez. It was in connection with the massacres of Frenchmen on this occasion that General Lyautey was sent to Morocco.

The Treaty establishing the French Protectorate was signed at Fez on the 30th March, 1912. Mouley Hafid had been giving trouble for some time, so that the French Government had to get rid of him. Mouley Hafid signed his abdication on the 12th August, 1912, and on the day following his brother Mouley Youssef was proclaimed Sultan in his stead; he has proved himself an excellent ruler.

As to General Lyautey's work, Monsieur Vaffier says that his diffi-

culties were exceedingly great, but owing to his farsightedness and power of organization he soon mastered the situation. In less than six months from his arrival at Casablanca, the rebels had been defeated and pushed back into their own country; the mountain tribes which had been giving trouble had also withdrawn into their own territory, whilst the tribes living in the plains had made their submission. The Shereefian authority, which had been a byword in Mouley Hafid's time, was restored, and the Maghzen was once more able to do real acts of government by administering the tribes, maintaining order, and collecting taxes.

Since the outbreak of the War the local French authorities by the energetic measures adopted have succeeded in keeping the tribes quiet, in spite of the German propaganda work which was on foot in the autumn of 1914.

The part played in the War by Moroccan troops is briefly touched upon in the volume under review; it is too well known to require any detailed reference; whenever they have come into action they have acquitted themselves nobly.

The 104th number contains the official communiqués from the Central Government to the Provincial Civil Authorities—it is the XIX. Volume which deals with this subject. These communiqués cover the period March—April, 1916. The volume is provided with appendices relating to the principal events occurring during the months in question.

The 105th number is entitled *L'Effort de la France*. In a preface to this volume by Monsieur Alfred Croiset, Doyen of the Faculty of Letters in the University of Paris, it is stated that when Germany, in August, 1914, unchained the dogs of war, she felt absolutely certain that before the expiration of the year she would have her rivals in the world lying as dead game at her feet. Everything had been carefully organized, in her appreciation of the situation. No contingency had been overlooked! Beyond a doubt, Great Britain, the Egotistical, would remain neutral, and Italy friendly disposed. Belgium, terrified out of her wits, would allow the immense German Army to pass unopposed through her territories, and in one month after the commencement of hostilities France would be crushed. Germany would then be in a position to turn against Russia, who would at once seek to make peace with her powerful Western neighbour. In a short time all resistance, or thought of resistance, would be over and Germany would tower above everybody and everything. Such is the picture that Monsieur Alfred Croiset draws of Pan-German dreams. We now know to what extent these dreams have been realized. Croiset asks: "How was it that Germany's prodigious preparations came to be paralyzed by resisting forces which she had failed to foresee, and to which she still endeavours to be blind, but which Maximilian Harden and many another recognize to be invincible?"

He answers the question himself: "An effort not less prodigious than her own, if more tardy, nevertheless superior in resources, superior above all in moral force, has come into operation; acting as a counterpoise it has by degrees upset the balance which now tells in favour of right and civilization."

In the volume under review, an attempt has been made to give in outline the effort made by France to hold her own. Ill-prepared at first to meet Germany's act of aggression, which took her by surprise, France promptly made ready to parry all blows and to thrust back in return. Her army, her navy, her industries have all responded to the call and have put forth all their energy to resist and to conquer.

"In this marvellous counter-attack," says Croiset, "everything is worthy of study and admiration." The mainspring of the great work accomplished has been the unanimous resolve of the Entente Allies to re-establish once more the rule of right and of justice. The *force morale* it is that has created the *force matérielle*. The human conscience has revolted at the horrors of the Germanic methods of war. Indignation has been the greater against Germany by reason of the fact that credit had been given her for possessing generous and pacific ideas in this XX. Century; whereas since the outbreak of hostilities all rules which govern the relations of civilized peoples have been broken by Germany. In the track of her army of positive science and of sophisms have been witnessed diabolical acts of barbarism and of pitiless savagery committed by her soldiers. The present War has become a crusade, the object of which is to root out the *Kultur* of Pan-Germanism, poisoned as it is with Cæsarism and militarism, and to substitute in its place the cult of justice and of humanity. It is in this direction that the effort of the Entente Allies tends and this end it will attain.

The contents of the volume are arranged in five sections, with the following titles:—*Les Nations Européennes et la Caserne Germanique* (by Victor Bérard), *L'Effort Moral de la France* (by Gabriel Séailles), *L'Effort Militaire de la France* (by Pierre Dauzet), *L'Effort Industriel de la France* (by Lucien Lévy-Bruhl), *Conclusion* (by Victor Basch).

In the first section Monsieur Bérard points that the present War is something more than the most formidable collision of armies of all time; it is also the conflict between political and moral ideas such as history has not known for at least 23 centuries, that is since the days of Marathon and Thermopylæ. As the Serbs and Belgians of to-day have attempted to do, so did the citizens of ancient Greece when they nerved themselves to resist the expansion of a military *régime* the promoters of which believed it to represent the last word in science, in organization, aye, even in *Kultur*.

Bérard gives an interesting account of the struggles of ancient Greece against the Asiatic barbarians of the V. Century and expresses the opinion that the present struggle between the Germanic peoples and the rest of Europe is exactly similar in all respects. He points out that all the European nations, except the Germans, have, since ages long past, continued to be firmly attached to one idea and one religion, that of individual liberty and of common independence; the Germans have never been willing to give their adhesion to these doctrines. Bérard quotes from the speech made by William II. to the citizens of Görlitz on the 28th November, 1902, when he gave expression to his views regarding the principles which should guide the German people in the following terms:—"In the XX. Century, it will be science, above all technology, which will be the ruling consideration and no longer philo-

sophy as in the XIX. Century. We must conform to this ideal ; it is in scientific research, in the capacity for organization and in discipline that the greatness of Germany lies. Liberty of thought, liberty of science, that's the liberty that I desire the German people to enjoy and that I am willing to grant them—but not the liberty which allows individuals to act haphazard according to their own ways of thinking."

The above statement of the Kaiser appears as a heading to the second volume of the biographical sketch entitled *Tagebuch Kaiser Wilhelms II.*

Bérard points out that to science, and more particularly to technology, unquestionably is largely due the daily welfare of individuals and of nations, but liberty of thought alone, of religion and of science, the dumb liberty of the soul or the deaf liberty of the book were not sufficient to satisfy the ideals of philosophers of old time and cannot be expected to do so to-day ; liberty of movement and of action have at all times also been considered essential. He continues : " To the *liberté grecque* and to the *égalité romaine*, Europe, having in the meantime adopted Christianity, became inspired with the desire to add the *devoir de fraternité*."

The day when, as a result of the French Revolution, the device *Liberté, Égalité, Fraternité* was first cut on the public monuments of France and became a recognized motto throughout Europe, on that day there coalesced, so to speak, the triple teachings of Greece, of Rome and of Christ.

Bérard thinks that the Entente Nations exhibit certain differences in their acceptance of the lessons of the triple teachings in question ; Great Britain, more anxious as regards *liberty*, is surprised at the somewhat demagogic passion nourished in France for *equality* ; it is in the relations of the Slavs, Serbs and Russians that the Quadruple Entente affords the most complete example of *fraternity*. He continues : " All the nations of Europe, except the Germans, have the same Greco-Roman conceptions of law and right, having lived under the *obéissance romaines*, either in the ancient provinces of Western Rome, or in the territories or within the folds of the Church of Byzantine Rome. All have inherited from the two Romes the same ideas and the same opinions, the same instincts regarding the State, and 'tis this that has created the solid unity of the European coalition against the German *Kriegsherr* and his vassals. Although Russians, British, French, Belgians, Italians and Serbs do not live under the same system of polity, nevertheless the British, Belgian and Serbian monarchies, the French Republic and the Russian Czarism are of the same species, sprung from the same Greco-Roman stem.

Referring to Aristotle's definition of man as being a *political animal*, i.e. a being who only develops fully in an urban or civilized community, in fact in the *polis*, Bérard remarks that the peoples of a State are still to-day *political people*. It is towards the Greek *polis* that they still turn as it were towards the source of all their civilization and towards one of the models of one of their policies. The definition of Aristotle retains its full force to-day ; the savage and the wild beast live in woods, caves or the desert ; the boor and the undomesticated animal only inhabit the wide fields ; slaves and degenerate animals live in palaces

or the domains of their master ; but *man* lives in his *polis* and the *German* in his *barracks*.

Bérard gives an extract from the Introduction to Prince von Bülow's work on *German Policy* in which the latter admits that his countrymen do not possess a gift for politics. The Prince describes *political instinct* as the gift to grasp generalities, such that a people suddenly faced with a critical situation are able at once to distinguish between the interests of the nation and those of individuals. Continuing, he states, that the German temperament is such that his countrymen direct their energies first and foremost for the attainment of personal ends and, in consequence, with them matters of public interest come after and take second place.

The Germans form leagues or *Verein* in order to satisfy their tastes or their wants, in order to push their preferences or their ideas. But every *Verein*, Von Bülow tells us, is more or less separatist ; every *Verein* is directed instinctively or consciously against the principles of sovereignty and the interests of the public. Even the Unity of Germany proclaimed in the XIX. Century under the baptism of fire at Königgrätz and at Sedan does not amount to a *German Union*, if by a National Union is meant a voluntary grouping of nations into a *Unified State* with full knowledge of the consequences of such an act. The Roman notion of the *res publica* and all this implies does not appeal to the German mind, and, since Europe is to-day almost entirely influenced by the conceptions of Roman law, Germany has become an isolated State in the Old World.

Contrasting the conditions of human society in the Roman State with that in Germany, Bérard points out that in the former there was the plenary power of the State which permitted oppression of the individuals and tyranny directed against their very souls, in the latter, there exists the hierarchic subjection of the men of Germany which permits the enslavement of their bodies and the reduction of their characters to the depths of servility ; in the former there was the national duty of obedience and of devotion to the State, in the latter there exists the feudal duty of military service and of fidelity to a Lord Paramount ; in the former there existed a free community of people possessing equal rights, in the latter there is obligatory enlistment and conscription. That is to say there is between these two conditions of society the difference between European civilization and German *Kultur*.

In conclusion Croiset states that a Latin brain is quite incapable of either inventing or accepting the definitions of the State, of order, of duty and of right such as those which have been invented by the German brain. The Latin believes in equality of rights for all men in all lands, but the German, after 19 centuries of *Kultur*, still cherishes the notion that there exists a *German right* and a *German duty*, and that even those who are not of the Germanic race are under an obligation to yield their own views on these points in favour of those of the German Interpreter-in-Chief to the Almighty.

The article on *L'Effort Moral de la France* opens with the statement that the world is astonished at all that France has done. She has remained mistress of herself in good fortune and in bad ; exercising gene-

rosity intelligently, she has alleviated suffering by distributing its burden; her genius for improvisation has enabled her to fill up the voids in her military preparations; she has raised and formed armies, learnt war whilst conducting it, mobilized her industry, manufactured thousands of guns, and millions upon millions of projectiles. In connection with the above great works, the results of which are patent to all, there exists a subtle influence which, though invisible, is the motive force: the *effort moral de la France*.

Monsieur Gabriel Séailles asks us not to imagine for a moment that France has undergone some sudden transformation; he proceeds to trace the stages through which his country has reached the ideals which are the mainsprings of the machinery enabling the sons of France to accomplish all that is visible to the eye and audible to the ear. A great part of the moral effort which France has put forth, he tells us, is due to the women of his country; they have set a splendid example, they have done all the good works which lie in their province, and what is more difficult still, they have suffered the direst heart pangs with courageous silence and patient resignation.

"Fifteen months of war found France," says Séailles, "as calm, as firm, as resolved as on the first day of the War." She has shown the necessary confidence in herself which provides proof that she will rise to the heights demanded by her destiny.

Pierre Dauzet, in his article on *L'Effort Militaire de la France*, tells us that in spite of the difficulty of the task, nevertheless it is not impossible even now to give in brief an outline of the magnificent strategy by which the military genius of France managed to save the world from the German obsession. And when, on the termination of the present struggle, the full facts are made known the world will be astonished at the revelation of what the effort of France has accomplished. France with a population of 39 million souls only, a population less than that of either Germany, Austria, Russia or Great Britain, has however had serving in the ranks of her military forces during the past two years numbers equal, if not superior, to those of the other nations named.

In order to hold her own against the mighty forces sent by Germany against her, it became necessary that France should neglect no part of that science of organization in which lies the genius of Germany.

Owing to the secrecy with which Germany had prepared for the War, by providing herself with powerful siege guns, numberless machine guns, and by forming reserve Army Corps, etc., France, at the outbreak of war, found that the preparations she had made for the defence of her territories were quite inadequate. She had great arrears to pull up and Dauzet tells us, in his contribution to this volume, something of the nature of her *effort militaire* to make good the neglect of the past.

The plan for the first concentration of the French Armies, which had been decided upon by the French General Staff on the outbreak of war against Germany, was based on the massing of the main French Army in Lorraine and in the Woëvre; but since it was desired to leave nothing to chance other schemes had also been worked out to meet various contingencies. As soon as the violation of Belgium had taken place, General Joffre took up a waiting position on the banks of the Meuse and of the

Moselle, ready to launch his army to meet the Germans on whatever line of advance they might finally select.

Dauzet states that the initial German effort surpassed altogether in magnitude all that Germany was credited with being capable of. The sudden mobilization of 70 Army Corps by Germany represented about treble the number of Army Corps which she had maintained in peace. Between August and November, 1914, France had to meet the shock of 52 German Army Corps sent against her (2,100,000 men, about double the force that it was expected the Germans would employ against France, *vide R.E. Journal* for August, 1914, pp. 72 and 85). A French Army of 1,100,000 men, assisted by the Anglo-Belgian forces numbering only some 180,000 men, was alone immediately available to oppose the advanced portion of this highly-organized and well-equipped German Army, consisting of 34 Army Corps; it is not surprising then that the Western Allies did not bring the enemy to a standstill on the unfortified northern frontier of France. Later, French reserves were rapidly mobilized and quickly brought into action; the effort was supreme and within six weeks of the outbreak of the War victory for the first time crowned the French arms.

Dauzet gives, in this article, the dispositions of the French and German Armies during the early days of the War and traces in outline the progress of events leading up to the Battle of the Marne. The importance of the victory on this river line will not be fully appreciated till the history of our era comes to be written by those of a generation who may live in a period more remote from this great event than the present; nevertheless it is already recognized that in the same way that the Battle of Valmy liberated men, the Battle of the Marne has liberated nations.

The increase of the British Army, the preparations of Russia, the entry of the Italians into the War, the outflanking movement which brought the opposing western armies on to the seaboard between Dunkirk and Ostend are briefly touched upon by Dauzet. In conclusion he states: "If France is paying in blood and with the ruins in her land for not having given heed to the haughty hatred of her hereditary enemy, she is henceforth conscious of the terrible dangers through which she has passed; her magnificent and mute sacrifices have already saved her from the tyrannous German yoke; the world seeks to honour her in admiration of her deeds, and she is now bound by an indissoluble pact to her Allies."

"When peace reigns once more over the wide fields on which battles have raged, may the victory, when won, be sufficiently glorious to ensure for ever the preservation of the rights of nations and to avenge the heroic deaths of all who have fallen, be they ever so humble, on the soil of France."

Monsieur Lévy-Bruhl, in the introductory paragraphs to the article contributed by him, states that the longer the War is prolonged the more intense becomes the effort for the industrial organization which is demanded. Formerly, nations when they went to war required but armies and money to prosecute it to a successful issue. To-day the Entente Allies have armies, and they have the money, nevertheless there is yet something more they want!

The experience of the present War has shown that the bravest army in the world, with commanders of the best type, is doomed to disaster if it does not possess as its counterpart an industrial army capable of furnishing it with all the means indispensable for victory.

The subject is dealt with under the two main heads:—1, Organization, and 2, The Results. It is stated that after the Battle of the Marne the gravity of the situation in relation to the supply of munitions to the French Army was borne in on the authorities with full force. It had become evident that the output of ammunition, etc., would have to be on a scale tenfold as great as that the provision of which had been contemplated. In spite of the difficulties presented, this problem was solved; an outline of how this was done, and also statistical information as to the results obtained, is recorded by Lévy-Bruhl in his contribution. He has enabled us to gain some idea of what *l'effort industriel de la France* means.

In the final article entitled *Conclusion* Monsieur Victor Basch tells us that the great effort made by France has been fully appreciated by neutral Powers and more especially by those whose sympathies lean towards France. He particularly examines the attitude of the people in the United States of America towards Germany and France and explains how the former's experience of the peoples of these two nations strikes them. He calls attention to proofs of sympathy for France furnished by individual Americans during the present crisis; proofs which show that the American people are convinced that *l'effort de la France* will carry her successfully through her present ordeals. Basch in conclusion states that it ought now to be apparent even to the adversaries of the Entente Allies that the *effort français* is neither a transitory nor a flickering output of vital energy, but is a durable and permanent effort which will continue until the enemies of France have been definitely brought to their knees. France knows that this victory will cost a heavy price and will be difficult to win. But the whole nation has decided to fight to a finish; the very existence of France, it is recognized, is at stake.

W. A. J. O'MEARA.

NOTICES OF MAGAZINES.

REVUE MILITAIRE SUISSE.

No. I.—January, 1917.

THE PART PLAYED BY THE FRENCH-SWISS IN THE MILITARY HISTORY OF SWITZERLAND.

The Rôle of the Welches in the National Militia.

The article begun in the number of the *Revue* for December, 1916, is concluded in the number now under review.

"The *Welches* were," says the author of the *Revue* article, "in a general way, an element of progress and a source of emulation in the national army." The organization of the Militia in the days of the old Swiss Confederation was a matter entirely in the hands of the Cantons. In some cases the Cantons altogether neglected their military forces; this was not so in the case of Berne, which at all times kept its troops ready for war. The Vaudois derived advantage from this fact, being thus given an opportunity of displaying their warlike qualities.

A brief account is given of the quarrels of Berne with the Dukes of Savoy, which began about 1562 and ended in 1616. In the former year Berne, Geneva and the Pays du Vaud, alarmed by the attitude of Emmanuel Philibert, Duke of Savoy, put their troops on a war footing; the Duke, in consequence, appealed to the King of Spain for assistance. Although the Duke was compelled by the Treaty of Lausanne (22nd October, 1564) to renounce his pretensions to the Pays du Vaud for ever, yet, in 1590, the Bernese plenipotentiaries, in signing the Treaty of Nyon, were induced to hand back Geneva and the Pays du Vaud to him. This act enraged the Swiss to such an extent that the Council of Berne disavowed the Treaty of Nyon, which was annulled by a vote of the people. The situation again became critical in January, 1611. The then Duke of Savoy, Charles Emmanuel, could not reconcile himself to the loss of the rich lands of the Vaud; he, therefore, put his army in motion on Geneva. Berne at once called out the troops of the *Elite*, occupied the Jura passes and sent a *regiment de secours*, composed largely of Vaudois, to the threatened centre; at the same time, sending word to the Court of France concerning the designs of the Duke on the Pays du Vaud. France ordered Charles Emmanuel to withdraw his troops from the Swiss frontier and at the same time moved her own troops forward; the Duke at once complied with the French demands.

In 1616 a new alarm was raised. A Spanish army assembled in Franche-Comté for the purpose of seizing Savoy, and simultaneously menaced Western Switzerland. The *regiment de secours* referred to above again occupied Geneva and at the same time the Bernese Army was also mobilized. Charles Emmanuel now sought help from Berne and entered into a defensive and offensive alliance whereby this Canton undertook to provide him with three regiments. A large number of

Vaudois enrolled in these regiments and many of them distinguished themselves whilst serving under the Duke.

During the Thirty Years War, which spread over half Europe, Switzerland managed to remain neutral; nevertheless Swiss regiments were serving during this period with every one of the belligerent armies. In 1620, the Spaniards and Austrians devastated the Valtellina (in the Grisons). Troops furnished by the Zurich and Berne Cantons at once crossed the Alps and marched to the assistance of the *Liges Grises*; they were defeated by the Spaniards at Tirano, suffering great losses in officers. At the same time Berne also sent troops (one company being provided by Lausanne) to the assistance of Mulhausen, at that time menaced by the Imperialists.

Although at one time the bonds uniting the Cantons became exceedingly weak, yet when the Armies of Turenne and the Swedes approached the Rhine, the Diet reassembled at Wyl, after Swiss territory had been violated, and decided on the adoption of measures for home defence, known as the *Défensional de Wyl*; this being the first federal military organization adopted by Switzerland (1647).

Soon after the signing of the Peace of Westphalia, external dangers having ceased to trouble, internal quarrels broke out in Switzerland; in consequence, for a century and a-half the French-Swiss soldiers played a part only in Civil Wars and in the service of foreigners. This unhappy period is worthy of study on the part of the Swiss; it shows them that internal disorders have in the past been made the pretext by foreign Powers for interfering in Swiss affairs.

When the peasants of Haute-Argovie, Entlibuch and Emmenthall revolted in 1653, the Vaud provided a contingent of 5,000 men and Neuchatel one of 1,200 men, as reinforcements to the Army of General d'Erlach, who soon broke the back of the rebellion. The first Civil War of Wilmergen broke out soon afterwards. The Protestant force which consisted of 8,000 men from the Vaud were surprised and defeated on the 23rd January, 1656, by the Catholics.

At the beginning of the XVIII. Century, the complicated question relating to the *Succession de Neuchatel* nearly provoked a war with Louis XIV. In connection with this situation the French King broke off commercial relations with the Cantons; his cavalry advanced to Huingue and 27 battalions of infantry concentrated at Besançon. Berne and Zurich at once sent forward 5,000 men, 2,000 of whom came from the Vaud, to the frontier of Franche-Comté. In a short time 30,000 Bernese troops, under General de Tscharner, were ready for active operations. At this juncture the reorganization of the Neuchatel Militia was entrusted to officers of the Pays de Vaud; they raised a division 10,000 strong. This demonstration of force was sufficient to prevent war, Louis XIV. being at the time badly in need of all his own troops. The French King therefore withdrew his troops and resumed commercial relations with Switzerland (1707).

During this period 60,000 Swiss soldiers were serving in foreign armies; they took part in the Spanish War of succession. Höchstett, Ramillies, Oudenarde, and Malplaquet spread the renown of Swiss soldiers throughout Europe; the French-Swiss particularly distinguished themselves on the occasions referred to.

Internal troubles were, however, not yet at an end ; the second Civil War of Wilmergen followed. The Catholics and Protestants of Haute-Argovie again came to blows. The army which was employed in connection with this outbreak at Bremgarten and at Wilmergen (1712) and successfully suppressed this insurrection consisted principally of *Welches* ; the Romand battalions behaved with marked gallantry at the Battle of Wilmergen (25th July, 1712) which brought the rebellion to an end.

The Peace of Aarau which followed did not, however, reconcile the factions and, in consequence, the French Ambassador remained Master, so far as his relations with the Diet were concerned. Berne, at this time, alone maintained an attitude of dignity in the *Corps helvétique*. It allied itself to Holland and looked to Great Britain for assistance to shake off the French influence. It maintained its militia as an organized force, one-third of this force consisting of men drawn from the Vaud.

The total numbers from the Vaud who were serving in Bernese regiments in Switzerland, Holland, France and Piedmont amounted to 25,000 men.

The XVIII. Century was a period of peace. The governments of the oligarchic Cantons went to sleep, deceiving themselves regarding the dangers which threatened. The army was neglected, but the military instincts of the Swiss people remained indestructible.

At the end of the XVIII. Century, troubles began to brew in the Cantons, and gave warning of the events which were to hasten the disruption of the former Confederation. On two occasions the national spirit seemed to revive. The news of the massacre of the Swiss Guard at the Tuileries in August, 1792, roused the people to anger. A force from the Pays de Vaud consisting of 14 battalions of infantry, 4 squadrons of cavalry, and 6 batteries of artillery was sent (under General de Muralt) to the Jura frontier. The firm attitude of the Pays du Vaud and of Geneva caused France to withdraw the force she had sent to Carouge.

Six years later, the Revolution in the Vaud opened the road to Berne and into the small Cantons to the armies of the Directory. Many Romand soldiers served in the ranks of the army which at this time fought in the cause of the old Switzerland, which was then expiring.

The invasion of Switzerland and its occupation by foreign troops during the Napoleonic Wars were years of humiliation for her people, and ruined her by exhausting her financial resources. The national army existed at that time on paper only ; this was more particularly so from the time of the Act of Mediation, owing to the fact that the great Corsican had swept the men serving in the military forces of the Cantons into the ranks of his Swiss regiments, which were always maintained at full strength. During the period of his supremacy Switzerland provided him with 90,000 recruits, the majority of whom perished in Calabria, in Spain and in Russia.

The partial mobilizations carried out in 1803 and 1809 showed the inadequacy of the Swiss Militia for the needs of the Confederation. A few years later, namely, in December, 1813, when an Austrian Army of 160,000 men advanced on to the Swiss northern frontier, there was only a weak cordon of 20,000 men to oppose them. On the 17th December, the Austrians summoned the Swiss garrison of Basle to hand over the

bridges over the Rhine. The Government at Berne, wishing to save the town from destruction by bombardment, ordered the troops at Basle to retire inland. The Swiss soldiers much resented this affront; some men of Vaud in their rage destroyed their muskets and, at the same time, the officer charged with the defence of Eglisau refused to obey the humiliating order. The Austrians were in such strength that they pushed aside the weak forces opposed to them and overran the country. However, they handed over Geneva to the Swiss.

During the Hundred Days the Confederation threw over its attitude of neutrality, and in July, 1815, 40,000 Swiss soldiers invaded Franche-Comté; and a combined corps was sent by the Cantons to the Siege of Huningue. The Romands, particularly the men of Vaud, on this occasion again proved their reliability.

The years of peace which followed the Napoleonic Wars provided Switzerland with an opportunity to reorganize her army. But in 1838 the peace of Switzerland was again menaced. In this year a French army of 37,000 men was concentrated on the Swiss frontier, under General Aymard; and other French troops were being assembled at Lyons. Without awaiting the orders of the Diet, Geneva caused her fortifications to be repaired and called up 7,000 men for service. Vaud instantly sent two brigades to the frontier and soon had 20,000 men under arms. The Valois and Friburg followed the example set them. The Diet was in consequence able to show a firm attitude. All the Cantons now rose in arms, and Swiss residing in foreign lands hastened to the aid of their Motherland. Prince Napoleon, then a captain in the Federal Army, proceeded to England and the dangers that threatened Switzerland passed away, Louis Phillip withdrawing his troops.

The German-Swiss showed their appreciation of the results obtained by their French compatriots. Lucerne, Zurich and Schaffhausen sent congratulatory addresses, swords of honour and commemorative medals to their compatriots, the *Welches*, who had proved themselves to be "the guardians of the National Honour."

Stage by stage, the Federal Army made progress and became the corner stone of the national edifice, the earliest of Swiss institutions, "the refuge of Confederate friendship and republican fraternity."

Once again, in 1847, Civil War compromised the stability of the Confederation. The Sonderbund was an unhappy spectacle, but it proved to be the point of departure of a new Switzerland—the Republic of 1848. In this war 180,000 Swiss were engaged on the two sides.

In conclusion, the author of the *Revue* article points out that the *Suisse romande* can, without any vain boasting, claim to have played its part in the military history of the Confederation, and she has every right to be proud of what her sons have done.

Owing to the participation of the *Welches*, as allies and as subjects, in the wars of the heroic epoch of the Leagues, from St. Jacques to Marignan, they possess military traditions in common with the German-Swiss. The uncouth N.C.O.'s, known as *Trüllmeister*, who trained the contingents in the communes in the XVI. Century have inculcated in succeeding generations of Romand soldiers the principles of the rigid elbow-to-elbow drill and of discipline in the ranks. The old Swiss word *Trüll* has passed into the English and German military vocabulary

under the spelling *Drill*. The *Trüllmeister* of the Swiss Cantons have also been the instructors of German soldiers and of the early French infantry.

The *Welches*, even when serving in Swiss regiments of the French Army, continued to use a German-Swiss dialect, in which dialect all words of command were given. They cherished this privilege so highly that in 1812 when, at a review before Napoleon at the Tuileries of a Swiss Division, a French General attempted to execute a movement by giving the words of command in French, one of the regiments, composed of *Welches*, refused to move, because the words of command were not repeated to them in their customary language—*Schweyzerdütsch*.

WOUNDS IN WAR.

The *Revue* article is illustrated by reproductions from radiograms and from photographs of injuries suffered during the present War. The article is of more particular interest to the medical profession. The author of the *Revue* article states that previous to the outbreak of the present War the practice of surgery, as it affects armies, was based on the experiences of the Russo-Japanese War and the Balkan Campaigns. It was summed up in two formulæ: antiseptic treatment and temporization.

These principles found their application in the field dressings which were issued to every individual soldier sent to the front. As long as the rifle bullet was responsible for the great majority of casualties the above formulæ met the situation—at the Battle of Liao-Yang 97.90 per cent. of the wounded in the 2nd Japanese Division were hit by rifle bullets and only 2.10 per cent. by artillery projectiles. However, since August, 1914, it has been necessary to modify completely the surgical treatment of wounds; due to the fact that a very large proportion of the casualties have been caused by artillery fire. In the present War 80 per cent. of the wounds have been due to artillery projectiles and only 20 per cent. to rifle bullets. The *Revue* article enters into details of a technical kind relating to wounds of various kinds; this subject-matter does not lend itself to condensation into a short space.

It is pointed out in a short summary that the *Revue* article is only an outline of a big subject. Many volumes on the new surgery relating to wounds have already appeared; and the subject continues to be closely studied by army medical officers with ceaseless attention. In great wars of former times the mortality owing to sickness was from three to ten times as great as that caused by rifle and artillery fire; however, in the Russo-Japanese War the reverse was the case so far as the Japanese were concerned. Nowadays, by the aid of hygiene, many virulent diseases can be successfully combated. The proportion of mental cases has been very large in the present War, but this is not to be wondered at when the intensity of the shocks to the nervous system to which soldiers have had to submit is taken into account.

THE DESTRUCTIVE EFFECT OF PROJECTILES.

I. *Introduction*.—It would be rash, says the writer of the *Revue* article, to form any final judgment on the murderous and destructive effects of projectiles before the present War is brought to an end. Two celebrated sieges, those of Port Arthur and of Adrianople, have afforded

data for appreciating, to some extent, the results of fire effect against entrenchments and against their defenders. It is agreed that these results cannot be considered as the last word on the subject. To-day, the belligerents have, so to speak, introduced factory practice into war; they have taken advantage of the technical progress in the mechanical and other arts, as is evidenced by the use made of electric means of communication, motor traction, and aircraft.

Motor traction renders possible the use of heavy artillery, and a continuous supply of ammunition thereto, in positions at a distance far removed from railways, and heavy artillery is, in consequence, as effective in the field as the stationary guns of a fortress mounted in cupolas. The accuracy and rapidity of fire of field guns, the intensity of rifle fire, the wide use made of machine guns have each had a decisive influence in bringing about the present condition of trench warfare.

The *offensive à outrance* advocated not long since by the German Great General Staff, and promulgated as a dogma in the majority of military regulations, has had to give place to a defensive-offensive. Siege warfare is the order of the day, and battle manœuvres possess, at the present time, a transient character. The determining cause of this evolution in modern war arises from the improvements introduced in armaments and in explosives. These improvements have led to a notable increase in the efficacy of fire effect, both against living targets as well as against the materials employed in defence.

II. *Remarks on Ballistics.*—A knowledge of ballistics has long been recognized as affording mental equipment of great importance to professional soldiers. The author of the *Revue* article quotes the following extract from the *Traité pratique des tirs Collectifs* of Capt. Collon, of the Belgian Artillery :—"The general theory of the flight of projectiles and a profound knowledge of the properties of their trajectories, considered in relation to the discharge of projectiles singly as well as collectively, and when fired horizontally as also when fired at various angles of elevation or depression, constitute an indispensable basis on which choice should be made of positions either for the offence or the defence." Other eminent writers have expressed the same opinion in somewhat different language.

It was towards the end of the XVI. Century that Galileo established the first equation, in its simplest form, for the fall of a water-jet. He proved that a body to which motion is given in a horizontal plane, if allowed to fall freely in space, describes a parabola whose axis is vertical. The physical properties of gases being unknown at this period, the retardation produced by the air was not taken into consideration by him. Later Newton suggested the law for the correction in respect of the resistance of the medium in which a body might be moving. He stated that the retardation was directly proportional :—(i.), To the transverse section of the body, (ii.), to the square of its velocity, and (iii.) to the density of the medium in which motion was taking place. Corrections made on the above assumptions were found to be correct for velocities above 240 metres per second and below 420 metres per second, and the law was applied accordingly for many years. Euler and Jean Bernouille, of Basle, next took up the study of the subject and prepared the ground for mathematicians of the order of Borda, Gauss, Cauchy,

and Piobert, who laid the foundations of a new branch of dynamics, that of ballistics.

Approximate equations for the trajectory of moving bodies in vacuo and in air were worked out by the application of the principles of mechanics, and the now well-known fact was ascertained that the ascending and descending portions of the path of projectiles were not symmetrical about a vertical axis in the case of their flight in air or other media.

It is pointed out in the *Revue* article that in the case of the ordinary forms of elongated projectiles their longitudinal axis describes, during flight, a cone in space (about a certain point on this axis), and also experiences an oscillatory motion of very short periodicity, *i.e.*, it is subject to precession and to nutation. This complex motion tends to increase the penetrative power of projectiles and diminishes the expenditure of kinetic energy. In the case of a rifle bullet, owing to its relatively small weight, there is a tendency for it to rock or seesaw about its centre of gravity; an attempt has been made to cure this defect by giving bullets a bi-ogival section instead of a cylindro-ogival section.

The shrapnel bullet, it is said, has a maximum effective range not exceeding 150 metres, measured from the point at which the shell from it was ejected burst. When the shell explodes the bullets cease to be subject, to some extent, to the rotatory motion given to the shell by the rifling of the gun from which it was fired and to the full retardation effect exerted by the air on the shell. It is for this reason that the spherical shape adopted in the first instance for all projectiles has been retained in the case of the shrapnel bullet. The destructive effects of projectiles depend, as is well known, on the initial velocity with which they leave the weapon from which they are fired (or with which they are ejected from an exploded shell), their weight and their shape.

III. *Striking Energy of Bullets and Shell Fragments.*—The invention of colloidal powders has enabled the muzzle velocity of guns and rifles to be increased to such an extent that in recent times the effective ranges of the infantry weapon and of field artillery have been practically doubled. This invention was followed by great improvements of a mechanical order both in the rifle and in artillery pieces and in the projectiles fired from them. The 8-mm. (0.315-in.) French rifle bullet of bi-ogival section has an initial velocity of from 600 to 650 metres per second, and possesses kinetic energy equal to from 300 to 350 kilogramme-metres (approximately 2,170 to 2,530 ft.-pounds) on leaving the muzzle of the rifle. At the ranges at which infantry ordinarily become engaged, the kinetic energy remaining in this bullet is still sufficient to produce serious wounds; for example, at a range of 800 metres it is 65 to 70 kilogramme-metres (470 to 505 ft.-pounds), whilst at a range of 2,000 metres (remaining velocity about 250 metres per second) it is 20 kilogramme-metres (about 145 ft.-pounds). The *Revue* article contains a tabulated statement giving information regarding the initial velocities, weights of bullet, powder, charge, etc., of the infantry weapons in use in the Swiss, French, and German Armies. Illustrations are also given of various cylindro-ogival and bi-ogival bullets. In a comparison of the destructive effects of rifle bullets and of shrapnel it has generally been considered that the former had the advantage. This arises from

the fact that the initial velocity of a shrapnel shell is nearly 25 per cent. less than that of the rifle bullet ; and further the weight of the shrapnel bullet is, as a rule, some 20 per cent. less than that of the rifle bullet. As the range of field guns is increased from 1 kilometre to 4 kilometres the remaining velocity of the shrapnel shell falls from 420 metres per second to 250 metres per second. The shrapnel bullets of an exploded shell possess kinetic energy equal to 15 kilogramme-metres (about 110 ft.-pounds) at their extreme range ; this is sufficient to put a man *hors de combat* (a horse requires the expenditure of double this energy to put it out of action). A tabulated statement provides information regarding initial velocities, weights of shrapnel shell, bullets, etc., in relation to field artillery in use in Switzerland, France, and Germany. —(*To be continued*).

NOTES AND NEWS.

Switzerland.—A special correspondent contributes a few notes of interest relating to affairs in Switzerland. He opens with a brief reference to the Swiss General Staff scandal and others which succeeded it in the year 1916.

It is stated that recent debates in the Federal Chamber, although they could not be expected to satisfy all parties in all respects, have nevertheless created a feeling of confidence and reciprocal goodwill in the majority of the Swiss people, a feeling which did not previously exist. It is said that the Swiss people are stronger and more united to-day than was the case a year ago. Very few changes have taken place in the higher commands of the Swiss Army in recent times ; to this fact is it due that the training, etc., of the Swiss Army has proceeded smoothly and methodically. Swiss officers have been allowed to visit both the belligerent fronts, and a number of Commissions of Swiss Medical Officers have been allowed to examine the hospitals and camps for prisoners of war in France and in Germany. There are now some 20,000 sick and wounded soldiers of various nationalities interned in Switzerland. Many of the interned are capable of undertaking some light occupation and of working at a trade.

The dilatoriness of the authorities in dealing with the "affaire Bircher" continues, it is said, to occasion disquietude in the ranks of the officers belonging to the Suisse Romande.

It is suggested that the military authorities are not interesting themselves sufficiently in the matter of the preliminary instruction of recruits. It is urged that this matter should receive serious attention during the current year.

The Central Schools of Instruction for officers which existed before the War were abolished in 1914 and 1915, but were resuscitated in 1916. An innovation is now being introduced by the institution of Divisional Central Schools for the instruction of officers ; they will be directly under the control of Divisional Commanders. The German Ambassador at Berne has issued an official denial regarding the rumour afloat that Germany was contemplating the violation of the neutrality of Switzerland.

Portugal.—A special correspondent briefly reviews the military situation in Europe. He points out that, of the small nations of Europe, Switzerland and the Scandinavian countries are the only ones which

have not been drawn into the whirlpool of war. Will they, he asks, entirely escape being sucked into it? He looks upon the German peace proposals as *contemptible bluff*. Peace will come in its good time, and he hopes that when it does come the small nations will be made entirely free and that a federation of Great Powers will be formed to guarantee their perpetual independence.

Information.

A *résumé* is given of the report relating to second preliminary military course in skiing organized at Chaux-de-Fond in the winter 1915—1916.

A few details are given relating to a proposal regarding the introduction of a Dental Department in the Swiss Army.

This number concludes with a Bibliography.

W. A. J. O'MEARA.

RIVISTA DI ARTIGLIERIA E GENIO.

October, November, and December, 1916.

SUMMARY OF MILITARY OPERATIONS FROM THE 1ST AUGUST TO THE
1ST SEPTEMBER, 1916.

Italian Offensive on the Lower Isonzo.

The preparations for offensive action which led the Italian Army to the storming of the strong place, Goritza, and to the conquest of the defensive system of the Carso were projected during the winter of 1915-16.

At the commencement of the spring, taking into consideration the possibility of an enemy's offensive in Trentino, it was necessary to send detachments of troops and artillery of new formation, which previously were intended for the Isonzo front. In the middle of May that offensive broke out in full violence and it was again necessary to send towards the Trentino a large number of the units of reserves that were available. But, in providing for this, the Italian Supreme Command repeatedly confirmed its orders to the commanders of the armies of the Isonzo to persist in the dispositions for the offensive on that front. The capture of the strong place Goritza, notwithstanding intervening disturbances, remained at all costs the principal objective of the summer operations. In the first half of June in fulfilment of this idea the arrest of the enemy's invasion of Trentino was decided upon. The supreme command caused reconnaissances to be made, to be able at an opportune moment, with rapid movements on interior lines, to bring to the Isonzo and Trentino fronts, troops and guns with all the means necessary for a heavy attack.

The rapidity of the manœuvres, by the railways and autocars, had to be maintained in the greatest possible measure, so as to ensure an initiative action by surprise; or in any case, before the enemy had time to deliver his attack. The offensive against the bridgehead at Goritza had to be preceded by an attack on Montfalcone, lasting two days.

The movements by railway for the collection of the troops and material

destined for the offensive on the Lower Isonzo were completed in three distinct periods. During the first period from the 29th June to the 27th July, there were preliminary movements consisting of the transport of some reserve units no longer necessary for action on the Trentino. The absolute tranquillity of the execution of these movements was characteristic of this period, which in no way drew the attention of the enemy or revealed the intention of the Italians. During the second period, from the 27th July to the 4th August, the real manœuvres were evolved; these consisted of a very rapid location of artillery and munition, and of the great units and their alignment on the front of the operations. Characteristic also of this period was the very minute accuracy of the preparations, the rapidity of execution, the secrecy of the movements attained by each detachment learning its own destination only during the march. During the third period, from the 4th August, the railway movement was evolved with the greatest regularity and precision.

Capture of the Bridgehead of Goritza.

The strategical object of the operations being established and the plan for the rapid carrying out of the great manœuvres between the Trentino and the Isonzo, the supreme command entrusted to the 3rd Army the arduous and honourable duty of directing the attack along all the front from Sabatino to the sea. The 3rd Army in its turn studied with all possible care the direction of its tactical manœuvres, and the best and most rational employment of the means assigned to it. It was now possible to locate the batteries of artillery in such a manner between the 27th and 31st July, that on the evening of the 3rd August they were ready to open fire.

On the 4th August there took place the action on the Montfalcone sector. After an intense artillery preparation the Italian infantry stormed the heights of the quota 121 east of Rocca, taking 145 prisoners, among whom were 4 officers. But the enemy had placed in the abandoned trenches a great number of bombs which exploded at the moment when the Italians victoriously broke into the trenches, producing the usual asphyxiating gas. Large masses of the enemy's troops were then launched to a counter-attack which compelled the Italian troops, decimated and helpless from the effects of the gas, to retire on the trenches from which they had set out, taking with them the captured prisoners.

The day of the 5th passed with simple artillery actions directed to test the enemy's front and divert his attention; whilst the enemy deceived by the manœuvres of the Italians sent reinforcements of troops and artillery in haste towards the Montfalcone sector.

On the morning of the 6th August between 7 and 8 the artillery opened a violent fire against the enemy's front from Sabatino to St. Michele. During a lull in this formidable bombardment, ardent detachments of infantry were launched against the enemy's lines to ascertain the effects of the fire. At 4 o'clock it was ascertained that the first lines of the enemy's defences were completely destroyed and the successive waves of infantry broke through. The intrepid Italian infantry advancing with indomitable eagerness to the attack of positions which were considered until then to be impregnable was an amazing

spectacle; while the artillery with wonderful precision seconded their efforts, preceding with curtains of exterminating fire and destroying the reserves massed behind the enemy's positions, and the indefatigable engineers repaired the communication and completed the destruction of the accessory defences and improvising new communications.

On the left wing of the Italian front a column commanded by Colonel Badoglio moved to the assault of the formidable rampart of Mont Sabotino, the key to the defence of Gorizia. Such was the impetus of the troops that overcoming one portion of the enemy's lines, they gained the Quota 609 in 40 minutes, making prisoners of almost all the garrison. The rapid advance proceeded towards the Isonzo and at dusk the Italians had gained the lines S. Valentino, S. Mauro on the eastern slopes of M. Sabotino. On the heights east of Gorizia, a Brigade assaulted north-east of Oslavia, the heights of Quota 188, until now contested with so many sanguinary combats, and after hard and alternating strife succeeded in storming the position. More to the south another Brigade with their first impetus broke through the enemy's strong defences, gained the crest of these heights and reached the Isonzo at Grafenberg. Here, surrounded by preponderating forces of the enemy, they were engaged in a most violent combat during the whole of the night.

At the southern end of the heights, the troops reached the M. Calvario, and in the plain broke through the intricate defensive lines constructed by the enemy on the southern margin of Podgora and the Isonzo. A battle not less obstinate, but otherwise victorious took place on the southern margin of Carso, where the valorous infantry assaulted the strongly fortified lines at the summit of M. St. Michele, another powerful bulwark of the Gorizia defences, which for 15 months of warfare had cost the Italians so many valuable lives, and after insistent assaults succeeded in capturing them entirely. Here it is right to declare that the enemy opposed along the whole front a brave and obstinate resistance. Some defended themselves with desperation in caves and isolated pits. They were hunted out in hand-to-hand fights and compelled to surrender.

More than 3,000 prisoners, 10 guns, numerous mitrailleuses and much booty of war material of every kind represented the trophies of this glorious and memorable day.

The Austrian Command, surprised by the unexpected attack of the Italians, but still not despairing of success, sought by every means to restore the situation, and while sending in haste reinforcements to the position they still resisted, they massed troops and artillery in an attempt to repair their losses by desperate counter-attacks.

* * *

The capture of M. Sabotino and M. St. Michele being assured it remained to complete the storming of the important heights west of the city. The sanguinary and incessant battle was protracted until the afternoon of the 8th. The broken and intricate ground, the many powerful lines of defence, the vicinity of Gorizia, a conspicuous centre of the enemy's resources, facilitated their tenacious defence. Step by step, at the cost of large sacrifices, the Italian infantry, with the admirable incessant co-operation of the artillery, acquired the whole of this steep and

intricate ground, storming one by one the numerous trenches and obliging the defenders to surrender.

In the afternoon of the 8th August, owing to this victorious action, all the heights to the right of the Isonzo constituting the bridgehead of Gorizia, and M. St. Michele on the left of the river were in possession of the Italians. The lines from the Isonzo to the Tolmino Valley were entirely assured to them. Detachments crossed by the Isonzo ford which the enemy had partly damaged, and these were reinforced on the other bank. A column of cavalry and cyclist bersaglieri were launched in pursuit. With great rapidity the detachments of engineers, under fire from the enemy, threw bridges across and repaired the damage caused. On the morning of the 9th August the Italian troops entered Gorizia, while a column of cavalry and cyclists traversed the plain around the city, breaking up the last resistance of the enemy.

The conquest of Gorizia deserves to be enumerated among the finest military operations of Italy. In three days the most important of the enemy's strong places on the Isonzo fell into Italian hands by means of the attack *di viva forza*, one of the heaviest and most violent attacks on a strong place ever recorded in European warfare. It may be related that on the fortified place Gorizia, Austria had during peace times expended the greatest care, and during the time of Italian neutrality had increased its value with defensive works which the experience of the first months of European war had contributed to render formidable. On the declaration of war the enemy's command had concentrated imposing defensive forces at Gorizia and had made it the chief strategical place.

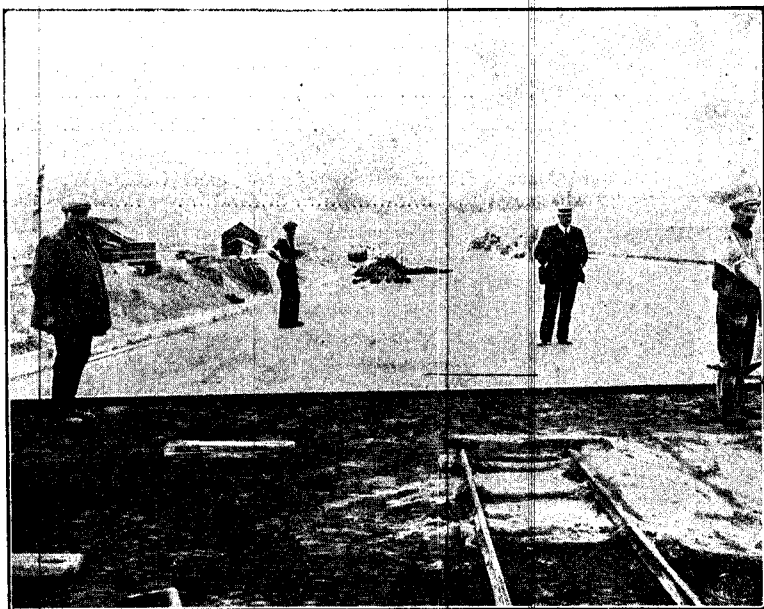
The enemy's command, as attested by prisoners, was under the illusion that the endeavours to put a stop to the Austrian invasion of Trentino had exhausted the offensive capacity of the Italians, so that their manœuvres on internal lines, conducted with rapidity, precision and secrecy, were able on the morning of the 6th August to permit of their breaking through with extreme violence against an enemy morally unprepared. The efficacious attack on Montfalcone completed the surprise.

The action of the Italian artillery on the 6th August represented a truly classical example of concentration of fire against fortified lines. It was minutely studied and prepared for, and thanks to the exploration of the ground by aeroplanes, patrols, and optical observations, the enemy's positions were perfectly recognized and planned on the map, the targets actually marked, the method of fire established with scrupulous precision, so that at a fixed moment a torrent of steel and of fire was thrown unexpectedly on the enemy's position, overturning the defences, beating down the parapets, destroying the traverses and the observatories and interrupting the communication.

(To be continued).

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