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LECTURE.

Friday, May 13th, 1864.

GENERAL H.R.H. THE PRINCE OF WALES, K.G., K.S.I., &c., &c.,
Vice-Patron of the Institution, in the Chair.

RAILWAYS STRATEGICALLY CONSIDERED.

By Captain H. W. TYLER, R.E., Railway Department, Board of Trade.

AN eminent soldier and author of the last century—Marshal Saxe—asserted that legs were of more value than arms in war. Other writers express the same idea in saying that the whole secret of war consists in marching; and the Archduke Charles proves the truth of it by showing that certain battles are won by successful strategy before they are fought. Now strategy is simply the art of moving military forces to the best advantage on a theatre of war; and the objects to be attained in the practice of it during a campaign (as well as in the practice of tactics during a battle) are (1) to be superior at the proper time and at the decisive point, and (2) to threaten the communications of an enemy without exposing your own. Setting political considerations aside, war is from beginning to end a question of communications. The Romans, when they subjugated a country, set to work at once to make roads through it, and those roads remain to the present day. In now forming the plan of a campaign, the main points to be considered are the direction in which and the lines by which the forces shall be moved. In carrying it out, the principal care of a commander is to prepare for victory by employing the means of communication or transport at his disposal to the best advantage, and massing his forces on the decisive points. The position of those so-called decisive points depends upon the communications of the country. The nature of ground, the position of rivers, mountains, marshes, is chiefly important as affecting the progress of the troops, and the way in which their communications can be secured. The manœuvring which sometimes precedes an engagement is effected with a view, either to cut off a portion of the enemy before the remainder can come up, or to obtain a position from which his communications may be threatened; and a mere threat of this sort is frequently sufficient to force an enemy to retreat without fighting. During a battle, on a scale of whatever magnitude, the victor looks mainly to the communications of his enemy, the vanquished to his own. And in the course of a pursuit, the object of the victor is still to intercept his

foe's communications, and thus to cut him off from his base of operations.

Communications being thus, as it were, of supreme importance in warfare, and the success of campaigns depending mainly upon their being used to the greatest advantage, it is a matter of the highest interest to all military students to study the effect of railways upon the various operations of war, and to profit, as far as possible, by the experience which has been afforded in other countries on the subject.

It is not yet forty years since passenger railways came into use, and there were at the end of last year 12,299 miles of railway open for traffic in this country alone,—in which 400 miles a-year are still being constructed. In round numbers there are about 118,600 miles of railway in the world, of which 53,000 are in Europe, 52,000 are in North America, 6,000 (principally in British India) are in Asia, 1,800 are in South America, 600 are in Africa, and 200 are in Australia. They will no doubt continue to increase for a length of time with great rapidity; and the more they spread over a country, the more important they become in a military sense. The tendency of railways in every country is to radiate from certain centres of traffic and commerce. The trunk lines are first filled in, then secondary lines and cross lines, and, finally, the means of communication between, first, the principal, and, secondly, the inferior places become multiplied. It is impossible now to lay out any long line of railway in this country which does not compete more or less with existing lines. The junctions at which some of these lines meet must become strategic points of the greatest importance to the defence of every country—points on which an invader would at once seize, and the loss of which would very much hamper the operations of the defenders. Looking at the map of England, such points are at once apparent. An enemy landing on the south coast would naturally regard the junctions at Brighton and Lewes, of the line from London with the South Coast Railway, as points of primary importance, and Canterbury, Ashford, and Hastings on the one side of it, as well as Havant (on the north of Portsmouth) and Bishopstoke (on the north of Southampton) on the other, are also places of great importance for the same reason, namely, that the main lines out of London join the coast lines at those points.

Of these junctions, Canterbury and Ashford derive protection from the fortified position of Dover, and Havant and Bishopstoke from that of Portsmouth; and it is evidently not necessary, under existing circumstances, to throw up works in anticipation for the defence of the remainder, as it might be if our coasts were more accessible, our fleets less strong, and our volunteers less efficient. But with our *vital points* placed, as they are (except Spithead, the most important of them all), in a respectable position of defence, and with 150,000 gallant volunteers ready to assist the regular forces in manning our forts, as well as in more active operations, we need be under no apprehension for the safety of the country. I would, however, while on this subject, say a few words in regard to the defence of our coasts. There is a very general opinion—and confirmation has been prominently given to it by a gallant naval officer in this theatre—that our

system of coast railways might, if the connection were completed at certain points, be relied upon for conveying troops to prevent the landing of any hostile force. I need hardly say that any invasion of this country would be attempted in great force, and that the portion of the coast which would require to be specially guarded lies between Portsmouth and the Thames. The enemy might be expected in several divisions, and at different points, and our great object would be to have four or five thousand men (including a strong force of artillery) *on the spot*, ready to fire into their boats as they approached the shore, supported by the fire of their larger vessels. If they were to land unopposed, or inadequately opposed, then we should have lost the best opportunity for attacking them at the most critical period of their first operation,—as they were approaching the shore, leaving the boats, and forming on the beach. Now the coast railway cannot follow all the sinuosities of the coast, and is in places several miles from it; and during the time that would be occupied by a body of troops in marching (on being warned by telegraph) to the railway, in embarking upon it in successive trains, in performing their railway journey, in disembarking from the trains, and in marching to the spot at which a feint had been made, or at which their presence was really required,—these operations having taken all the longer for want, perhaps, of platform and siding accommodation at the particular points of the railway employed,—the enemy would have reached the shore, and would have taken up a position in force to cover the landing of more troops.

In this, as in all other cases, railways are comparatively of little use for short distances, or where troops have to march any great distances to and from them. The length of time occupied in preparing the trains and embarking the troops (including cavalry and artillery) is considerable as compared with that consumed on the journey. On the other hand, 20 or 30 extra miles in a railway journey, when the troops are once embarked, is only a question of an hour's travelling. It is obviously in the case of long journeys, in which the troops can perform in an hour, and without fatigue, what would otherwise be a hard day's march, that they are of most service.

If we were obliged to make serious preparations against an invasion, we should do well, for these reasons, not to rely upon coast railways alone, but to form camps in the necessary localities round the coast, and to organize movable brigades,* able to move independently of the railways, or to take advantage of them, as might be required.

In considering the relative importance of roads, rivers, and railways, we must reduce them to the common measure of time. In military operations, victory is a question of days, or hours, or sometimes even of minutes, in the movement of troops, when the forces are on anything like an equality. The time that will be required to march a certain number of troops to a given spot having been calculated, and their support being a matter of vital importance to the contemplated

* Such, for instance, as that which was so efficiently equipped and instructed at Shorncliffe in 1804, under (Sir John) Moore, and which afterwards became so celebrated as part of the Light Division in the Peninsula War.

operations, delay may ensure defeat, as punctuality may render success comparatively certain. Those were anxious moments during which Blucher was floundering through the mud with his gallant troops on his way towards the field of Waterloo. But the computation must be separately made for each road, each railway, or each river, according to their respective qualities and means of accommodation, and that irrespective of distance. So many hours, rather than so many miles, from A to B—from any one point to any other point on the chart—with such and such chances of obstruction, impediment, or delay, is the result at which any one arranging the plan of a campaign wishes to arrive, and on which he must base all his projects.

On a well made railway, in good order, with two lines of rails, the number of troops that can be despatched with their stores and ammunition, is only limited by the number of vehicles available, and the delay in forming, loading, and despatching the trains at one point, and unloading and returning them from the other. There are about 7 locomotive engines, 21 carriages, and 140 trucks or waggons, for every 10 miles of railway on the principal metropolitan lines of this country. But the rolling stock of any one line may be employed upon any other line, as is frequently done for purposes of excursion traffic, when the gauge is the same. In the event, therefore, of hostile invasion, or in any case in which a partial interruption of the ordinary traffic would be temporarily justifiable, the supply of locomotive power, and of vehicles for the transport of men, horses, guns, and ammunition, would be practically unlimited.

A field battery of artillery will take 45 minutes to load, and 45 minutes to unload, and will require, on the narrow gauge lines of this country, six carriages, 20 trucks and break-vans, and 57 horse-boxes, making altogether 83 vehicles. These might be conveyed along a tolerably level line in two trains, weighing, besides the engines and tenders, about 250 tons each. A regiment of infantry,* requiring 40 vehicles, might in like manner be taken in one train. And a regiment of cavalry (at 400 horses and 500 men) with baggage and forage, requiring 135 horse-boxes, and 25 other vehicles, might be taken in four trains. When loading banks are not available, or are insufficient, temporary platforms are required for embarking horses and guns, and the time which would be occupied depends upon the amount of accommodation provided.

An army division consisting of two brigades, of two regiments of infantry, one of cavalry, and one field battery each, would thus be conveyed in 16 trains, each composed of about 40 vehicles; and an army corps containing three such divisions would travel in 48 trains of similar dimensions.

In connection with this subject, it may be interesting to mention what was done on the Brighton railway in 1863, in conveying the Volunteers to the Review near Brighton on Easter Monday. I happen to have the details by me, as I had occasion to obtain them at that

* Soldiers occupy more space in railway carriages than ordinary passengers of the same class, in consequence of their arms and accoutrements.

time for another purpose. The system of that railway comprised 240 miles, and the Company possessed 145 locomotive engines, 1,858 carriages or passenger vehicles, and 2,588 waggons and trucks, or merchandize vehicles. On the morning of the review, 6,922 volunteers were despatched from the London Bridge station in 9 trains in 2 hours and 41 minutes, and 5,170 volunteers from the Victoria Station in 7 trains in 2 hours and 20 minutes, without difficulty. They travelled to Brighton, 53 miles, in 2 hours and 28 minutes, on an average from the time of starting. The railway company had to provide also on that day for Easter Monday traffic to the Crystal Palace, for all their ordinary traffic, and for 2,000 volunteers along the South Coast from stations on their own line. They carried altogether on that day 132,202 passengers, including volunteers and the holders of season and return tickets. To meet this extraordinary traffic, they borrowed 72 carriages from three neighbouring companies, and 79 carriages brought volunteers to and over their railway from other lines.

I would now refer to some of the leading features of the Italian campaign of 1859, of which so good an account has already been furnished by Major Miller in this theatre. I have marked in black on the excellent map of Lombardo-Venetia which hangs on the wall, the railways that enclose, and in blue some of the rivers that intersect, the country* in which the principal part of that campaign was fought. The railway bridges over the principal rivers, and especially that over the Po at Casale, which was included in the fortifications at that place, were naturally points of importance. The Austrians possessed, as will be seen, lines of communication by railway from Verona, which was their principal base of operations, to the north by the valley of the Adige—to Venice and Udine on the east—to Mantua on the south—and to Milan, Novara, and Vercelli on the west. The Allies, on the other hand, whose base was at Alessandria, had the advantage of railways to Genoa on the south and Turin on the west; and there were railways also to Vercelli and Mortara on the north, and towards Piacenza on the east.

Some of the French troops travelled from Paris to Lyons by railway, 25,000 in a day. Some moved from Paris to Genoa in five days. 12,000 men are said to have left Paris for Lyons on the night of the 21st of April. A battalion of one regiment went from Lille, through Paris and Lyons, to Marsilles, including the passage through Paris and three hours of detention at Lyons, in 40 hours. The Austrians also sent a fourth corps d'armée by railway from Vienna; and an accident occurred at an early stage of the proceedings, which shows how desirable it is to use separate trains for troops and gunpowder. Nearly 150 Austrian soldiers were killed and wounded in an accident on the Verona railway, during which some of the ammunition waggons exploded.

During their advance into Sardinia and their occupation of the line of the Dora Baltea, the Austrians tore up the rails and destroyed the

* See Plate xxvi.

railway bridges which they met with; but this did not cause any serious impediment to the Allies, because the damage was repaired sufficiently to allow of their being again used as soon as they were required. On the 6th they blew up the railway bridge at Pontecurone, near Voghera; on the 7th that at Valenza; and on the 19th the arches of that over the Sesia, near Vercelli. But the Valenza bridge was afterwards made good by an earthen embankment in place of the two arches that were destroyed, and a Sardinian battery was established, with gabions, fascines, and earthworks, at the west end of it.

The Chasseurs de Vincennes, brought into Turin by successive railway trains, are described as having issued from the station, not fagged and reduced in numbers, as they would have been after a long march; but first at the "pas de charge," and afterwards at a run, with their knapsacks, capotes, tents and poles, batteries de cuisine, &c., &c., on their shoulders; amid shouting, and trumpeting, and clapping of hands; and it is added that "flowers were thrown down from the balconies upon these brisk soldiers as they passed through the streets." How different from the defenders of Sebastopol, who, from want of railway communication, lost the greater part of their numbers in crossing the steppes on their route to the scene of the conflict!

Between the 19th and 28th May the Austrians occupied a defensive position, not connected by means of railways, extending for about 50 miles along the Sesia and the Po, from Vercelli to Pavia; while the French and the Sardinians, with their principal force at the fortress of Alessandria, were on the line, 30 miles long, from Casale to Valenza and Voghera, on the opposite side of the Po, with the advantage of railway communication, not only from one extremity to the other of that position, but also, in continuation, to Vercelli, Novara, and Milan, on the one side, and to Piacenza on the other. And Milan was the first point which it was the object of the Allies to reach.

The Austrian general, unable to divine that object, and anticipating an attack on his left rather than on his right, removed his head-quarters from the more advantageous position of Mortara to Garlasco, nearer to Pavia, on the 19th May; and on the 20th the reconnaissance was made under his instructions which led to the battle of Montebello.

Count Stadion was directed to attack Casteggio and Montebello about noon, and having taken those places, to use them as a basis for threatening Voghera, and thus to oblige the enemy to display his strength. He accordingly crossed the Po at Viccarizza, and joining Urban from Stradella, advanced, partly along the railway, and partly by different roads, with 20,000 men towards Voghera. He carried the heights about Casteggio, and pushed on to Genestrello; but Count Gyulai says in his despatch, "The enemy, however, soon displayed a superior force, which was continually increased *by arrivals by the railway*; so that Lieutenant Field-Marshal Urban's and Gaul's brigades, which had come up to his assistance, were compelled, after great loss, but heroic fighting, to fall back on Montebello."

The special correspondent of the *Times*, writing from Pavia on the 21st May, says: "From the heights of Montebello the Austrians

beheld a novelty in the art of war. Train after train arrived by railway from Voghera, each train disgorging its hundreds of armed men, and immediately hastening back for more. In vain Count Stadion endeavoured to crush the force before him before it could be increased enough to overpower him." It is to be observed also that the 74th, 91st, and 98th Regiments were, as stated in General Forey's despatch, dated midnight on the 20th May, employed in defending the railway at Cascina Nuova against the Austrians under Brauen, who advanced along the railway to attack it.

The Austrians retreated, in the words of the Austrian bulletin published in the *Wiener Zeitung*, after the enemy had been obliged to develop his whole force; and they thus claimed to have effected the object they had in view. But what Count Stadion really did, under the orders of Count Gyulai, was this: he advanced towards and partly along a line of railway which was directly connected with the principal base and head-quarters of the allied forces only twenty-five miles from Voghera. With 20,000 men under his command, he was, of course, able at first to push back the advanced posts of the enemy; but in threatening Voghera, and in giving time for a further display of hostile force, he only waited for reinforcements to arrive by that railway. Further delay on his part would have increased the number of his opponents to any amount necessary for defeating him, and it was only by retreating when he did that he avoided a serious disaster.

He discovered, it is true, that there was no great number of the allies in the neighbourhood of Casteggio, but he found out, also, what he does not appear to have anticipated, any more than Count Gyulai, that the railway afforded means for bringing up fresh troops. In reality, a reconnaissance in that particular direction appears hardly to have been required, because the allies could not have advanced towards the strong fortress of Piacenza, or have attempted to cross the Po between Piacenza and Voghera, with any immediate prospect of success.

Between the 25th of May and the 2nd June, and while, therefore, the above battles were being fought, that flank movement was effected by the French which was destined to be the leading feature and the turning point of the campaign.

The Sardinians were concentrated at Vercelli on the 29th May, were fighting at Palestro and Confienza on the 31st May, and moved to the Agogna on the 2nd June.

The third French corps moved from Ponte Curone to Casale, miles, on the 28th May, to Prarolo on the 29th, constructed a bridge there over the Sesia on the 30th, crossed to Palestro in support of the Sardinians on the 31st, and was at Robbio on the 2nd June.

The second corps marched to Casale on the 29th and 30th, reached Vercelli on the 31st, and Novara and Olenzo on the 1st June.

The fourth corps proceeded to Casale on the 29th May, to Borgo Vercelli on the 30th, and to Novara and Olenzo on the 1st June.

The Imperial Guard proceeded to Casale and Vercelli on the 29th and 30th May, crossed the Sesia on the 1st June, and reached Novara and Turbigo on the 2nd June.

The first corps remained at Voghera till the 1st June, to deceive the Austrians, and moved nearly 60 miles from Voghera to Vercelli on that day.

This was undoubtedly a bold and hazardous movement, and one which might have been attended with fatal results, if undertaken in the face of a more active enemy, possessed of better information.

The first corps remained isolated at Voghera, 25 miles from Alessandria, and 50 or 60 miles from the other corps of the allied armies at Vercelli and Robbio. It is true that they were, with the assistance of the railway, only one day's journey from the rest of the army; but the Austrians might, without serious difficulty, have made arrangements for arresting their progress at almost any part of their journey on the 1st June; or they might have cut them off from their communications and annihilated them on either the 30th or the 31st May.

The third corps at Prarolo on the 29th May, and at Robbio on the 2nd June, afforded protection, in conjunction with the Sardinians, from an attack towards Vercelli, as long as the Austrians were inferior in numbers in that direction; but no such protection was provided near Valenza, where the railway is nearest to the river Po, and was most liable to attack. The third and fifteenth Austrian corps were near this important point when the flank movement began on the 28th May, but were afterwards ordered to march northwards. Indeed there was no time during the four days, from the 29th May to the 1st of June, and hardly any point between Vercelli and Voghera, at which the Austrians might not, by better dispositions and rapid movements, have struck such a blow at the French as would have changed the face of the campaign, and perhaps even the issue of the war. They heard the engines and trains at work on the railway between Casale and Vercelli on the night of the 31st May, and they saw French troops on the march from Vercelli to Novara on the following morning, and Zobel requested to be allowed to attack them. But it was only on the 2nd of June, apparently, that Gyulai found out that he had been circumvented, and made up his mind materially to alter the disposition of his troops. He then directed the six corps which lay between the Ticino and the Sesia to retire to the left bank of the Ticino, and the two corps at Pavia and Piacenza to move northward, about the same time that Count Clam, with the first corps, which had been hurried up from Bohemia by railway in an incomplete state, was approaching the Ticino from Verona, also a day too late.

The allies were by this time in an excellent position for moving on Milan. Concentrated in the neighbourhood of Novara, they had only the river Ticino, and the grand canal, guarded by one incomplete corps, before them, while the mass of the Austrian army was further than that of the allied army from the critical point. Their sudden and rapid movement to the north was thus justified so far by success, as rash operations frequently are; but it does not afford an example which should be frequently followed. A flank movement before an active and powerful enemy is always dangerous, because the troops engaged in it are necessarily ill prepared for attack, and are liable to

become engaged at particular points with superior forces. But such a movement in railway trains without adequate support is particularly so. The same precautions cannot be taken as on the march against a sudden attack, a surprise, or an ambuscade. Scattered in different trains along a line of railway, even the infantry, and more especially the cavalry and artillery, cannot readily be disembarked and brought into line-of-battle, and are, for the time, almost without power of resistance.

An obstruction suddenly caused on a railway during the transport of troops, either by the destruction of a bridge, or the displacement of a few rails, as the work of an enemy, or else by the bursting of a locomotive boiler, or a train running off the line, or any other so-called accident, may cause delay for hours or even days, and may be the means, by dividing an army into two or more parts, of exposing it to the risk of being beaten in detail.

These contingencies must never be lost sight of, or left unprovided for, in employing railways for strategic purposes.

The Austrian position on the Po and the Sesia was a good one in the first instance, either for opposing an attempt to cross the Po in the direction of Piacenza, or for striking at the allies during such a movement as actually took place towards Novara. But the only important move which they made from it towards Voghera was a false one; they were otherwise too inactive; and they retained it too long. Either they were too late, or their arrangements were hurried and imperfect at all points, after the battle of Montebello; and this happened principally from want of early and correct information, which, being essential to the success of all military operations, a first-rate commander, acting wisely, always takes measures to obtain. The whole country was no doubt hostile to the Austrians, and the French naturally adopted all the means in their power to keep their projects secret, and deceive their foes. But there are always means of obtaining more or less of information under the most adverse circumstances; and I am the more disposed to insist here upon the necessity for a well organized department for the purpose, because movements may be made so much more rapidly by the aid of steam than by other means. The necessity for having such information at the earliest possible moment, increases in proportion to the rapidity with which an attack may be made, or a position gained. And as railways come more into use for military purposes, so should the "intelligence" department of an army be more carefully organized, and its functions be more efficiently performed.

It should be added, with reference to the strategy of the Emperor Napoleon, that a commander who is engaged in making rapid movements, and who is well informed with regard to the positions of the forces opposed to him, may fairly calculate upon immunity from attack in any particular direction, for a certain period after his plans have to some extent become developed; though it must be admitted that he had no right to reckon upon the Austrians being so much wanting in foresight, activity, or information, as they proved to be both during this flank movement and afterwards, in their dispositions previous to the battle of Magenta.

While, therefore, it would not often be desirable to follow the example of the Emperor of the French, in making so perilous a movement round the position of a powerful enemy advantageously situated, upon the chance of doing so unobserved and unopposed, it would be always inexpedient to follow the example of the Austrians, who left their opponents in free possession of an unobstructed railway almost surrounding their position, and allowed them to transfer the whole of their forces to a most important point, without taking proper measures for informing themselves in regard to their proceedings. They thus lost the most favourable opportunity that the campaign afforded, for striking a blow at their opponents, for gaining the prestige that they so much required, and for materially damaging the allies, without themselves incurring any serious risk in the operation.

The Austrians offered but very slight resistance at Novara when the allies entered that place, and they even abandoned the important masonry bridge at San Martino, over the Ticino, without destroying it. They mined the second pier from the right bank, with the intention of ruining the second and third arches; but the pier was not sufficiently injured to cause the fall of the arches, and the French were able to repair the bridge sufficiently for the passage of troops without difficulty. The Austrians were equally unsuccessful in regard to some of the bridges over the Grand Canal. They blew up the southernmost road bridge at Ponte Vecchio, and one arch of the northernmost bridge at Buffalora; but the latter was made passable for the allies by means of planks which had been carelessly left on the spot; and the more important bridge of Ponte Nuova for the main road, and the iron bridge which carried the railway, fell uninjured into their hands. But for the omission to thoroughly destroy these bridges, the French would still have found serious obstacles in the way of their advance, in the river as well as the canal, and time would have been afforded for the arrival of other Austrian corps.

In spite of these advantages, however, the French narrowly escaped a crushing defeat in the early part of the battle of Magenta. It will be remembered that the Emperor Napoleon had arranged to attack the Austrians in front, and to force a passage over the Grand Canal on that day, while Macmahon, moving southward from Turbigo on the east of the canal, should take them in flank. Having heard Macmahon's guns on the north of Magenta, he advanced with nine battalions of the grenadier division of the guard to attack the bridges over the canal, and gained two of them uninjured—the railway bridge and the Ponte Nuovo. But Macmahon, who had crossed at Turbigo, found unexpected obstacles and opposition to his advance from the north, over 10 or 12 miles, to the scene of the battle. The grenadier division of the guard, which crossed the canal without sufficient support, was well nigh overwhelmed, and Napoleon, under whose immediate directions it acted, was already bringing up artillery to endeavour to cover its retreat when Macmahon's force appeared in the distance. The Austrians this time brought up reinforcements by railway, which afforded them an opportunity for success in the early part of the day; but towards evening the Sardinians arrived in Macmahon's rear, the

French closed in upon the Austrians in increased numbers all round their position, and the Austrians were no longer in a condition to hold their ground. The railway served the Austrians on this occasion, not only as a means of reinforcement, but also as a means of defence. A letter published in the *Times*, written from Ponte di Magenta on June the 5th, to "My dear P.," said: "New and new battalions, brought up by the railway, the whistle of which was heard, began to advance to the attack of the position;" and the same correspondent added in a second letter, dated from Magenta on the 7th: "But the fiercest fight was further behind, on the railway line and the station house behind it, and the village close by. Pressed back all along the line, the Austrians concentrated here all their efforts of resistance. In front of the station, beyond the line of rails, is a large long pit, extending for some distance to the right and left, and formed by the excavations necessary for the construction of the line. Besides this, the railway bank, which is somewhat raised, forms a kind of ready parapet, behind which the defenders enjoyed some protection. The station, as well as the neighbouring buildings, and a square, solid campanile, were filled with riflemen, while the troops of the line massed themselves in front of them. As the troops came up they were brought out here, and took the place of their exhausted comrades. To carry this strong position, the Fusiliers and Chasseurs of the Guard were ordered forward. They broke through, driving the enemy before them, until their course was arrested by the line of strong wooden railings. A few common shot would have easily brought them down, but there was no place whence to bring them to bear, so nothing remained but to tear them down by main force and the axes of the sappers."

The Austrians abandoned Milan and retreated so hurriedly after the battle that they did not even destroy the railway or carry off the rolling stock. The Milanese sent a train to Magenta the next morning for the wounded, and the remainder of the wounded and the prisoners followed as speedily as they could be transported in other trains to that city.

The French owed, then, much of their advantage in this part of the campaign to the way in which they utilized the railways at their disposal.

In the first position they took up, from Casale to Voghera, they had, as we have seen, the great advantage of railway communication between the extremities of that position and with the fortress of Alessandria, which served as their base, near the middle of it. They were enabled, first to convey reinforcements by railway to Forey, when he was engaged at Montebello, on the east of that position; and afterwards to move rapidly northward, and by a circuitous route, towards Milan by the aid of the railway, with a secrecy, facility, and rapidity, that would otherwise have been impossible. And railway bridges gave them important assistance in crossing the various rivers and streams that they encountered.

On the other hand, they would have found the route open from Novara to Milan, and would have been almost unopposed in crossing

the Ticino and the Naviglio Grande, if Count Clam Gallas had not arrived with his corps by railway in the opposite direction; and although the Austrians were surprised (in a military sense) by the rapid movements of the French, and were unprepared to meet them with the mass of their forces on the advance from Novara, the railway yet proved useful to them during the battle of Magenta. It enabled them to bring up reinforcements which they could not otherwise have received; and a railway embankment (which was subjected by General Auger to a flank and cross fire from 40 guns), served them for a breastwork, a railway *side-cutting* for rifle-pits, a railway fence for palisading, and a railway station for a block-house, at the most critical part of the fight. Their omission to destroy the railway to Milan after the battle, which afforded a good means of transport to the wounded, did them no great harm.

And here I would observe that, although failure to secure the destruction of railway bridges and works which may be of use to an enemy, as in the case of the bridge of St. Martino, is a serious fault, and may lead even to the failure of a campaign, yet a commander will always act wisely in abstaining from injury to a railway (as well as to any other work of public utility) which can afford no military advantage to an enemy. The importance of destroying such works depends, not upon the amount of damage that can be effected, but upon the means that are at hand for repairing it, and the time that can be afforded for doing so before they are required for use.

I need not follow the Austrians in their retreat behind the Mincio, nor the French in their cautious pursuit. Neither during these operations nor in the subsequent advance of the Austrians towards the Chiasso, which led to the magnificent and hard-fought battle of Solferino, in which two Emperors and a King commanded their respective armies, were railways directly made use of, and therefore they do not present any incidents of interest connected with our present subject.

I now turn to another, and a very different theatre of war. The Italian campaign was concluded in two months, and the principal operations extended over a space of about 100 miles long, from Vercelli to Solferino, and 50 miles wide from Turbigo to Tortona. The civil war in America, which only now begins to show real symptoms of termination (from failure of confidence, and therefore of credit in the north), has lasted for three years, and has extended over an area some 900 miles long by 800 miles broad. The Italian theatre was traversed by numerous roads and substantial bridges, the destruction of which required more skill and powder than the Austrians had always at their command. But we have now to consider a country containing roads or tracks comparatively few in number, and often in very bad order—railways of great length, but cheaply constructed—numerous rivers spanned in many cases by wooden bridges and viaducts, which require no more than a lighted torch to ensure their destruction. The railways and rivers in America have been, in consequence of the distances to be traversed, and the indifferent character of the roads, of paramount importance in a military point of view; and the telegraph wire has partly superseded, for similar reasons, other means of transmitting orders, or

of reporting from the different scenes of operations those results which have too often turned out to be either false or imaginary. The line of railway is there in many cases the only practicable means of communication and transport, for moving an army as well as for supplying it with provisions, stores, ammunition, and reinforcements, and it becomes itself a primary object of attack. Expeditions are organised, or raids undertaken, for tearing up rails, for burning wooden sleepers and timber beams, for capturing or destroying engines, carriages, and trucks, and for rendering a railway temporarily useless. Battles are fought for the possession of a junction between two or more railways, and these junctions become strategical positions of the first importance.

The main objects of the Northerners are of course (1) to take possession of the Southern capital so near to them at Richmond; (2) to secure the navigation of the Mississippi and other rivers; (3) efficiently to blockade the southern ports, and (4) to seize important posts on the coast and inland, with a view to the subjugation of the seceded states. The objects of the Southerners, on the other hand, are strictly defensive, and their operations are therefore mainly confined to active resistance at the several points of attack, with a view to ultimate freedom from Northern domination.

Taking a general survey of the scene of operations, the points to which I would now particularly direct attention upon the map* are, (1) the two capitals—Washington and Richmond, shown by dark marks, within 100 miles of one another; (2) the Ohio and Mississippi rivers, forming one continuous river line 1,200 or 1,500 miles long, from Pennsylvania to New Orleans, with the Cumberland, the Tennessee, and its other tributaries shown in blue; (3) the Potomac, the Rappahannock, the York river, and the James river, in the vicinity of Washington and Richmond, also in blue; (4) the railways (shown in brown) of greatest importance for strategic purposes, comprising—the route along the Potomac from Washington to Cumberland and Cincinnati—the main route from Washington and Richmond on the east to Memphis on the Mississippi—the north and south routes from Memphis by Jackson, Mississippi, to New Orleans, and from Columbus by Corinth to Mobile—the line from Louisville to Memphis crossed by the through route, past Nashville and Chattanooga, to Atlanta and the whole of the south-eastern states—the three communications with Richmond, (a) from Washington by Gordonsville on the north and west; (b) from Aquia Creek and Fredricksburgh on the north; (c) by the York river railroad on the east.

In consequence of the want of rails for renewals, and of sufficient engines and other rolling stock, the Southerners appear, in spite of their possessing this system of railways, to have laboured under very serious difficulties of transport, and they have at times been hardly able to furnish supplies for their armies. Without these railways, they could not possibly have carried on the war on the same scale, or with the same success. The railways have indeed been their principal allies;

* Vide Plate xxvii.

they form the key by which the object of almost all their inland operations may be understood; and their course has served to determine the site of almost all their positions; while the lines of the great rivers, on the other hand, have necessarily been followed by the Northerners in their aggressive operations. No great northern army has been able to maintain itself for any length of time, even with the aid of railways, more than a day's march from the sea or from a great river, and no great Confederate army has been able to remain or can remain far away from a line of railway. Over and over again they have been unable, without railway communication close at hand, either to continue a battle or to follow up a victory, for want of ammunition, which their other means of transport does not enable them to carry in sufficient quantity.

In the short time here allotted to me, I can only dwell briefly upon portions of some of the operations that have been carried on over this vast area, and over this lengthened period. I have selected a few examples that may best show the mode in which railways have been employed, and thus illustrate my subject. I shall have occasion to give some extracts from American newspapers, but I cannot feel that they are by any means reliable sources of information. Many of the reports on military and naval subjects are mere fiction, and are no more to be believed than the story of a dog and his tail, which appeared in the advertisement of a New York paper not long since, about the same time that the celebrated Report by the Secretary of the Confederate Navy, which so completely deceived us on this side of the water, was published in New York.

The different campaigns in Virginia, which first claim our attention, commenced in struggles for the possession of railway junctions, and the last important movement was principally for the purpose of destroying the Orange and Alexandria railway.

McClellan's successful action at Grafton, the junction of the railway between Cincinnati, Harper's Ferry, and Washington, with the railway to Wheeling, was almost the first operation of the war; and his seizure of that important place was the means of obtaining further success at Beverley and Huttonsville, and of driving the Southerners out of western Virginia.

The still more important point of Harper's Ferry, where the Shenandoah river joins the Potomac, where the railway from Winchester (the capital of the Shenandoah valley) joins the main line to Cincinnati and Washington, and where the eastern ridge of the Blue Mountains falls towards the river, was held by the Confederates until the middle of June, 1861, when the Northerners advanced in overwhelming numbers to occupy it. It afterwards became famous in consequence of the capture of Federal troops and stores effected there by Stonewall Jackson, under Lee, on his first invasion of Maryland.

The next place to which I would refer, is the Manassas junction, at which the railway from the Shenandoah valley and Front Royal joins the main line from Washington and Richmond on the east to Memphis on the Mississippi. Of the two pitched battles (of Bull Run) which have been fought near this place, the first took place on the 21st July,

1861. After retiring from Centreville on the 18th July, Beauregard posted his (Southern) forces on the north of the junction; and M'Dowell "concluded" to cross two fords over the Bull Run stream with the mass of the Northerners, in order to turn the enemy's left, and to destroy the railway on the west of the junction. Beauregard reinforced his left wing; Southern reinforcements, arriving by railway, left the train before it arrived at the station, and attacked the right and rear of the Northerners; and the Northerners, unable to stand such an attack, or to rally after it, fled in disorder.

The Northerners advanced to the attack on this occasion to the tune of Yankee Doodle, hardly calculated, perhaps, to inspire them with much martial ardour; and the Southerners, who are endowed with a lively wit, and have composed several songs to that tune in the course of the war, described the fight and its results in the *Richmond Whig*, in a piece of poetry which is too long to give here and is not fitted to so select an audience, but in which occurs the lines—

"Yankee-doodle wheeled about,
 "And scampered off at full run,
 "And such a race was never seen,
 "As that he made at Bull Run."

The second battle of Bull Run, on the 29th and 30th August, 1862, which also ended in favour of the Confederates, was fought between Jackson with 30,000 men on the first day, and Jackson and Longstreet, under Lee, with 45,000 men on the second day, against Pope at the head of 60,000 men. The positions of the contending armies were almost reversed on this occasion. Pope had advanced, in compliance with orders from Washington, towards the Gordonsville junction, in order, by threatening that junction (between the railways from Washington and Richmond, to Staunton and the Mississippi), to draw off attention from M'Clellan, and to allow of his army being extricated from its disastrous position on the peninsula east of Richmond.

In their several advances towards Richmond, the Federals have hitherto adopted the lines laid down for them by the railways. On the map, the route through Fredericksburg appears at first sight the most inviting, because the railroad through that place is nearly in a straight line in continuation of the Potomac, and is connected with a most convenient water-base at Aquia Creek, immediately to the south of Washington; but the difficulties by that route have hitherto proved to be insuperable. And, indeed, a railroad 65 miles long, as a sole means of communication with the base of operations, is too precarious to be relied upon in a hostile country for the continued supply of a very large army. Supposing that a large Federal army could, after safely crossing the Rappahannock, and after gaining instead of losing battles near Chancellorsville or Fredericksburg, be advanced by this line to some point near Richmond, its commander must then either leave a considerable part of his force to guard the line of railway, or run the risk of having the railway destroyed in his rear, and of being thus cut off from the means of either supply or retreat. Under these

circumstances, and because the route by Gordonsville offered still further difficulties of the same description, M'Clellan determined early in 1862, to advance along the peninsula from the east, so as to obtain the advantage of water communication to within a shorter distance of the southern capital.

When he reached the White House he had the advantage of the York River railroad, only 35 miles long, to communicate with the enormous dépôt which he had formed on the Pamunkey River. He repaired the railway without difficulty, and employed it for the supply of his army, but he required considerable detachments to guard it, and could not, even then, do so effectually. The Confederate cavalry, under Stuart, made a circuit round his rear, set fire to two of his transports, fed upon his provisions; and, disappointed of support from McDowell, who had been recalled to protect Washington in consequence of Jackson's exploits in the Shenandoah Valley, he was glad enough to escape, after the seven days' fighting on the Chickahominy, to Turkey Bend, and to seek refuge under the fire of his gunboats, on the banks of the James River.

But it was the sudden and unexpected return of Jackson by railway from Staunton, at the head of the Shenandoah, that contributed more than anything to the dismay of the Federals and the defeat of M'Clellan on this occasion. And the combination of marching and railroad travelling effected by Jackson, in first defeating the different armies opposed to him, at considerable distances from his railway-base at Staunton,—and then, after alarming the Federal authorities for the safety of Washington itself, returning by a rapid railway journey, to attack the right flank of the main army of the Federals before Richmond, when he was thought by them to be still in the north, is, perhaps, the most interesting and instructing episode in the whole war. It afforded the lessons that the Federals most required to learn, and that we may all study with benefit, in showing that whatever advantages may be possessed of railroad communication, the best opportunities must still remain with those forces which are prepared to march rapidly, as well as to travel by train when the occasion requires—that an army must not, because railway facilities are at hand, be unnecessarily encumbered with extra stores and baggage—that, in fact, locomotives must not supersede legs, and must not be made an excuse for useless encumbrances.

These operations afford, also, a valuable example of the advantage of even partial railway assistance in defensive warfare, and on interior lines, and of the minor use that can be made of them in aggressive warfare, in an enemy's country.

The last considerable operation that took place in these quarters, was when Lee, crossing the Rapidan in October last, pushed the invading army of Meade back upon the defences of Washington, by suddenly threatening his communications along the Orange railway. It was at first supposed by the Federals that the Confederates intended on that occasion to make another raid into Pennsylvania; but the event proved that their principal objects were, partly to take any opportunity that offered of advantageously engaging the Federal army,

and to seize what prisoners and booty they could from that army; but especially by destroying the railroad itself, to prevent the possibility of a further advance in that direction for some time to come, and perhaps for the remainder of the year. Those objects were fully attained. Meade saved, indeed, the bulk of his army from any great disaster, by a timely and active retreat. But he is said to have lost 7,000 prisoners and a vast quantity of material in doing so. A correspondent of the *New York Times* said, "The desperate dashes which they made at our trains, show, too, how greedy they are for booty;" and, he added, with regard to the Orange Railroad, 24 miles of which were destroyed on this occasion;—"This work has been very thoroughly done, Lee's whole army having been engaged on it for two days. From Bristol to the Rappahannock the destruction is complete—bridges burnt, culverts blown up, ties taken up and burnt, rails twisted and rendered useless, cuts filled up, &c. The engineers say that it will be at least a month before it can be again put in running order. It is with no small mortification, therefore, that we have to confess the rebels have achieved an end fully commensurate with the labour and risk of the campaign."

It will be an interesting study to compute at the end of the war, how many times different portions of railway have been destroyed and renewed, what proportions of construction and destruction have been effected by the Federals and Confederates respectively, and how many miles of new railway might have been constructed with the labour, money, and materials, that have been so freely lavished in these operations. Regular conspiracies were deliberately formed in some states for the destruction of railroad works and bridges; and, it has frequently occurred, as the lines of operation varied, that each side was glad to make use of portions of railway which they destroyed at other times, when they were likely to be of advantage to the enemy. I may here refer to some of the instances in which railway works have been destroyed, as showing the precarious character of railway communication, especially when timber bridges and viaducts are employed.

During the riots at Baltimore at the commencement of the war, the mob destroyed the station and burnt the bridge over the Susquehanna, as soon as the troops had started in the trains for Washington.

When the Confederates evacuated Harper's Ferry in June 1861, they destroyed, says Colonel Estran, "that wonderfully constructed railway bridge which here spans the broad stream of the Potomac." At a given signal this structure was blown into the air with a terrific explosion. All the buildings connected with it, the station, engines, locomotives, warchouses, as well as a flourishing town, with all its trade and prosperity, were condemned to destruction.

Colonel Estran also relates how that when the Confederates evacuated Newbern, about February 1862, they retreated across the "fine railway bridge which here spans the river Reuss;" and he adds: "The Federal troops now delivered so deadly a fire that our troops were driven from their positions, and we had to cross the bridge, to which we set fire immediately after, in order to prevent its falling into the hands of the enemy. In a few moments dense columns of

" smoke denoted that this work of destruction was in progress. Whilst " this noble bridge, the pride of the people of North Carolina, was " thus becoming a prey to the flames, the enemy actually stopped " firing, to witness the grand and awful spectacle. The flames rapidly " increased, the timbers crackled, and the whole structure finally fell " with a tremendous crash into the river below, and then for a brief " interval all was still again." It appears that " General Branch, who " commanded the Confederates, had previously secured a railway " carriage to himself, and started off inland," and that he afterwards (as it is quaintly stated) " found it no easy task to re-establish his " reputation for bravery."

When John Morgan, the Guerilla leader, made a raid on the small town of Gallatin, 20 miles north of Nashville, then occupied by the enemy, he proceeded to the railway station, and on the arrival of the train took prisoners the engine driver and five officers who were in it. " He then had all the carriages set fire to, and covering the engine " with turpentine, tow, and other inflammable matter, he sent it back " on fire at full speed towards Nashville."

It is stated in the *New York World* of June 15th, 1861, that " Some " disunion troops from Leesburg, Virginia, burnt four bridges on the " Alexandria, London, and Hampshire Railroad, at Tuscarora, Lycoline, " Goose Creek, and Beaver Dams, being the balance of the bridges " from Leesburg to Broad Run." On November 9th, two road bridges on the Georgia State road, two on the Chicamauga Creek and Hamilton County, three on the Eastern Tennessee and Georgia road, were all burned by the Union men of East Tennessee. On November 13, one bridge 200 feet span, four bridges north of Knoxville, and one very heavy bridge at Charleston, 75 miles south-west of Knoxville, were also burned.

The *St. Louis Democrat* of October 17th gives also a circumstantial account of the burning of the Big River Bridge—the principal bridge on the Iron Mountain Railroad. It appears that the 40 or 50 men who had been stationed in the neighbourhood to guard it were overpowered. A railroad train, which arrived about this time, was sent back for reinforcements. But they arrived too late—to find the timbers burning, the rails torn up on each side of the bridge, and the telegraph wires clipped.

But the horrible system which was adopted, of half burning the bridges with a view to the trains " falling through," affords stronger instances of the disadvantage of travelling by railway through a hostile country.

On the 3rd September, 1862, the Secessionists of Missouri burned several of the bridges on the Hannibal and St. Joseph Railroad; and on a train with nearly 100 passengers coming up to the Little Platt river, the bridge gave way, and precipitated the whole train down an embankment with terrible slaughter. And the *Louisville Journal* of September 13th, 1862, says: " Another fiendish attempt to destroy the " lives of national soldiers was made a day or two since on the North " Missouri Railroad. The timbers of a bridge near Sturgeon were " partially burned, in expectation that a train loaded with troops would

"be precipitated into the creek below, but the design of the villains being known, the train stopped at Mexico, and the troops encamped at that place, where they remained until the bridge was repaired."

The campaigns of Tennessee and the West have not been reported to us so much in detail as those in Virginia. Northern misrepresentation and Southern reserve have united to envelope many parts of them in mystery. But they are not less interesting, and certainly they redound far more to the credit of the Northerners. As soon as time had been afforded for the necessary preparations, the Federals possessed great advantages in being able to place gun-boats upon the Mississippi, and Tennessee, and other rivers, and by their communications by railway from all parts of the Northern States; and Cairo was soon occupied by the Federals. But Lexington on the Missouri was taken, with its stores and money, by the Confederate General Price. A series of advances, retreats, and conflicts was followed by a struggle for the possession of the unfinished railway from St. Louis to Memphis. At length the Federals prepared a joint expedition of troops and gunboats, with which to take advantage of the rivers of the country. The Southerners held Columbus on the Mississippi as late as January, 1862, and made a stand for some time at Bowling-green, where the railroad from Louisville to Memphis joins the railroad southward to Nashville. But on the 6th February, 1862, Fort Henry, a small work on the Tennessee, was captured. Bowling-green was evacuated on the 15th February; and Fort Donnelson, an important work on the Cumberland river, and on the Memphis and Louisville railroad, surrendered with 12,000 prisoners and great quantities of artillery and stores to General Grant and Commodore Foote the next day. This was a terrible and unexpected blow to the Southerners. Nashville, an important railroad junction, their base of operations in this direction, the capital of Tennessee, and containing vast quantities of specie, ammunition, and stores, became untenable, no preparations having been made for so unforeseen an event. The Confederates destroyed as far as possible their gunboats, provisions, and such valuables as they could not remove, and then occupied Jackson, Tennessee, and afterwards Corinth; and they retained that junction between the Memphis and Charleston railroad and the south line to Mobile for a considerable period. Beauregard's head-quarters were at Jackson in March, 1862. On the 3rd April General Sidney Johnson issued an address at Corinth to the (Southern) army of the Mississippi, of which Beauregard was second in command; and on the 6th and 7th April they turned upon the Federals at Pittsburg, and fought that desperate battle which has been styled by the former the battle of Pittsburg Landing, and by the latter the Victory of Shiloh.

During these operations the Confederates clung to the railways by Jackson Tenn, on the west, and by Murfreesborough, south of Nashville, the scene of other important engagements, on the east; and they made important use of these railways, as appears from Beauregard's report, to concentrate their forces for the fight at Pittsburg. The Federals on the other hand employed the Tennessee river in their advance, and it was their approach by that river to the Memphis and

Charleston railroad that induced Beauregard to attack them at Pittsburgh. But the Confederates were at length driven back all along their line to the important through line of railroad already referred to as joining the prolongation of the Orange and Alexandria railroad, and thus connecting Washington and Richmond with the Mississippi. This through line has been employed, it will be remembered, to great advantage by the Confederates in transferring troops from Virginia to Tennessee, and *vice versâ*, over a distance of about 500 miles, and notably on the occasion of the battle of Chicamauga, which was won by the sudden appearance of Longstreet and his troops from Virginia. This line is now held by the Federals at Chattanooga and Knoxville, at both of which places it joins the Tennessee river. The position of Chattanooga I would advert to as being a particularly important one, as will be seen by a glance at the map. Besides being situated on the Tennessee river, it is the point on which all the railway communications of this region converges, from Washington and Richmond on the east, from the whole south-east by Atlanta, from Memphis on the west, and from the whole north and west by Nashville and Louisville. But this position, however valuable to hold, is by no means an easy one for the Federals to advance from, as long as the Confederates are able to maintain a sufficient force in their front, because they would leave the river behind them, and be obliged to trust to railway communication, which is already liable to interruption between Chattanooga and Nashville, and which would be still more so as they approached Rome and Atlanta.

To show the feelings of the Northerners when they reached the Memphis and Charleston railroad, and as an example of the advance of a body of Northerners in an exceptional way, I would quote the following in regard to the march upon, and capture of, Huntsville, on the 11th April, 1862. A correspondent of the *Cincinnati Gazette* says, April 11, 1862:—"We have achieved a victory which, although bloodless, must be attended by such important results as can hardly be over-estimated. The main line, and for all practical military purposes the *only* line of communication between the eastern and western armies of the enemy, is in our hands. To General Mitchell and his brave troops belongs the distinguished honour of being the first to penetrate to the great Charleston and Memphis railroad, and the first to break the rebels boasted line of defence, extending from Chattanooga to Corinth.

"We all perfectly understand, too, that the rebels had accumulated upon this road nearly all the rolling stock of all the railroads from Bowling-green southward, besides what legitimately belonged to the road itself; and that they could therefore concentrate at any threatened point whatever forces they had at command.

"An advance force of a hundred and fifty cavalry, together with a section of the battery in charge of Captain Simonson himself, assisted by Lieut. M. Allen, commanding the section, the whole directed by Colonel Kennet, first caught sight of Huntsville, and the lovely cedars surrounding it. They were advancing upon the double track, when two locomotives, with trains attached, suddenly made their appearance upon the railroad. They were moving in the direction

" of Stevenson. A shot from one of Simonson's guns brought the first one to. The captain then turned to pay his respects to the second. A shot or two induced it also to haul up. In the meantime the engineer of the first train was quietly getting on a full head of steam, and when nobody was suspecting such a thing, he suddenly started off. The cavalry went in pursuit, and actually chased the locomotive for a distance of ten miles.

" A few horsemen tried their carbines upon the second train, and an unfortunate coloured person received one of the bullets in his neck. It was said too by the secesh that a rebel from Corinth, going home slightly wounded, was instantly killed.

" The infantry had come up while this was going on, and Colonel Mihalotzi, of the twenty-fourth Illinois, sent a detachment to tear up a portion of the track in the direction of Decatur. The escape of any more trains was thus effectually prevented."

And Brigadier-General O. M. Mitchell says, in a General Order (No. 93), dated

" Head-Quarters, Third Division,

" Camp Taylor, Huntsville, April 16, 1862.

" Soldiers,—Your march upon Bowling-green won the thanks and confidence of our Commanding-General. With engines and cars captured from the enemy, our advance guard precipitated itself upon Nashville. It was now made your duty to seize and destroy the Memphis and Charleston Railway, the great military road of the enemy. With a supply train only sufficient to feed you at a distance of two days' march from your depôt, you undertook the herculean task of rebuilding twelve hundred feet of heavy bridging, which by your untiring energy was accomplished in ten days.

" Thus, by a railway of your own construction, your depôt of supplies was removed from Nashville to Shelbyville, nearly sixty miles, in the direction of the object of your attack. The blow now became practicable. Marching with a celerity such as to outstrip any messenger who might have attempted to announce your coming, you fell upon Huntsville, taking your enemy completely by surprise, and capturing not only his great military road, but all his machine-shops, engines, and rolling stock.

" Thus providing yourselves with ample transportation, you have struck blow after blow with a rapidity unparalleled. Stevenson fell, sixty miles to the east of Huntsville. Decatur and Tusculumbia have been in like manner seized, and are now occupied. In three days you have extended your front of operations more than one hundred and twenty miles, and your warning gun at Tusculumbia may now be heard by your comrades on the battle-field made glorious by their victory before Corinth.

" A communication of these facts to head-quarters has not only won the thanks of our Commanding-General, but those of the Department of War, which I announce to you with proud satisfaction.

" Accept the thanks of your Commander, and let your future deeds demonstrate that you can surpass yourselves. By order of

" O. M. MITCHELL,

" W. P. Prentice, A.A.G."

" Brigadier-General, Commanding."

This force moved from Bowling-green to Nashville and Shelbyville, about 140 miles, by railway, and afterwards marched about forty miles to Huntsville. They did not acquire much glory in marching upon Bowling-green, or in precipitating themselves upon Nashville, because those places had previously been evacuated by the enemy. But they performed so great a feat in construction, by building 1,200 feet of heavy bridging in ten days, that I must leave the statement to the credibility of the Brigadier-General. They captured 17 locomotives and 150 cars at Huntsville.

I need not further refer to the fighting on the Mississippi, except in one particular. I would point out that the entrenched position of Vicksburg, which formed the principal defence of the Confederates upon that river, and which was so long and so gallantly maintained by them, existed as a military post in consequence of the communication by railway which it possessed with the country east and south of it. Its garrison resisted all bombardments and assaults by sea and land as long as that means of communication remained open, and only fell for want of supplies after it had been closed. Without that key to solve the problem, it would not be possible to understand the operations which led to its capture. The Federal General Grant obtained success last year, not by a direct attack upon it, but by marching from Grand Gulf, 20 miles south of it, to Jackson, 50 miles east of it. The possession of the latter place—at which the north and south railroad from Columbus to New Orleans joins the railroad running eastward from Vicksburg to Selma—enabled him to prevent all approach to it, to cut off all chance of supply, and thus to render it untenable.

The general lessons which may, as it appears to me, be deduced from what is at present known on the subject, are that: (1.) Railways may, when available, be often used with great advantage on a theatre of war, as an auxiliary means of moving troops, and as a principal means of supplying them. (2.) Railways are more quickly and easily destroyed and more readily repaired (in a temporary manner) when the necessary materials are at hand than common roads. (3.) A single line of railway, in good order, and furnished with a proper proportion of sidings, crossing-places, and rolling stock, is sufficient for the ordinary supply of any army in the field. (4.) Railways constructed with a view to strategical purposes, and intended for the conveyance of troops, should be laid with a double line of rails. (5.) A commander should in no case rely altogether upon a railway for communication with his base of operations in a hostile country, and should not rely too much upon a long line of railway, subject to attack from an enemy, in any country. (6.) Railways may be employed to much greater advantage in defensive than in offensive warfare. (7.) Railway junctions will often become strategical positions of the greatest importance. It is further plain, that as railways increase in number, and come into common use in military operations, so it will become more desirable that every soldier in an army should be able to assist in destroying or repairing them. I have had occasion to point out in

previous lectures* that the use of the spade in warfare will necessarily increase with the common employment of, and with a growing proficiency in the use of, rifled weapons; and I would now add that the use of railways in war will render it still more desirable that every soldier should be trained to be more or less of an engineer.

The best mode of imparting such training to British soldiers will be—not merely by putting them through an appropriate course of instruction—but by also employing them, or allowing them to work under proper restrictions, at trades and on works of public utility.

The day has gone by when a soldier's efficiency was supposed to depend more on the stiffness of his stock than upon his power to hit an enemy. A well trained, or an educated man, is not now considered likely to make a worse soldier than an ignorant boor. A commencement has been made under our enlightened Commander-in-chief with great success at Portland and Dover, in employing British soldiers, as those of other nations are employed, upon public works, and I hope that we may see that system very much extended. The soldier will become a more useful member of society, will be enabled to increase his means of subsistence, and will be materially raised in the social scale. Drill, discipline, and shooting, which are the first considerations in a military point of view, will not be less well learnt, or less remembered; temptations to strong drink and vicious habits, which are the result of a want of sufficient occupation, will in a great measure be removed; practice in actual work at home will make him more active, more handy, and more ready to perform any duties that may be required of him abroad or in the field; and he will be better able to provide for himself, and less dependent upon others, when his term of military service is completed.

* *Vide* lectures on "The Rifle and the Spade," 1st April, 1859; and "the Effect of the Modern Rifle upon Siege Operations," 16th April, 1858, at the Royal United Service Institution.