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NETHERLANDS SOUTH AFRICAN RAILWAY COMPANY AND THE TRANSVAAL WAR.

An account by the Secretary, TH. STEINMETZ, dated April, 1900.

Translated from the "Indisch Militair Tijdschrift," No. 4, of 1901, in which it was reprinted from "De Ingenieur," 14th and 21st July, 1900.

I.—BEFORE THE WAR.

THE war, which eventually broke out on 11th October, 1899, was preceded by a long period of tension, of alternate hope and fear.

The consequences to the Z.A.S.M. were a decrease in the inward goods traffic and an increase in the outward passenger traffic.

As early as August, and even some months before, many people looked upon a speedy commencement of the contest as unavoidable, and began to send their families to Cape Colony and Natal and to Europe.

The position of affairs became more and more acute; many people began to lose part of their income; Johannesburg became quieter; the excited tone of the English newspapers, in which the Boers were pictured as barbarians, who would, in case of war, destroy everything, and would not spare even women and children, made the foreign population more and more anxious, and more inclined to leave the country.

Naturally, it was principally the English subjects who fled. Many of them were poor; and for this reason the Cape Railway lowered its fares for destitute fugitives, and proposed to the Z.A.S.M. to do the like.

The latter railway refused, however, to do so, on the ground that there was no reason at the time to assume that Johannesburg was more unsafe than any other place in South Africa. In September the exodus began to be serious, and was at its highest point when, after the declaration of war, all English subjects, who could not get permission to remain, had to leave the country within a week.

British subjects of colour—the so-called coolies from the English East Indies and the Cape bastards—were also obliged to leave.

The cessation of work in the mines made it most necessary to put over the frontier as soon as possible the many thousand Kaffirs who were,

in consequence of it, without work and without bread, and easily turned their attention to plundering and robbery.

The figures below show how many whites and persons of colour were carried to the frontier in the month of September, and in October up to the 19th.

Date.	1st Class.	2nd Class.	Coloured Class. ¹	Total.
September	3,399	10,347	19,775	33,521
October 1-19	2,472	16,433	78,565	97,470
—	5,871	26,780	98,340	130,991

Of the total 130,991 about 53,000 (*sic*) were white and 78,000 coloured. In ordinary times about 9,000 persons leave the country per month. Taking into account that this exceptional passenger traffic partly coincided with the mobilisation and the conveyance of burghers to the frontier, it is not surprising that the number of carriages was wholly inadequate and that people had to be put into open cattle and goods trucks.

As far as possible endeavours were made to put the white women in carriages, and the other whites in separate trucks. Yet one frequently saw trucks packed tight with men of every conceivable colour, from the purest white to the deepest black.

As the journey to Cape Town took at least two days, to Durban one and a half, and to Lourenço Marques one, anyone who knows the African climate can imagine the sufferings endured from heat, cold, and rain, and, in addition, from hunger and thirst.

That there were no accidents on the Z.A.S.M. lines was a great piece of luck, and speaks well for the conduct of its *personnel*.

In order to follow the course of events further it is necessary to go more closely into the relations of the Z.A.S.M. to the Government of the Z.A.R. in time of war.

Article 22 of the Concession reads as follows :—

“When there is danger of war, in the actual time of war, or in case of internal disorders, the Government in the interest of the defence or of public order, may have the control of the railway and of everything required for the use of the same and suspend the ordinary traffic thereon, wholly or partially, and order all such measures as appear to it to be necessary, with reservation of compensation to the concessionary.”

¹ In the through trains to Cape Colony whites were carried in “coloured” departments.

By decree of the Executive Raad, Article 858 of 13th September, 1899, use was made of the above right. The railway was withdrawn from the direction of the Z.A.S.M. and put at the disposal of the Government.

The decree of the Executive Raad says further :—

“ With the view of being able to make proper use of the railway, the whole *personnel* of the above-named Company, under Article 2 of Law No. 20 of 1896, is *commandeered* to do duty on the railway in the functions which they now occupy, and they are placed under the orders of the Commandant-General and the war officers indicated by him, or of other officials, with the understanding that those who can be spared by the railway may always be commandeered by the Commandant-General for ordinary war purposes.”

From this it may be seen that the Company, under the terms of its Concession, was not only bound to convey the *personnel* and *matériel* of the forces of the Republic, but also to execute any other measures which were ordered, such as putting the traffic at the disposal of the Government, the exploitation of the railway in the occupied portions of Natal, the making and repairing of ammunition and guns in the workshops of the Company, etc.

SERVICE ORDER No. 32.

Instructions for the Action of the Personnel in case of a Portion of the Line being taken Possession of by the Enemy.

“ The *personnel* shall continue to perform their duties as long as possible, and not leave their posts of their own accord until these are taken possession of by the troops of the enemy.

The *personnel* must take no part in the struggle unless thereto commandeered by the lawful authority, and carry no arms on their persons whether on or off duty, and must not offer resistance to a regularly armed force.

If these orders are not obeyed the offenders will be held personally responsible.

If a portion of the railway is taken possession of by the enemy, the persons employed on that portion shall endeavour, in some way or other to get to portions of the railway which are not in the hands of the enemy, and place themselves at disposal for the Service again, unless their passage is obstructed by the enemy, or their remaining is desirable in the interest of a family.

No object can be gained either in the interest of the State or in that of the Company by defending the statics and the buildings against a regularly armed force.

If the occupation has been effected, the *personnel* shall cease working and leave the station or the line after having as far as possible put things in order.

The stationmaster, inspectors, and the other higher officials, must endeavour to obtain permission simply to exercise supervision over the furniture, material, tools, office requisites, and the books of the Company, or to hand them over in a regular manner.

In a general way, the principle must be adopted that no service shall be voluntarily done for the enemy. If in some cases, compulsion by threats is employed to get certain duties performed, the order shall be obeyed without raising objections, but the persons employed shall endeavour to get free as soon as possible.

The *personnel* shall be authorised to escape being made prisoners by promising to remain at their posts, and to take no part in the war.

A strict obedience to these provisions is earnestly enjoined on all persons, as well in their own interests as in those of the Company.

THE DIRECTION.

(Signed) J. VAN KRETSCHMAR.

Pretoria,

6th September, 1899."

Until now (April, 1900) the case anticipated in this order has not occurred, on the contrary, the Transvaal Railway Service has been extended beyond the frontiers.

One or two other questions with reference to the *personnel*, consequences of the peculiar condition of affairs, require mention.

Dating from the time when the Cape Government Railway managed the line from the southern frontier to Johannesburg there had been English subjects in several branches of the Z.A.S.M. During the period of pressure more Englishmen were taken on.

There were altogether in the traction traffic, permanent way, and works departments, about 115 English, besides about 540 Afrianders from Cape Colony and Natal, actually British subjects, but mostly of Holland-Afriander descent.¹

Could these men be fully relied on, and entrusted with the safety of the line and the trains in case of war?

As a preliminary measure, as many as possible of the English were transferred to the portions of the system where it was probable they would have very little to do with war traffic, so that the South-Eastern and Southern portions could be manned by Hollanders and (non-English) Afrianders. Later, after the outbreak of the war when the Government expelled the British subjects, permission to remain was only

¹ At the end of 1896, the total white *personnel* consisted of 3,051 persons.

asked for those of the English *personnel* who could not well be spared, and on whom the Company believed it could rely. The others had to go.

Some Englishmen remained in the railway service, and fortunately the confidence placed in them has not until now been betrayed. Among the *personnel* of the Company were about 350 burghers, partly Afrianders from the Free State and Cape Colony. These were all by the law of the land liable for duty, and for the most part very anxious to do it.

In order to be assured that the railway should not lose more of its *personnel* than could be spared, an arrangement was made with the Government whereby none of the *personnel* should be commandeered who were necessary for the railway service; the Company was to point out the persons it did not require, and, in case it wished for men on commando, they were to be sent back.

Many took service voluntarily, by permission, when they could be spared; but with some the desire to fight was so great that they went on commando without leave of the Company, and thus lost their situations.

The relations between the Company and those of its *personnel* in military service were regulated by Service Order No. 33.

SERVICE ORDER NO. 33.

Commando Service.

"In case that by the laws of the South African Republic the persons in the employment of the Company are commandeered to take part in expeditions or to perform duties in any other way in connection with defence, the following provisions are enacted:—

1. If a person employed is commandeered, notice must be given by telegraph to the stationmaster of the section, who shall decide whether the service of the person concerned can be provided for. If this cannot be done without difficulty the stationmaster shall give notice thereof by telegraph to the Exploitation Service, the Chief Engineer, Service of Road and Works, respectively, according as the person belongs to one of these services.

Endeavours shall be made through the Government Commissary to have the commandeering withdrawn.

2. The Company guarantees to those persons who can be spared half-pay if they are single, and two-thirds of their pay if they are married, *i.e.*, whenever the pay to be received amounts to less, the difference will be made up by the Company.

3. If any person employed wishes to volunteer for service, who has not been commandeered, and has been accepted by the military authorities, the stationmaster may give him leave, if the railway service admits of it, *without retention of pay*, and after payment of, or giving security for, whatever he may be eventually indebted to the Company.
If his services cannot be dispensed with, he has to choose between giving up the military service and dismissal.
4. The persons mentioned under 2 and 3, so long as they are doing military or other services for the Government, shall be considered not to be in the service of the Company.
5. If the Government no longer requires the services of the persons commandeered or the volunteers, as soon as they have reported themselves to their immediate superior officer, they shall be taken on service again, so far as they are physically fit for it, with the grant of full pay, excepting those volunteers mentioned in 2nd paragraph under 3.
6. If persons who are in military service receive orders from the Exploitation Service or from the Chief Engineer, with the approval of the Government, to resume their service on the railway, they must obey the orders immediately, on pain of dismissal.
7. For the volunteers mentioned under 3; if a payment is made for them in the Netherlands, this shall be temporarily stopped, unless the money for it is paid out in advance, or satisfactory security is deposited.
8. The stationmasters must give orders to the Exploitation Service or the Chief Engineer respectively of all persons who are accepted for military service.

These provisions do not apply to persons employed who, by reason of engagements with the artillery corps, are called out for ordinary or repetition exercises. For this object the usual furlough shall be given, without retention of pay.

THE DIRECTION.

(Signed) J. VAN KRETSCHMAR.

Pretoria,

7th September, 1899."

After the great exodus of English subjects and after the mobilisation when the passenger and goods traffic so far decreased that the night service could be stopped on a great part of the system, a great number of the *personnel* were spared for war and guard duties. The state of things at the end of 1899 is shown by the following table:—

<i>Personnel</i> on Z.A.S.M. Railway in Transvaal ..	2,223
„ „ Natal Railway captured by the Z.A.R.	221
<i>Personnel</i> lent to the Orange Free State ..	27
„ „ „ Pietersburg Railway ..	4
„ of the Z.A.S.M. on commando or guard duty	576
	<hr/> 3,051

The guard duty mentioned above was under the Commandant-General, and is to be regarded as war service.

By reason of the great number of Anglophiles who, it must be assumed, were still in the Republic, and by reason of the long stretches of line in a sparsely inhabited country, it was necessary at first to watch very carefully against the attacks of evil-minded persons on the bridges and other points of the railway which might affect the safety of the trains or occasion disturbance of the traffic.

Guards were, therefore, placed at nearly all the larger bridges and other important points; they consisted partly of burghers, and partly of volunteers from the Hollander Corps, which itself consisted partly of the *personnel* of the railways. Except that at the beginning of the war dynamite carriages were sometimes found on the track (they were always removed in good time), no real attack on the line within the borders of the Republic was successful, or even got as far as execution.

II.—MOBILISATION.

A modern European comprehends at once that the mobilisation of an Army takes place in pursuance of a pre-arranged and detailed plan, in which definite train time-tables are provided, founded on the number of troops and quantity of material, which have to be carried, and their place and time of shipment.

An Afriander does not comprehend this; on the contrary, he does not think it necessary to arrange and fix every detail beforehand, he relies rather on finding a way out of a difficulty, and on making a plan as the necessity arises.

Until now this has answered pretty well, although things have not gone so smoothly and well as they might have done had more preparation been made.

Where there were deficiencies, the general good temper, patience, and facility for bearing privations have helped to overcome all difficulties. To within a few weeks of the war the highest military authorities were not convinced that it was necessary to prepare for the worst with every

means at their disposal; the hope that it would not be necessary kept everything back.

In spite of repeated endeavours, the Company did not succeed in obtaining any *data*, even of the vaguest character, as to the number of burghers, horses, and wagons which it would be necessary to convey from any particular station to another.

Even the total number of burghers who would be sent to any particular point of the frontier or to the frontier as a whole was absolutely unknown. One could only guess that if the English did not anticipate us (*ons niet voorkwamen*) by an invasion *via* Lang's Nek along the S.E. line, the greater part of the forces would be conveyed to the Natal frontier.

The case of an English invasion—about which there was much anxiety on account of the armoured trains which the English advertised so loudly—was prepared for only by preparing some of the bridges on the S.E. line for demolition.

On account of a total lack of *data* with regard to the stations which must be prepared for loading and unloading horses and ox-wagons, there was little to be done except to arrange for temporary platforms and ramps, so that it would be possible, somehow or other, to load cattle at stations where no arrangements existed. 20 cattle ramps (*vee laad bruggen*) and 20 temporary loading platforms were made, while others were, in haste, widened and improved.

In addition, timber and sleepers were deposited at various stations, so that temporary cattle loading docks could, if necessary, be made.

The general goodwill and the handiness of all Afrianders in working with horses and oxen helped to overcome the difficulties which arose from the incompleteness of the arrangements and want of preparation.

Ox-wagons, guns, and ammunition wagons were by preference kept together in one train of the necessary number of trucks and put on by end loading, the intervals between the trucks being bridged over by planks, and the outward end arranged so that the carriages could not run over. Each gun and wagon, therefore, had to be pushed the whole length of the empty train by man power; when in position they were made fast by wedges and the wheels secured by leather *riems*.

The total lack of *data*, already alluded to, made it impossible to elaborate a time-table for the military traffic; it was, therefore, determined to stick, for the time being, to the ordinary schedule, to add special trains as they became necessary, and to keep some ready for use, which was very difficult, as the ordinary traffic to the frontier had to be kept up until the war actually broke out.

Instead of the frontier station Volksrust, where there is a large platform and ample arrangements for detraining wagons and animals, the station next before it, Zandspruit, was appointed by the military authorities as the place of assembly for the forces destined to invade Natal. The station has only one short piece of double line to allow trains to pass, a short siding and a small dock; extensions were of course made, but the station was wholly unsuitable for the rôle suddenly thrust on it; and this was the cause of unavoidable friction, so that the full carrying capacity of the S.E. Railway was only attained after several days. This, as the line was single, with stations about an hour apart, was limited to 11 trains a day in each direction. During this period two temporary crossing stations were laid out on the S.E. line.

To enable detraining to be carried on at night at Zandspruit, an electric light installation was erected in the early days of October; it consisted of 2 masts with arc lights worked by a dynamo on a locomobile.

After the most pressing commando traffic was over, the night service was stopped, with a view to security, on 15th October.

When the service to the commandoes was continued in Natal, it was necessary to introduce the night service again on the S.E. line in order not to lose too much time on the journeys. But in the portion of Natal occupied by the Boers the night service was never introduced, and traffic was worked almost exclusively by daylight.

Meanwhile, in consequence of an almost complete cessation of the ordinary traffic, important reductions could be made on the other lines.

The night service was given up on the sections Springs-Krugersdorp (the Rand Tram) and Witbank-Komatie Poort (the Eastern line minus its Western portion). By the latest traffic notice (4th March), trains will only be run by day on the Eastern line.

Besides this, with the exception of a few passenger trains between Pretoria and Johannesburg, the speed allowed was only that of mixed trains and goods trains.

In consequence of these limitations of the traffic, a large number of the *personnel* was freed and placed on the Natal Railway, lent to the O.F.S., or placed on military service, as already related.

The total military traffic to the frontier was not so great as one would expect in spite of only a portion of the burghers having taken up arms. From various districts the commandoes marched mounted, with ox-wagons, to the place of assembly, as had been the custom in the past, although the use of the railway would have saved time and trouble to both men and horses. Yet it was not the first time that the Transvaalers had had the opportunity of learning the use of railways in warfare. At the time of the Jameson Raid and the Magato Campaign full use had been made of them.

The first military train left Pretoria on the South-Eastern line, on 28th September, with a part of the artillery, consisting of 6 guns and timbers, 8 ammunition wagons, 60 men, and 105 horses.

The following table gives some figures of the war traffic:—

Date.	Men.	Horses and Mules.	Oxen.	Wagons.	Guns and Ammunition Wagons.	Goods (Tons).	Ammunition (Tons).
From 28th September to 10th October, to Zandspruit alone ...	8,369	5,381	1,907	308	8	1,525	93
From 28th September to 10th October, total military traffic ...	9,065	6,256	1,935	495	37	1,778	383
From 28th September to 31st October, total military traffic ...	13,413	13,271	3,203	1,077	53	3,972	683

After October, the whole military traffic could be carried out quite easily with a reduced service.

Beyond the ordinary despatch of slaughter-oxen and other supplies, and horses and ammunition, and the conveyance of the many burghers who were always going on leave or returning, and generally took their horses and goods and frequently their ox-wagons with them, the traffic offered no special points of interest.

Use was also made of the railway to transfer whole commandoes from Natal and from the Western border of the S.A.R. to the Free State. A medium train for a commando with wagons carried about 125 men with the same number of horses, 3 ox-wagons, 30 oxen, 1 wagon, and 16 mules. The typical composition of such a train may be taken as 4 first and second class carriages, 16 cattle trucks, 4 low-sided trucks, 2 goods trucks, and 1 luggage van—altogether 27 vehicles.

Whenever there were no ox-wagons, or whenever these were sent separately, a medium train for a commando took about 200 men with horses and baggage, and consisted of 6 carriages, 20 cattle trucks, and 1 luggage van, or 27 vans as before.

With such a train a number of Kaffirs usually went as followers and servants; they found places as best they could.

With 2 engines the number of trucks was 40 to 50.

The rolling stock consisted of:—

Carriages, first class	-	-	-	-	-	142
„ second class	-	-	-	-	-	44
„ for coloured persons	-	-	-	-	-	49
Coal trucks	-	-	-	-	-	2,530

Cattle trucks	-	-	-	-	-	-	541
Closed goods trucks	-	-	-	-	-	-	477
Timber trucks	-	-	-	-	-	-	375
Long coal trucks	-	-	-	-	-	-	979
Platform trucks	-	-	-	-	-	-	10

In consequence of the exodus of foreigners on the outbreak of war and the interruption of the traffic with Natal and Cape Colony, of these carriages and trucks there were 194 in Natal (of these 26 were recovered later) and 222 in Cape Colony; the loss was made good by 252 Natal trucks which were found in the occupied part of Natal, and the Natal and Cape trucks which were on the Z.A.S.M. lines at the beginning of the war. Notwithstanding, there were not enough cattle trucks and far from sufficient platform trucks for the transport of guns and ox-wagons.

As in consequence of the decreased coal traffic, only a small number of coal trucks were required, and there were also trucks used for the transport of rails and long timbers available. Three hundred and fifteen coal trucks were converted into cattle trucks by the addition of temporary partitions, and 139 coal trucks and 223 timber trucks were made into platform trucks by taking away the sides and saddles.

III.—OPERATIONS IN NATAL.

When, in the course of September, diplomatic relations were strained to breaking point, and the conviction gained ground that England wanted war and would force it, either by demanding more than the Republics could grant or by some other means, it was to be anticipated that the Transvaal would take the initiative and attack. By doing so they would ensure a certain advantage as long as the English Army in South Africa was still weak.

This actually took place, although the advantage was nearly all lost through lack of activity before Ladysmith and Kimberley and the raising of the sieges.

For a long period, however, it was expected that the English would make the first attack, and it was thought that the war would begin with an invasion of the Transvaal from Natal over Lang's Nek. The Government did not wish to give a pretext, by assembling burghers on the frontier, for this invasion to be easily carried out.

Certain positions only were fixed, at which an attempt was to be made to hold the enemy; the necessary measures to make the railway unserviceable were also taken, among others an iron bridge of 166 feet span was prepared for demolition.

In order to be able to telegraph from a station up to the latest moment, the instruments were shifted from the usual offices to other

rooms, so that if the station was suddenly attacked information could be sent; the necessary precautions were also taken to prevent the enemy destroying the apparatus by turning on a strong current.

But none of these measures have, until now, been of use, for the course of events was not that which was anticipated.

The English were surprised by the initiative of the Republics, did not feel themselves strong enough, retired in all haste from the frontiers in order to concentrate at Dundee and Ladysmith, and the Boers entered Natal without encountering resistance.

On 14th October the Commandant-General gave the order to man the Natal Railway and to work it for military traffic. As the commandoes advanced, the Natal line was opened as follows:—

17th October	to Newcastle	-	-	62 kilometres.
20th	„	„	Dannhauser	- 98 „
22nd	„	„	Hattingspruit	- 110 „
25th	„	„	Glencoe	- 122 „
27th	„	„	Dundee (branch line)	9 „
2nd November	„	„	Elands Laagte	- 171 „
7th	„	„	Modderspruit	- 187 „

Before a new section was opened, a careful examination of its condition was of course made.

It appeared that the English railway *personnel* had retired in a great hurry, that they had not attempted any demolitions and had not done any damage of importance; the Lang's Nek tunnel was wholly untouched.

At a few places the rails were unspiked, which was easy to repair; the points at one place on the main line had been taken away and all the telegraph instruments had been removed.

The Boers themselves, however, through fear of being surprised by armoured trains, and for other reasons, gave the breakdown gangs more work to do. The telegraph line was destroyed by them for long distances, the track was broken up and a couple of bridges damaged. In order to obstruct the retreat of General Yule from Dundee a bridge of two 30-foot spans on the Dundee branch line was blown up, by the Irish Brigade, with a dynamite charge in the central pier. The damage done was not very great, and was easily repaired. The same ineffective method was applied with greater success to a similar bridge over a small spruit near Waschbank. But even here the repair was not difficult.

In consequence of the ineffective guarding of the line in Natal, some Englishmen succeeded in damaging the big bridge over the Waschbank on the night of the 8th-9th December.

The bridge consisted of two 100-foot spans; it was only guarded by two Kaffirs, who ran away.

The attackers were too hasty about their task, and only managed to cut through the top flange at the end of one girder, near the centre pier, with a charge of dynamite; the lower flange was undamaged, and the bridge remained in position. The Kaffirs brought intelligence of the attack, so that the approaching train could be stopped until the repairs were completed. They consisted simply of a pier of wooden sleepers under the end of the second section; by 2 p.m. the bridge was again ready for traffic.

The bridge over the Sunday River was also damaged by dynamite by evil-disposed persons on the night of the 29th-30th November while the guard was asleep, but not seriously.

On 2nd November, 1899, the station at Elands Laagte was opened; it was intended to be the end station of the regular service and the commissariat dépôt. A pair of points and some line were laid.

Supply trains were forwarded to the Boer headquarters at Modderspruit, and at this point of the line, about 5 or 6 miles from Ladysmith, a temporary station was erected, a semi-circular line and two sidings laid, and a platform of sleepers and planks made. Later on a goods loading dock, taken from the Ingagane Station in Natal, was erected.

Various stations in Northern Natal had been extended by the English with a view to large movements of troops, and provided with long high platforms for detraining cavalry and increased water supply, improvements which came in very handy for the Federal Army.

The telegraph lines were repaired as the Army advanced, and 24 telegraph instruments were put up in the stations. On account of its simplicity and the small number of cells required, the American intermittent current system was used in Natal.

At the end of November, when General Joubert returned from his invasion of Natal to the north bank of the Tugela, this naturally magnificent position was occupied by the Boers.

The Tugela bridge at Colenso was destroyed. The destruction was carried out under the immediate orders of the military authorities by an inspector of the Company, who, like many others, had served in the Dutch Engineers, and was therefore no stranger to demolition work.

The bridge consisted of five iron lattice girder spans of 100 feet each, on masonry piers. In each of the spans a dynamite charge was placed, at an interval of one-third of the length from one end, against each of the lattices, the upper and lower flanges, the web, etc., so that there were about forty charges altogether, all connected by leads to a Siemens and Halske "exploder." The forty charges detonated at the same moment and the bridge was very thoroughly demolished. One of the stone piers was afterwards levelled to the ground.

The bridge over the Orange River at Norval's Pont was also blown up by the Z.A.S.M. *personnel*.

Three spans were destroyed by dynamite charges placed against the upper and lower flanges and the web. On account of the trough shape of the flanges the dynamite was placed between the iron and a wood core about 4 inches thick, which was spiked to a plank fastened under or above the flange.

Such a charge takes about eighty cartridges or about 11 lbs. of dynamite. But in this case the explosive was not used grudgingly, as for the three spans about $3\frac{1}{2}$ chests of dynamite, or 198 lbs., were used.

The explosion of the charges took place simultaneously with the help of a Siemens "exploder." Nothing was done to the iron piers, as they fell of themselves.

The road bridge, close to the railway bridge at Colenso, was not destroyed. This was done by English shell during the battle of Colenso (15th December, 1899).

On the section Colenso-Ladysmith one small bridge near Nelthorpe was destroyed earlier during the investment of Ladysmith.

In order to be able to reach the Tugela position easily, the Commandant-General judged it desirable to make a road bridge over the Klip River on the Elands Laagte road near Colenso. This bridge was built alongside the existing drift, which is a very bad one. It was about 166 feet long and was wholly made of 3-inch by 9-inch timbers; it was anchored with steel cables as precaution against floods.

In order to obtain communication with the positions which the Boers still held on the south of the Tugela, another small bridge, suitable for foot passengers, horses, and, in cases of need, for vehicles, was thrown over the river by the *personnel* of the Z.A.S.M. It was built near the so-called Bosch Kop or Monte Christo. It consisted simply of baulks laid in the shallow river and anchored from rock to rock by cables; the roadway was formed by wooden sleepers, which were taken from the neighbouring railway, and held together by a rail at each edge. The sleepers were 7 feet 4 inches long, and thus formed a roadway of quite sufficient breadth.

After the Boers had given up these positions, in the night of the 19th-20th February, they burnt this bridge as well as the flying bridges which had been made in the neighbourhood.

As the wagon road was extraordinarily bad, the Commandant-General intended to improve the communication with the Tugela positions by taking into use the piece of railway from Nelthorpe *via* Pieters Station to the foot bridge on the Tugela; an order to this effect was given on 17th November.

This piece of line, about 11 kilometres long, was very little damaged; only a small bridge near Nelthorpe required repair. There were some open goods trucks of the Natal Railway left behind on it, which were sufficient for the purpose, but there were no locomotives. These could only be brought from Modderspruit, more than 20 kilometres off, by a very bad road.

Two 19-ton locomotives were partly dismantled at Johannesburg. The boiler was loaded on one very strong lorry, such as is used to move boilers, the under carriage on another, and they were placed, lorries and all, on railway trucks.

The transport over the wagon road was very troublesome, on account of the hills, mud drifts, and high water. But both engines got to Pieters on the 28th December, and the 30th December were ready for service.

The piece of line was opened for traffic on 3rd January. The line was naturally not very much used, its very short length hardly made the saving in transport over a bad road worth the trouble and loss caused by two extra loadings and unloadings.

In the last days of February, when the Colenso position and Ladysmith were abandoned, the two locomotives were left behind, after they had been disabled by removing the connecting rods.

In the same manner as above described, a locomotive was transported from Modderspruit to Smith Crossing, a ferry on the Ladysmith-Harri-smith line, in order to work the line on which only one locomotive had been left behind.

On the relief of Ladysmith, both these locomotives were removed out of the reach of the English in good time.

The obvious idea of making a loop line round Ladysmith, *e.g.*, from Modderspruit along the Boer positions to Pieters, was also considered, although it looked like a long job, but it was abandoned on account of the great distance and the difficulties of ground.

When, on 18th February and following days, General Buller at last succeeded in gaining possession of the important positions on the south side of the Tugela, and was pressing forward from them—which in conjunction with the disasters in the Free State led to the abandonment of the siege of Ladysmith—the Council of War decided to occupy the Biggarsberg positions.

On 1st March, the last train left Ladysmith, only leaving behind a couple of Natal goods trucks which were off the line, and had been used for dwellings by the *personnel*.

The last train was barely away before shells fell in the station.

The retirement of the railway *personnel* and *matériel* to Glencoe was carried out in perfect order. All telegraph instruments were taken away.

In the afternoon and night of the 1st March, the so-called "demolition train" followed. All the bridges, many masonry culverts, and the water reservoirs were blown-up.

These reservoirs are tanks about 3 feet 4 inches high, formed of cast-iron plates of a fixed model, so that the tanks can easily be enlarged. They stand on cast-iron pillars; one or two of these columns were destroyed and the tank then fell to pieces.

The demolition of the bridges was carried out in the same manner as the Colenso bridge. There was no lack of explosives nor necessity to spare them, so there was no uncertainty about the results.

The railway service in Natal was now much simplified. Hatting-spruit, about 110 kilometres from the frontier, was the end station, while supply trains went as far as Glencoe (122 kilometres).

The working of the Natal line was from the nature of the case very irregular, for commandoes were shifted at very short notice, that nothing might leak out about their movements. Much was therefore demanded of the *personnel*, but the administration was extremely simple.

All traffic took place on Government traffic orders, there was no private traffic, therefore no receipts, and no responsibility. On the other hand, all cost of *personnel* and *matériel* was charged against the Government.

As long as they held out, use was made of the stores left behind on the line, such as coal, etc.; the Service Orders were printed by the Volksstem press, which was carried in a railway carriage, on the menu cards of the station restaurants.

The Natal coal mines, which all lie north of the Tugela, fell undamaged into the hands of the Federal States, but they were not worked, so that the coal needed for the Natal line, as soon as the supplies found had been used up, had to be obtained from the Transvaal.

IV.—THE WORKSHOPS.

In conclusion, there remains a portion of the work of the Z.A.S.M. to be described that certainly has contributed not less than anything else to the comparative success of the Republican Army and to make the continuation of the war a possibility.

One of the things which the War Department of the S.A.R. had neglected to provide in the years which preceded the war and followed the Jameson Raid was an arsenal.

There were indeed guns, of the best type, although not many of them, and rifles and a great quantity of ammunition; but there were no workshops for the manufacture of cartridges, shells, and what, in general, are called projectiles. Shops speedily became desirable also for the repair of guns, rifles, and wagons, for the manufacture and repair of harness,

saddles, and a hundred other things which belong to the indispensable equipment of an Army.

By the so-called commandeering, *i.e.*, forced sale to the Government, as well as from abandoned warehouses and the shops which still remained open, the men were more or less provided with clothes, shoes, and many other articles; while later on a few workshops were improvised.

Rifle cartridges were made by the Transvaal Explosive Company (Maatschappij voor Ontploffbare Stoffen) and by Delfos Brothers of Pretoria; gun ammunition was made by both the above, by a workshop at Johannesburg, which was commandeered by the Government and placed under the care of the representative of Creusot, and by the central workshops of the railway at Pretoria.

The last alone was in a position to execute repairs to guns.

The Government made great use of the powers, which it had by virtue of the concession over the workshops as part of the railway.

Although the work on the maintenance of the railway material was limited to the absolutely necessary, it became necessary to introduce regular night work in the shops, and a whole electric light installation was put up for the purpose.

Among the most interesting work which was carried out in connection with the war must be mentioned four complete ambulance trains. Each consisted of a hospital car, 2 passenger cars, 5 luggage vans, and a closed good trucks. Of the luggage vans, 3 were without special fittings, 1 was provided with chests, filters, water-tank; and a petroleum store, and the fifth, in addition, with a heating stove.

The hospital cars were mounted on a big frame carried by 2 bogies. One car had 32 and the other 20 beds; these were fitted with wire mattresses, except one or two, which were provided with wooden bottoms for wounded who could not stand the movement of the wire mattress.

Of the work which was done of the artillery, I shall only mention the most important. A 15·5-centimetre Creusot gun, named Long Tom, that was injured by a night sortie of the English to Lombard's Kop (near Ladysmith) in December, left the workshops in January wholly fit for service. The bore was badly injured by a dynamite charge at a short distance from the muzzle, the breech was also damaged, and the breech block lost. The gun was shortened at both ends, about 16 inches in all, the chamber was shifted forward, a new screw thread cut, and a new breech block made. The gun appears not to have lost either in accuracy or in range.

The Krupp howitzer that was also injured at Ladysmith—by a dynamite charge that was placed on top of the gun and caused a dent in the bore—was also repaired, the dent removed and the grooves re-cut.

In place of a similar Krupp howitzer, which was so much damaged that it could not be repaired, a completely new one was constructed on the model of the damaged one. Steel that stood the same tests as the model was found in Johannesburg in the form of a heavy machine shaft. This gun is still in use.

A number of repairs were also done to large and small guns and Maxims.

Three timbers and platforms were made for the 15·5-centimetre Creusot guns, and the wheels of many guns were repaired and renewed.

Howitzer projectiles with steel points, intended for use against armoured trains, were also made. But by far the most work was done in casting and turning time and percussion fuses, which, as already reported, was done in co-operation with other factories.

(Signed) TH. STEINMETZ,
Secr. der N.Z.A.S.M.

Pretoria,
April, 1900.