WIRELESS TELEGRAPH ON THE LACKAWANNA*

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The Lackawanna first made experiments with wireless in 1909. During the early part of 1913 towers were erected at Scranton and Binghamton. On November 28, 1913, train orders were transmitted between the two points and messages were first transmitted to and from trains and fixed stations at Scranton and Binghamton three days later.

We now have stations equipped with Marconi apparatus as follows:

	Call.	Wave Length Meters.	Height of Tower. Feet.	Capacity of Station. Kilowatts.
Hoboken	WBU	3,000	402	5
Scranton	WPT	3,000	175	2
Binghamton	WBT	1,800	165	2
Buffalo	WBS	1,600	150	2
Limited, Train No. 3	WHT	600		1
Limited, Train No. 6	WBG	600		1

The wireless apparatus on the train is similar to that at the fixed stations. The motor generator, operated on 30 volts direct current from the car-lighting generator, draws about 40 amperes, and provides 500 cycle alternating current at 250 volts for the radio transmitter. The antenna current is about 35 amperes.

We can communicate from a moving train to a fixed station 130 miles away, but are able to receive messages on the train from a fixed station 200 miles distant. The aerial on the train is a phosphor bronze wire arranged in rectangles, one running lengthwise above the roof of each of four cars, with an additional wire lengthwise. These wires are parallel with the top of the car, and 18 in. above it, each rectangle being carried on porcelain insulators at the corners and center of each car, with wire link connections between the cars. The lead is taken from the middle of the antenna through the side of the car near the roof into a compartment two by four feet, which contains the apparatus and the operator.

After the first trip it was found that there was no interference with signals. The speed of the train, or its change of direction, has no effect on the transmission or reception of messages, and communication to and from the train is not retarded while the train is passing through tunnels.

The train radio service has been used for such purposes as reporting the number of passengers on board destined to connecting lines, providing additional cars, or cutting out cars at division points, or ordering an ambulance for persons taken ill on the train. Commercial telegrams are sent for passengers. The wireless telegraph serves as an auxiliary means of communication in the event of interruption to wire facilities, and has already proved its practicability and efficiency under such conditions. The wireless office at each division point is located near the despatcher's office, and in case of total wire failure the wireless is resorted to immediately for communication between the stations named above.

The cost of installation is not prohibitory, considering the advantages to be gained in having a means of communication which can be relied upon when all other sources fail. In 1914 we had a storm in March that completely wrecked pole lines in New York, New Jersey and Pennsylvania, and the only communication we had for 10 days was the wireless. Again, early in December, there was a severe ice storm, and there was absolutely no wire communication in this territory for three days. We had to depend on the wireless, and obtained entirely satisfactory results.

That we are obliged to carry an operator on each train equipped with wireless has led us to take up the wireless telephone. We have obtained some favorable results, having talked from a fixed station to a moving train a distance of 53 miles. The wireless telephone requires 110 volts, and we were obliged to install a 5-h.p. steam turbine in the baggage car, taking steam from the locomotive. In the front end of the car, next to the baggage car, is a small compartment for the apparatus and attendant. The transmitter resembles the quench spark wireless telegraph, and requires no attention after being set to the desired wave length. When adjustments are made to the required degree for receiving in tune with a particular station wave length, no other station can pick up. We have made a number of trips with our installation and have transmitted the voice from trains to fixed stations 15 to 25 miles distant. The wireless telephone is being developed slowly but surely.

Discussion. The paper was discussed by several members. It was the general opinion that the wireless was a useful auxiliary as an insurance against total loss of means of communication when the pole lines were crippled by a severe storm. As such storms occur so seldom, it was doubted, however, whether the use to be obtained from the wireless was sufficient to make the expenditure for it worth while. Several speakers expressed the view that there was little or no advantage in using a wireless telegraph for train despatching except when the wire lines were crippled; and it was conceded that the wireless telephone had not yet reached a practicable stage.

*Abstract of a paper read before the New York Railroad Club on February 19.

THE RUSSIAN BATH TRAINS

Soon after the outbreak of the war the Russian Imperial Ministry of Ways of Communication, formed a committee to superintend the distribution of a fund subscribed by the railway officers and employees for aid to the sick and wounded. The Russian peasant is accustomed to take his vapor bath every Saturday, and the absence of this comfort was keenly felt. One of the achievements of the committee has been to equip a number of bath-trains for the soldiers at the front.

Each of the three trains which have thus far been despatched to Poland is composed of over 20 cars, including four bath cars, subsidiary cars for disinfecting garments and ridding them of vermin, a refreshment car and cars containing supplies of clean linen. In the bathing car it was necessary to provide baths for the greatest possible number at the smallest expenditure of water, for often there is difficulty in getting a supply of water at all. A combined shower-bath and vapor system has been used, the equipment being simple, inexpensive, and economical in time and water, and offering the least danger of infection. The bath car is a large Pullman car divided into two compartments. The larger of these contains 21 shower baths, disposed along the walls, and a number of wooden benches. The smaller compartment forms the vapor bathroom and is provided with three shower baths; fixed to the walls are wide shelves on which the soldiers lie. The car accommodates 24 soldiers at a time and the whole set of four cars a total of 96. The walls are double-panelled and insulated by a layer of felt so that the temperature may be maintained at 69 deg. C. The floor, the ceiling and the upper part of the walls are lined with linoleum, and the lower part of the walls with zinc panels. The water drains off through a sink in the body of the car. The bath cars are connected at one end by means of gangway bellows with two cars where the men undress, and at the other with two others where clean linen and the disinfected overclothes are put on. Each of these cars accommodates 48 men and the walls and flooring are identical with those in the bathing cars.

The cars for disinfecting clothes and getting rid of the vermin form an essential part of the train. Superheated vapor and formalin are used for disinfectants. The disinfection car is divided into three parts, these being, respectively, a room for cast-off clothes, the disinfecting chamber proper and a space where clean clothes are dried. As the car is not sufficiently large to provide for all the bathers, and since the clothes are turned out in a wet condition and require some time to dry, only such clothing as is infected passes through the car, the rest being merely sent to the chamber where the vermin is destroyed.

The next car is a tea room, which is fitted with tables and benches and can accommodate from 80 to 96 men at a time. The dining car is composed of two sections, the first forming the dining room proper for the staff of the train and the second

the kitchen. The officers of the staff are lodged in a special compartment car and the rest of the crew in a third class car.

There are also two more cars; one fitted with closets and chests containing a supply of clean linen and the other carrying the soiled linen, which is deposited at one of the laundries which the committee has established at various places. The train itself and the hot water used in the baths are heated by a superannuated eight-wheel locomotive.

About 2,000 soldiers can be accommodated in the course of one working day of 18 hours. The soldiers are first sent to the undressing rooms where every man gets a ticket and two bags marked with the same number, one for his cast off linen and the other for his outside clothes; these are then carried, respectively, to the disinfection chamber and the soiled linen car. Each man has his hair cut by the barber, after which he proceeds to the bath car, where he is given some soap, a brush and a brass wash basin. When he returns to the dressing car he is supplied with clean linen and given his outside clothes, the latter having been mended if necessary. He is then sent on to the tea room and he is provided with hot tea, sugar, bread and tobacco. The equipment of one of these trains costs about $30,000. The total cost of operating it, including the supplying of the clean linen, is $46,000 a month.

We are indebted to the staff of the Russian Imperial Minister of Ways of Communication for the above information.

AN ENGLISH EXPERIMENT IN RAILROADING

As has several times been noted in these columns, the railways of Great Britain are now under government control and are being operated by a committee of general managers. The government has agreed to pay for the services rendered to it a sum sufficient to make the net revenues practically the same as before the war. The following comments on the way the plan is working out are taken from a letter from a London correspondent of the New York Times' Annalist:

What has been the effect of government control on the earnings of the railways and on the services given to the public? Concerning the former little can be said. The railways have been relieved from the obligation to publish full accounts, which, in view of the arrangement with the government, would be farcical. They have for the same reason ceased to publish the usual weekly returns of approximate gross earnings which formed some guide to the stock exchange of the intrinsic merits of their different stocks. In regard to the services to the public, reliable information is scarce. Freight cars have been rushed from the military bases to the ports, and the process of bringing them back empty has not been too well handled. This, however, may be due to dislocation of the ordinary trade channels, not to mismanagement.

Passenger services, except with the continent, have been maintained fully at the ordinary winter standard, restaurant and sleeping cars running as usual, as well as excursion trains. The only exceptions have been the services to Ireland, which have been reduced owing to the absence of suitable steamships, many of the usual vessels having been taken over as hospital ships or transports. Also certain suburban and underground services have been reduced in London, owing to the earlier hours kept by the inhabitants. On the other hand, some special holiday facilities, which usually end in September, were kept on till November because so many folk had postponed their holidays at the outbreak of war. It is anticipated that this summer the services will be extended as usual.

Efficiency of running trains has on the whole not been so good as in peace time, but it does not appear that this is due to state control. Occasionally, when another 40,000 troops or so, with big guns, ammunition, and impedimenta, go to France, or India, or Egypt, the ordinary traffic on certain sections may be held up. The actual embarkation of troops at Southampton and other ports has been performed with great efficiency. The trains usually come alongside the steamer, discharge their contents, and make room for a successor, in about 12 minutes. This is one of the few departments where the British have little to learn from other peoples; the process is so familiar, owing to the frequent movements of troops overseas in peace time, and the men in charge have three years' experience of the South African war to help them, so that muddle is rare. The melancholy reverse process of bringing back the special hospital trains of wounded is equally well done. There have, however, been rather more accidents than was to be expected since the war began. The cause of this seems to be shortage of labor. There are 600,000 railway men approximately in the country, of whom 70,000 are now with the colors. Enlistment from among them is now being discouraged, but even the places of the 70,000 have proved hard to fill. Thus boys and other untrained persons have often to be employed, with the results that inevitably follow the use of inefficient labor.

Replacement of freight and passenger cars does not appear to be going on as rapidly as usual. Shortage of labor is here the cause again, not economy, for from the shareholder's point of view economy in repairs paid for out of revenue is no advantage, because the government makes up the difference in net receipts, as already described. Moreover, some of the railway manufacturing centers (which are controlled by the railways themselves to a very large extent) have been transformed into armament works.

VACUUM PAINT SPRAYER

The paint sprayer shown in the accompanying illustration is operated by means of a vacuum created in the delivery pipe. The paint is contained in the can under atmospheric pressure, and is drawn up into and through the nozzle by means of air pressure passing over a series of holes in the nozzle. The quantity of paint is regulated by the air valve, as shown in the illustration, and the sprayer itself is controlled by a push valve which controls the flow of air. Air at the ordinary shop pressure may be used to operate this machine, and its construction is of such a simple nature that it may be used by unskilled labor. The only precaution necessary in using this machine is to be sure that it is thoroughly cleaned, after being used, either by turpentine or by benzine, in order that the atomizer may not become clogged with the paint, which would otherwise harden while the machine is idle. The sprayer is sold by the Gustin-Bacon Manufacturing Company, Kansas City, Mo.

Vacuum Paint Sprayer for Railroad Work