



HE two great means of communication on the modern battlefield, the means by which general hendquarters keeps in touch with every sector of the line and by which the perfect co-ordination of all branches of the service is possible are the airplane and electricity.

The romantic appeal of the aviation service, the stirring stories of high adventure that have come out of the war have made the work of the birdmen, the superseders of cavalry as the eyes of the commander, familiar to the people at home. On the ground

charging infantrymen and roaring cannon capture the imagination. But

the heroic labors of men who keep open the telegraph and telephone lines which make co-operation of infantry and artillery possible are almost unknown outside the service, save, for instance, when one reads of a medal bestowed on a line repairman for magnificent disregard of danger. For their losses and their honors are alike great.

They go over the top with the troops, smoking their pipes, coolly stringing lines behind the advancing first line so that the gun crews may be kept informed of the advance or told to concentrate their fire on a particularly obnoxious machine gun, says a writer in the New York Sun magazine section. They

clamber out of dugouts into the slush and the freezing wind of a winter right to feel their way along a broken wire, sometimes over the shell-pitted open ground behind the trenches until they find the break, then sitting in ice water under fire they repair it as carefully and skillfully as if they were at work in the shop at home. It often takes three or four men to repair one of these breaks; the first men sent out may never come back.

Repaired at all costs the wire must be, and danger does not excuse a slipshod bit of work. For the signal system of the army is what the nervous system is to the human body.

Without it the modern army covering 100 miles of front cannot see, feel or move. The army commander wishing to move a portion of his line 50 miles away or to change the rapidity of his artillery fire or to receive information of enemy movements is as helpless without the siender threads of copper as he would be if he wished to move his right arm and found the nerves paralyzed.

"There are still people of intelligence who think that the transmission of military thought is summed up in the use of the notebook, the orderly and his horse," writes Brig. Gen. George P. Scriven. "But these are passing, and the trained soldier and the educated volunteer understand the vital importance of information.

"Hence the necessity for a signal corps or its equivalent, for without its aid modern armies can no more be controlled than can great railway systems; the commander in the field remains blind and deaf to the events occurring around him, incapable of maintaining touch with conditions and out of reach of his superiors or those under his authority upon whom he depends for the execution of his plans. The brain lacks the power to control because the nerves are lacking.

"Time is the main factor in war; to arrive first with the greatest number of men and with the clearest understanding of the situation is to succeed. The last, and often the first, of these conditions depends upon the lines of information of the

And these lines in turn depend upon the obscure but daring work of the repairman, the grimy, mucky, hard-fisted mechanic who crawls on his belly through shell fire calculated to appail the stoutest heart and connects the break between the commander and the point he wishes to reach.

Somehow the lines are kept open all the time or are broken for only short intervals, and the constant tending of them has made possible in France a system of wire communication that is a marvel of efficiency. Indeed so perfect is it that London and Paris are in direct connection with general headquarters on the British front, which in turn is in touch with every division and brigade staff on the line. A wire could be put straight through so that Lloyd George if he wished could hear the bursting of high explosives and shrapnel on the Amiens front.

This tremendous use of the telephone and telegraph in warfare is partly the result of the impetus arising from the American application of electrical communication on a large scale in the Spanish war. The signal corps as it now exists is a comparatively recent evolution.

In the American army the idea first arose in the mind of a young army surgeon, Albert James Myer. The office of signal officer of the army was created in June, 1860, the first of its kind, and Myer was appointed. He was at once sent with an expedition against Navajo Indians in New Mexico, and his crude apparatus at once demonstrated its worth.

When the Civil war began he was ordered East and opened a school for signalers, and in that was the definite beginning of the present signal corps. Wires were carried on horse or muleback then, the instruments were imperfect and telegraphic communication was a rare and precious thing. The service took on tremendous importance in the Spanish war and followed the troops through Cuba and the Philippines, and in China was the only



AMERICAN LINEMEN STRINGING WIRES BEHIND LINES

means of communication for a week between Peking and the rest of the world. But the tasks that confronted our signal men

in these wars were play compared to the work that is being done every day on the western front. Our signal men there have an area to cover about the size of Pennsylvania and they have gone at it with a vigor and efficiency that spell volumes for the superiority of Americans in this particular line

The hardy linemen who have strung lines and repaired breaks on the Western plains or battled with great floods and storms in the Rocky mountains have taken to this new work with a zest which is inspiring. On the foundation of the French system they are building a signal system that will be a model of its kind.

Up to within four miles of the front construc-The wires are strung on poles and most of the poles have been planted by the French. But when one gets inside the shell-torn section that stretches at least four miles from the front wires have to be protected by being buried from six to eight feet deep, so that only a direct hit by a large shell will disturb them.

Within half a mile of the front not even this protection is sufficient, as the shells churn and rechurn the ground. Therefore all wires in this zone are duplicated and are strung along both sides of the trenches. Sometimes a trench wall is covered

In the battalion headquarters signal office, where the hundreds of wires from the trenches and observation posts center and where the receivers hum with the constant tremors of a world under fire, plain Bill Smith lounges in a corner rolling a cigarette and occupied in his own particular thoughts. It is a dugout, this headquarters, and the air is vile, but Bill got used to that long ago.

"The wire to A battery is down," Smith's superior officer says, turning to him. "All right, sir," is the answer. And Bill climbs

out of the dugout, repair kit over his arm and tin

In the trench he finds the wire that is broken and begins to follow it along. It is hot work in the trench, shells are dropping thickly, but Smith doesn't mind-much. He follows the wire down a communication trench and then after a long time out into the open, where he has to crawl along looking for the hole that will mark the place where the line has been broken.

He gets nearly there when a shell lands near him and Bill Smith, his face toward the break, goes west. After a time, back in the dugout, another repairman is sent out and perhaps he is luckler than Bill and finds the break,

Then he has to sit down in the shell crater, the smash of bursting shells so close that sometimes he is half buried in dirt, calmly making the connection that will enable the observation officer up front to get in touch with his battery again. If he gets back to the dugout he will be sent out again and yet again if the bombardment is heavy, and often for days and nights at a time these men are under fire, snatching a nap now and then in the dugout between breaks. But they keep the lines

In an attack the signal men go over the top with the infantry, generally with the second wave, in charge of the observing officer. They make for a point where they can establish an observation post, and as they pass on and through the enemy's barrage they unroll their line and one of them carries a field telephone, through which they somehow manage in the din of battle to make themselves

That telephone is like a battle flag, and many a man goes down with it, only to have it picked up and carried forward by another of these noncombatant troops. Their business is only to serve, not to fight, and they do it with a cool daring which is not surpassed in any branch of the service.

They are in the forefront of every advance and in the retreat are sometimes the last to leave the front line, where they stick to the end of their wires under terrific shell fire until ordered to rejoin their commands if they can get through allva.

"An experience of this kind happened to me & short time ago in a lonely chateau of the Ypres Menin road," an English officer wrote home. "The chateau was the center of a perfect hell of German shrapnel for nearly a week, until it became almost untenable and was abandoned by the hea4 quarters staff.

"The general gave instructions that a telegraph ist was to remain behind to transmit important messages from the brigades, and I was left in charge of the instruments in this shell-swept chateau for a day and a night.

"On the second day the Germans broke through our trenches and the wires were cut by the shell fire. I was given orders to evacuate the building and smash up my instruments. These I saved by burying in a shellproof trench, and then I had to escape between our own fire and that of the enemy's across a field under a terrible tornado of shrapnel.

"On the early morning of the same day one of our cable detachments was cut up and another captured by the Germans, only to be retaken by our sappers and drivers after a desperate and glorious fight."

The linemen also have regular patrols, stretches of line which have to be constantly examined not only for breaks but also to make sure that they have not been tapped by enemy sples in such a way that every bit of information sent over them finds its way to the Germans. In the Alsne once, where the hill country offered good cover to spies, the wires were constantly being tapped.

One day a lineman passing along the road noticed a lot of cable lying at one side. He started to coil it up and found that a piece of wire had been tied to the main line. When he traced it he found that it ran to a haystack. He went on, tapped the line and sent in word to headquarters and an armed escort found a spy hidden in the hay with several days' supply of food.

They are autocrats in their way, these wire repairmen, and no one is permitted to interfere with the swift execution of their work. Word coming over the line that the wire to a battery was repaired is often the sweetest sound in the world to an observation officer up front, even if it comes in a rough brogue which French weather has not im-

So when anybody else breaks in on the line and interferes with the repairman he gets rolled, especially if he has been sitting for several hours in a shell hole with an ley rain dripping down his back. An English officer told of what happened to a general who broke in once,

"A general came in the hut and told me 'I rang up the to ophone just now and said, "Give me the - brigade, please," but some one with a loud voice report deliberately and distinctly; "Get off the blinking line." I got off remarking that as soon as convenient I should like to speak. I apologized and explained that the line had been down and was being repaired. He went off with

a merry twinkle in his eye." As the number of men in the American army abroad grows with the weeks, the number of linemen, those who make possible all that the artillery and infantry together accomplish, will steadily increase until they are a small army in themselves. And probably it will not be long before announcement will be made that some plain Bill Smith, wire repairman, has been given a medal for bravery under fire, which attracted attention even among the hundreds of brave acts which these men perform every day.

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