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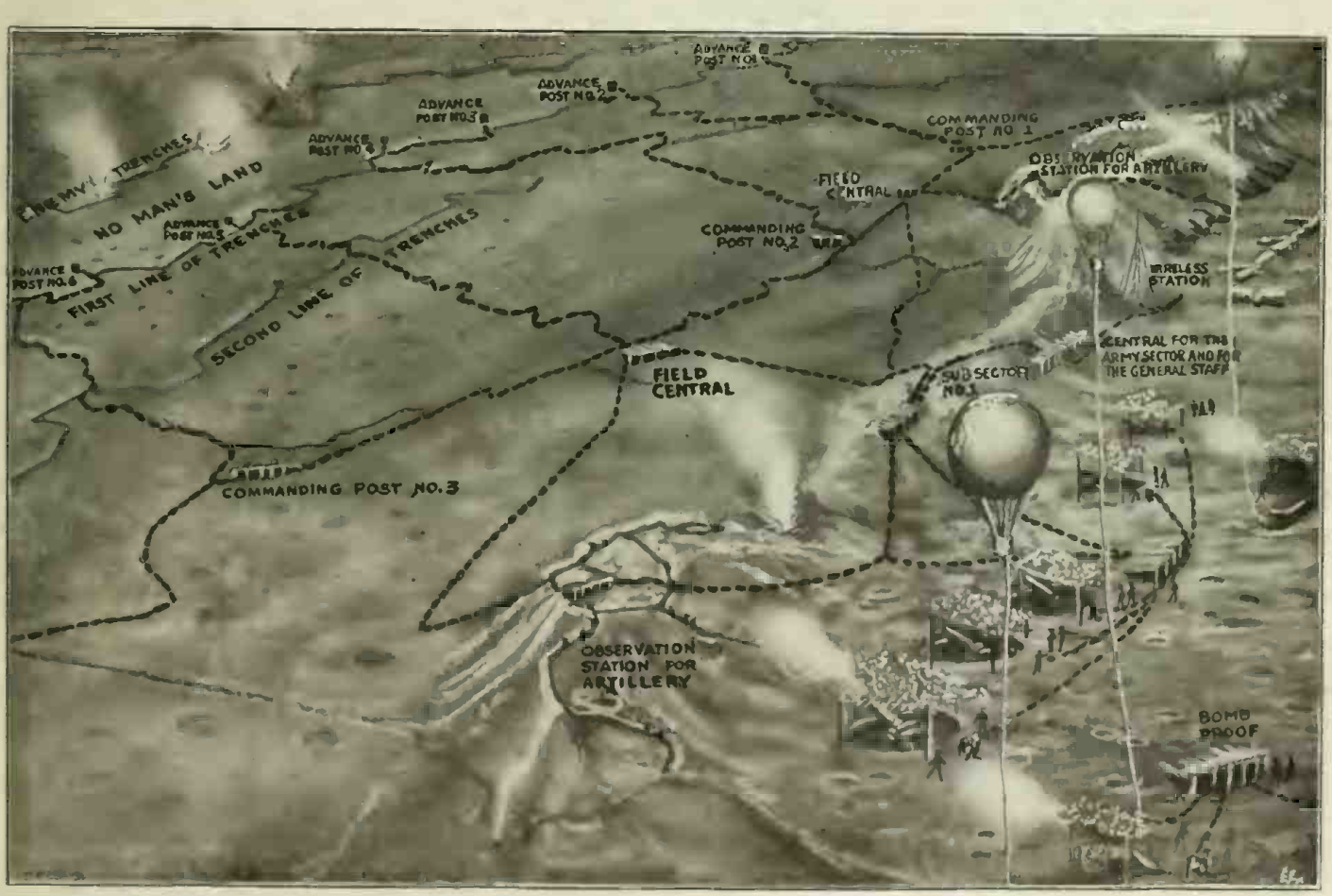
Telegraph and Telephone on European Battlefields

IN no war in the past have the electric signaling systems covered so many square miles or such a great diversity of requirements. The commanding general wants to know how a certain division is progressing; an artillery captain wants to ascertain just adventure, action—all of these come to the Signal Corps man in the pursuit of his duties more than ever before. To-day he may install a telephone switchboard in a cheerful little town near grand headquarters, situated a dozen miles back of the battle-front. To-morrow he may be came along and was pleased to learn that all of the circuits had been tested out without losing a man. The same captain was grieved to hear the next day that this brave lineman, his work done, had been picked out of a pole-top by a stray shell.

At the beginning of the war there were



A Birdseye View of a Modern Battle-field With the Various Telegraph and Telephone Lines Linking the Advanced Trenches With the Artillery In the Rear, Also Enabling the Post Commanders to Communicate at Once With Any Section of Trench Line for Combined Assaults. Note the Large Number of Shell Craters, Reproduced from Actual Photograph.

where his shells are dropping; these and a million other facts must be transmitted every hour of the day along the hundreds of miles of battle-front. And it is really marvelous how the army signal corps have perfected their frail looking wires and instruments, so that they will work under the most unfavorable conditions. Romance, stringing wires thru a shell-swept forest. One case which is on record will serve to show the lottery-like chance these men take. An English military lineman had been busy for several weeks in a district near the Aisne battle-front. He had about completed straightening out a perfect jungle of wires and circuits. His captain certain dangers connected with telephonic communication, for our foes were not slow to try to catch our communications, and their engineers were soon busily engaged establishing delicate microphones near our telephone lines, so as to intercept messages and learn of our projected actions, says Isidore Recoulier, commander of a section

of French sapper telegraphers. We soon learned of this and have now apparatus by which any such "cutins" or listening is practically impossible, for great advances have been made in the arts of telephony since the beginning of the war.

We have had to develop a system by which the telephone wires used by the artillery and infantry could be instantly distinguished from one another, so that we might not mix up the lines, for while they co-

operate, the systems are absolutely separate.

The ordinary telephone is easily establisht, running from the point of contact with the enemy to the chief of that sector, and from the sector itself to the commander. When these wires were so simply laid as at first it was easy for the enemy to "listen in," but now the current is returned by special conductors, and the use of spy microphones is almost impossible. The artillery has its telephone system, independent of the other lines, but connecting with the headquarters of attacking and defensive troops. A line is run on the front, in any way that the ground will permit, and kept in order at any risk. Often when the bombardment is heaviest, one of these wires is broken and must be repaired, while shot and shell burst among the engineers. When an attack is in progress the telephone engineers follow the line closely, installing new stations at the first possible moment, so as to keep in touch with the rear and the centre of command. If driven back, this corps has to pick up all material so that it will not fall into the hands of the enemy.

After the cannon, whose fire has been directed by aviators and captive balloons via radio, have smashed the trenches of the enemy, and they extend their fire, the infantry attack begins and, bayonets couched, the men advance. The various units follow each other in obedience to orders from their leaders. These orders are long since decided upon, and in the midst of this tumult all is directed by a general plan. Meanwhile, further to the rear, the generalissimo, the general commanders, the chiefs of the army corps, of divisions and brigades, with detail maps spread out before them, follow the movements and give their orders. All of this has to be done along the wires of the telephone.

The generalissimo is stationed in a house where many lines meet, so that he can be in constant communication with all the rear and the advance. Every chief of service in turn, as well as every commander of a unit, of one or more lines, is ready with a report, awaiting orders. The development of the telephonic communication between headquarters and all parts of the forces has been so perfected that it works without delay. Each army is connected with General Headquarters by a line at the end of which an officer receives all useful information, making it possible for him to follow the least movement of his troops. Near this officer another insures his connection with the aides of the generalissimo, especially charged with conveying orders from the chief of the army. These orders are called "Directives."

Photos from Central News Photo Service

Left.—A Photo From the Egyptian Battle-Front. Advanced English Artilleryman Telephoning Warning of Enemy Aircraft Approaching. Note the Camel.

Center.—A French Officer of Engineers In a Mine Gallery, with Newly Invented Microphone, Detecting the Sounds of German Counter Mining Operations. Men Who Do This Work Are Called "Listeners." Listening Is a Very Delicate Operation. It Consists of Detecting the Direction, Height, and Distance of the Sounds Heard. To Obtain Greater Clearness, Drums Are Used as Well as Special Microphones. As Soon as a Prolonged Silence on the Part of the Enemy Is Noticed After a Period of Rather Hard Work, the Conclusion Is That a Chamber Is Being Loaded, and at Once You Charge Your Own Mine. The Loading of the Mine-Chamber Is Followed by the Operations of Connecting the Fuse and Tamping. The Latter Consists of Blocking Up the Mine-Chamber with Bags of Earth or Sand, so as to Direct the Force of the Explosion Towards the Enemy.

Right.—A Central Telephone Station In the French Trenches at the Aisne.

In its turn the general quarters of an army is connected with general headquarters from which it receives orders and to which reports of each phase of action must speed. Moreover, it is in close communication with neighboring armies as well as with the army corps under its direction.

Each army corps is itself connected with the army of which it is a part, and as follows: From the army corps to division, to the brigade, to regiments, to the trenches as far as the first line and outposts.

This primary circuit allows the sending of orders and knowledge as to how they are carried out.

The telephonic circuits of the artillery are much more complicated. It plays the same part as the former for batteries and groups; but more than this, it serves for reporting on location of objectives and directing the fire. It has to insure the cooperation of the various groups of artillery with one another, and the connection of these groups with the wireless headquarters, which are in direct connection with observers on aeroplanes and captive balloons, as well as with posts of observation on the ground.

It must not be forgotten that the artillery works by concentration of fire. The artillery must prepare the way by battering down forts or trenches for the advance of the infantry—so both must be kept in close touch. The aviators signal how and where the fire should be directed. The telephone, telegraph and wireless all play their part.

Whether in the trenches or in defensive operations the telephone has a great immediate value, and even in advance movements, whenever a halt takes place the very first duty of the engineering corps (telegraphic division), is to establish communication by telephone with the rear. The military telephone is quite different from the regular machine. It consists in its simplest form of a "combination" (microphone and telephonic ear-piece, joined by a hard rubber handle, etc), the branch-box, induction coil box and battery for producing the current. In setting the wires care is taken to prevent "grounding," isolating the wires as carefully as possible. Usually the line is laid by four men; an unroller (of the wire), an assistant, a mounter and assistant. The unroller carries the wire on a bobbin in his left hand, playing the wire out slowly. His assistant keeps the wire straight. The mounter attaches the wire to the point of departure, his assistant hands him the wire as needed, who lays it upon its supports as he advances. When he reaches the end of a piece of cable he tests his connection carefully to the point of departure. He marks by a pebble or bit of paper the point where he has connected each 500 yard cable, in case of breaks. He locates his stations in the safest possible places, out of view of the enemy, or protected as much as possible. If an advanced position must be abandoned, the corps in charge of the laying work takes up the wires as rapidly as possible, removing all memoranda from the station, and beat a retreat with the line.

Wireless has proved of great value for aviators to convey their information to their forces, and only within the last year and a half has the method of communication been perfected. For obvious reasons the construction of the antennae and other parts cannot be described. Suffice it to say that methods of communication between the aeroplanes and the ground have been devised, and they are of such kind that the enemy cannot intercept the messages. The captive balloons use a telephone wire which unrolls as the balloon ascends. Batteries alone are possible in campaign telephony, and special batteries have been devised which are both light and powerful.