Low in the foreground may be seen the entrance to B tunnel, which has now crossed under C to assume the relative position occupied farther back along the line by C tunnel.

Immediately behind the pile of earth on the right of the picture is the portal of the Steinway Belmont tunnels, leading under the river to the New York Central station.

An idea of the massive nature of the work may be formed from the size and number of the shores required to hold up the outer forms of the upper tunnel.

The work is being covered up as fast as completed, and about a year from now, as passengers are carried through the tunnels, they will probably be unconscious even of the difference of gradient between tunnels B and C, and there will be no evidence on the surface of the immense work here shown of carrying one tunnel over the other.

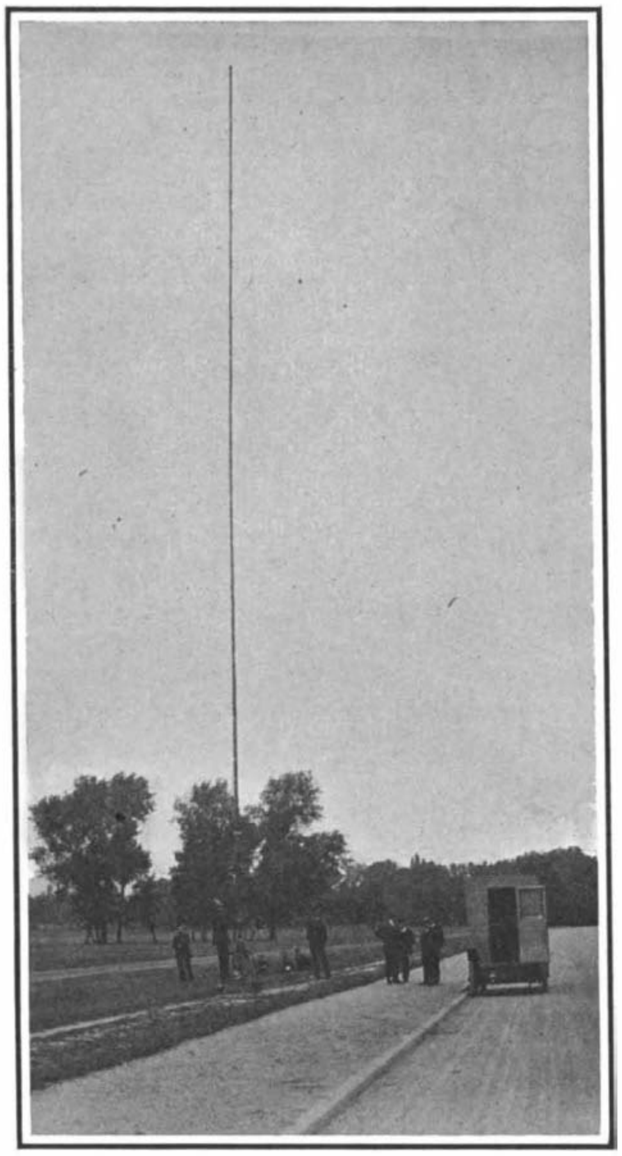
AN AUTOMOBILE WIRELESS TELEGRAPH STATION.

The officers of the telegraph corps of the French army have been experimenting with an automobile wireless telegraph station. Externally, the vehicle resembles a limousine of the ordinary type. The wireless apparatus is not conspicuously visible through the glass windows. The mast, its base, and the winch by which it is raised are carried on the roof of the car and covered with an awning. The car, all parts of which are movable, is divided into two compartments. The forward compartment contains the sparking coil and other dangerous instruments, the rear compartment contains a 5-horse-power dynamo, the receivers, the operating key, and a comfortable seat.

The car and apparatus weigh 6,160 pounds. The weight is increased to 7,260 pounds by the addition of the crew of six men, with their baggage. The car is driven by a motor of 22 horse-power, and can maintain a speed of 26 miles per hour on a level road, and more than 6 miles per hour in ascending a grade of 14 per cent.

The antenna is set up very easily and rapidly, owing to the ingenious telescopic construction of the mast, which, when lowered, consists of a number of concentric metal tubes about ten feet in length. The central and smallest tube incloses a steel wire about ⅛ inch in diameter, coiled very closely into a helix, so that it resembles a strongly compressed spiral spring, or the wire wrapping of a rubber hose. The wire, similarly coiled, is extended into the base of the mast, where it is gripped by two pairs of wheels which are operated by cranks and gearing. By this mechanism the wire is forced upward, carrying with it the central tube, which, when extended to its full height, draws after it the second tube, which in like manner draws out the third tube, and so on. Although the elevation of the smaller tubes leaves the lower part of the wire inclosed in larger tubes which allow it to bend slightly it remains sufficiently stiff to keep all the tubes practically vertical.

The mast, with its aluminium support, weighs about 400 pounds. The telescoped mast is first screwed to its base and then raised to a vertical position by four men. A few seconds' work at the cranks then extends it to a height of 66 feet. The five wires of the antenna are attached to the top of the mast. Four of these wires, each about 160 feet long, are distributed at equal angular distances around the mast and are attached to the ground by other wires, insulated from them, so that the lower ends of the antenna wires are about 26 feet above the ground. The fifth antenna wire is connected with each of the others and is extended, through a hole in one of the glass windows of the car, to the apparatus inside. The mast is also anchored to the ground by stays, attached below the summit. When the antenna has been set up the motor is geared to the dynamo, only 3 horse-power being usually employed.



The mast fully extended.

The station can be made ready for operation in six minutes. Its normal radius of action exceeds 90 miles. As two men suffice to operate it, continuous service can be assured by dividing the crew of six men into three watches of eight hours each.

The French army already possesses wireless stations drawn by horses. Each station comprises two wagons, one of which carries twelve men and a gasoline motor. It takes half an hour to set up one of these stations and the radius of action is only about 60 miles. Nevertheless, the stations are superior to those of the German army, the installation of which occupies 45 minutes, with a greater number of men. The French army is the only one that possesses an automobile wireless station.

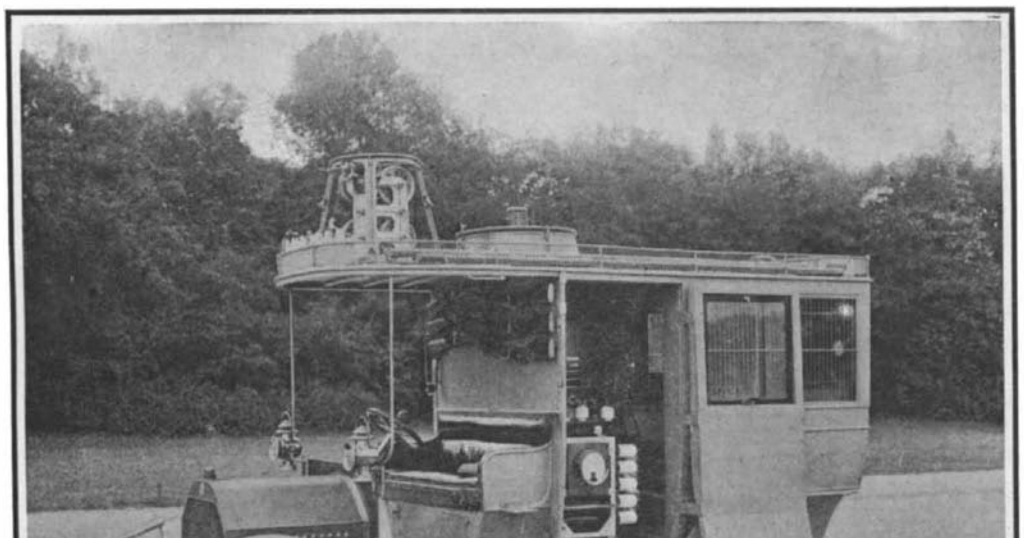
The installation of wireless stations on dirigible balloons has been contemplated, but the problem presents an almost insuperable difficulty. The highly-charged antenna, by its inductive action on the wires by which the car is suspended from the balloon, would cause sparks which might ignite the hydrogen which escapes from the staunchest of gas bags. The danger could be diminished by substituting non-metallic ropes for the steel wires, but even the ropes would become conductors when wet.

This danger does not exist in the case of aeroplanes. It is estimated by experts that the total weight of an aerial wireless station need not greatly exceed 100 pounds. The station could be operated by one man, in addition to the aeronaut. The day—apparently not very distant—when an aeroplane shall carry the weight of three men will soon be followed by the combination of those two present marvels—wireless telegraphy and mechanical flight.

Making Briquettes.

Briquette making formed the subject of a paper recently read before the South Wales Institute of Engineers by Prof. W. Galloway. Small coal, as is well known, cannot be burned so economically in the furnaces of boilers in its original state as when in the form of briquettes. Briquettes made exclusively with anthracite coal burn too slowly, and it is advisable to mix a certain proportion of bituminous coal to overcome this objection. Up to the present, no kind of agglomerating material other than pitch or resin, or a mixture of these, has given satisfactory results. Briquettes made with resin alone become soft and lose their shape in the fire; those having a mixture of 4 per cent of pitch and 1½ per cent of resin give better results. It is of interest to note that the total output in the United Kingdom in 1906 amounted to 1,513,220 tons, while Germany produced 14,500,851 tons of this fuel in the same year. The paper contains full descriptions and drawings of the mixing and drying machinery and presses required for briquette making, together with estimates of labor required and costs. For example, at an English works making 102¼ tons of briquettes per day of ten hours, the total cost, including labor, materials, fuel and stores, interest and depreciation, works out to 9s. 7.45d. per ton.

The linking of India and Ceylon by railway is again under discussion. There is said to be no serious engineering difficulty connected with the bridging of the Paumben Channel, nor at the south end of the line, for the island of Mannar is already practically attached to Ceylon. But between the southern end of the island of Rameswaram and the northern end of the island of Mannar there is a distance of about 38 miles, marked by an almost continuous coral reef, either covered with shallow water or rising above the level of the sea in numerous coral islets—the "stepping-stones" of Adam's Bridge—to be bridged.



An automobile wireless telegraph station.

Erecting the telescoping mast.

AN AUTOMOBILE WIRELESS TELEGRAPH STATION.