those facing west are nearly as seriously injured; those facing south follow, but are much less injured than the two former; and those facing north are least injured, but only slightly less than the southerly walls. 4. When corners of buildings are thrown out, they have gone most frequently to the north-east, next to the south-west, third to the north-west, and least frequently to the south-east. So many isolated observations are inconsistent with these generalizations, however, that little value can be attached to them. Similar inconsistencies are observed in the behavior of the marble and granite shafts in marble-yards and cemeteries. Of those which have been overturned, the larger number have been thrown either to the north or south, but some have gone in various other directions; many have suffered torsional displacement, but of these some have turned with others against the sun; while others are displaced laterally without overthrow, and in as many directions as there are compass-points. Chimneys, too, have been twisted both with and against the sun, and during their oscillations have 'walked' in various directions. A Charleston chimney twisted with the sun, and slightly displaced southward, is shown in fig. 3; and a neighboring monumental shaft turned in the opposite direction, and displaced north-eastward, is represented in fig. 4. Perhaps the discrepancies among these observations may eventually be eliminated, and the apparent confusion reduced to order; but for the present, inferences as to the azimuth of the wave-paths in Charleston and immediate vicinity are premature.

It is remarkable that the intensity of the seismic action has varied greatly within the limits of the city of Charleston. Thus in certain quarters the buildings have escaped with trifling injury, while similar and similarly oriented buildings in other quarters have been completely destroyed; and all possible intermediate phases of injury are found in different parts of the city. The numerous observations on the variable intensity of the disturbance in Charleston and elsewhere in South Carolina have not yet been collated and digested; but it would appear that there are large areas within which the intensity of the disturbance culminated (and Charleston is one of these), and, moreover, that within these areas themselves there are foci or nodes of maximum vibration circumscribed and separated by annuli in which the disturbance was less severe.

A few fissures, such as those abounding at Summerville, occur in Charleston and vicinity, and some small craterlets have also been observed in the neighborhood.

A number of slight tremors were experienced in Charleston. They differed from those felt at Summerville, 1°, in less intensity and greater duration; 2°, in direction, which was manifestly more nearly lateral than vertical, though the azimuth was not accurately determined; and, 3°, in the absence of detonations or other sounds than such as might be attributed to movements in furniture, in neighboring buildings, etc.

Briefly, it appears, that within a radius of a dozen miles somewhere near the centre of the district affected, and within an area of remarkably uniform topographic configuration and geologic structure, the effects of the recent earthquake are quite diverse: viz., that at Summerville the principal effects are crushing of structures in the vertical direction, and the formation of fissures with the outflow of a considerable volume of water; that at Ten-Mile Hill, half-way between that point and Charleston, the principal effects are local deformation of the surface and the extravasation of a great volume of sand-laden water, with combined crushing and lateral displacement of structures; and that in Charleston the predominant effects are lateral displacement in various directions (without vertical crushing) and overthrow of structures, torsional displacement and overturning in different directions of monuments, together with some fissuring of the surface and the extravasation of small quantities of water.

W. J. McGEE.

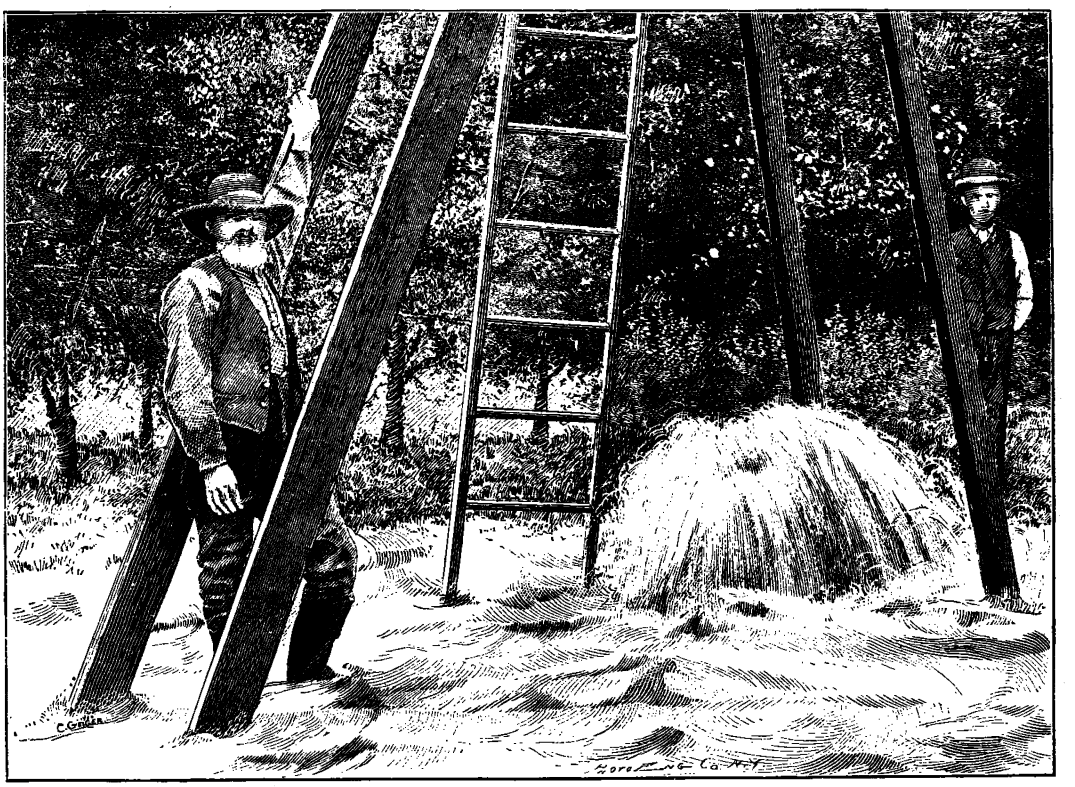
COMPRESSED AIR ON CABLE-ROADS.

ONE of the minor annoyances in connection with the cable street-railway system is the fact, that, until the car is gripped to the moving cable, it must depend for its motive power upon some other agent; that is, it must be run to and from the car-house by hand or horse power; and switching from one track to another at the termini of the road is usually accomplished in the same manner. To dispense with this extra motive power, by making each car temporarily self-propelling, is the object sought in a series of experiments now in progress on the Tenth Avenue cable-road in this city. The experimental car is fitted with a small air-compressor, an air-engine, and several cylindrical air-tanks, placed beneath the body of the car. The compressor is connected by a clutch with one of the car axles; and the engine or motor is connected in a similar manner, though with the addition of an intervening train of speed-reducing gear-wheels. On a recent trial trip, the air-tanks were filled to a pressure of about five atmospheres, at the car-house, by means of a compressor. The driver, or grip-man, then opened the valve admitting air to the engine, and the car propelled itself

steadily and smoothly out of the car-house, around a curve, and over a switch to the main cable-track. Here another device, intended to lessen the labor of the grip-man, was brought into play. Air was admitted to a small cylinder on the grip, causing the latter to close firmly upon the cable, and the car sped on its way, up and down hill, out to the terminus at Fort George. The brakes were also operated by means of the compressed air acting upon a separate brake cylinder. To stop the car, the grip was let go, the air-brake put on, and, if the pressure-gauge showed much decrease of pressure, the compressor-clutch was thrown into gear, thus utilizing the motion of the car to renew the supply of compressed air. The compressor was put into action also, to keep the pressure at the proper point; so that, with a little additional work thrown on the cable, the car always held in reserve sufficient motive power to work the grip and brakes, as well as to run switches and to propel itself to or from the car-house. The trial trip, though it revealed some defects in the mechanism, was essentially a success. The general adoption of this or similar devices upon cable-roads will depend, of course, upon the economic results attained by extended trials in actual use.

THE ARTESIAN WELL AT BELLE PLAINE, IOWA.

SIMULTANEOUSLY with the report of the recent earthquake came sensational stories of an artesian eruption at Belle Plaine, Io., and speculation at once connected the two events with each other, and with renewed geyser activity in the Yellowstone park and seismic movement on the opposite hemisphere, as factors of a common disturbance of the earth's crust. Without reposing faith in such broad hypotheses, it seemed worth while to investigate the artesian phenomenon for its own sake.



ARTESIAN WELL AT BELLE PLAINE, IOWA.

The more sensational elements of the accounts were found to be chiefly the work of a romancing reporter whose moral faculties present the only similitude of seismic disturbance the case affords. The well is indeed phenomenal in some respects, but these are surely of the artesian order, and entirely without mystery. The following are essentially the facts: —

Last spring it was incidentally discovered that