

tered wind velocity at that place for 5 minutes was 50 miles per hour from southeast, with an extreme of 60 miles per hour, though the storm seems to have lost its tornado characteristics before reaching that place. The approximate value of property destroyed is as follows: Moundville, \$80,000; Hull, \$8000; Birmingham, \$4000; total, \$92,000.

The tornado at Moundville occurred on the southeast side of a decided barometric depression which swept rapidly northeastward over northern Mississippi, or northwestern Alabama, during the night of January 21-22, when the pressure was rather low, though not extremely so, at Birmingham, Meridian, Mobile, and Montgomery.

Fig. 1 shows the section of country through which the storm passed.

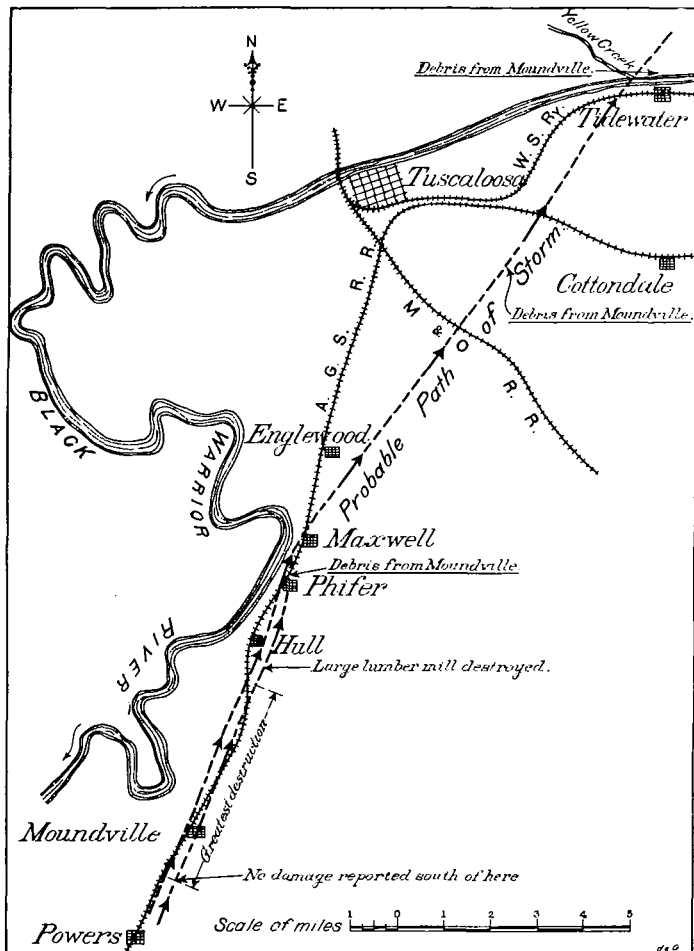


FIG. 1.—Path of tornado at Moundville, Ala., January 22, 1904.

ARRANGEMENT OF LIGHTNING RODS.¹

By Prof. W. S. FRANKLIN, Lehigh University, South Bethlehem, Pa., dated February 10, 1904.

1. Good connection of a lightning rod to ground is a prime necessity in lightning rod construction.

2. The experimental and theoretical study of the transmission of rapid electrical oscillations and of abrupt electrical pulses along wires or rods has led to the recognition of the following facts:

(a) Straightness and directness of path to earth is the most important condition in so far as the arrangement of the rod is concerned.

(b) A given weight of metal is much more effective as a carrier of rapid electrical oscillations or abrupt electric pulses

¹ This article was written, at the request of the Editor, as an answer to a question by a correspondent of The Rural New-Yorker in regard to the arrangement of lightning rods.

when it is in the form of a ribbon or thin-walled tube or wire cable than when it is in the form of a solid rod.

3. If the path along the rod to ground is roundabout, the more direct path through the protected (?) structure is apt to be chosen by the electrical discharge, notwithstanding its poor electrical conductivity and in spite of any ordinary degree of insulation of the rod.

4. The arrangement shown in fig. 1 affords very direct com-

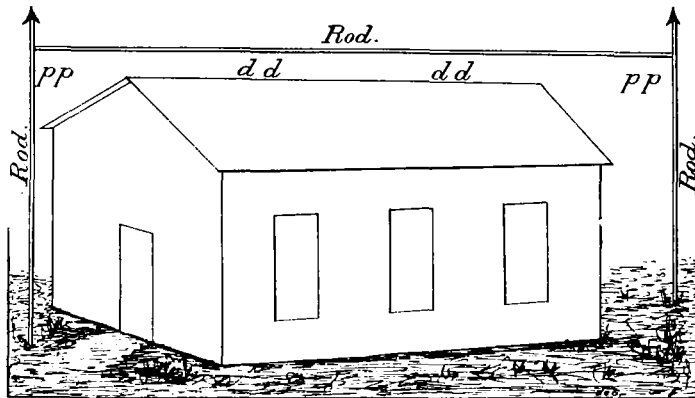


FIG. 1.—A well-protected structure.

munication to ground from the regions *pp pp*, which regions are, therefore, to be considered as well protected. On the other hand, the ground communication from the region *dd* is unnecessarily roundabout, and this region *dd* is, therefore, unnecessarily exposed to danger.

Given a good ground connection, then directness of path to ground from the region which is to be protected is so important that the matter of insulating the rod from the building, either by air spaces or by glass, is of no importance whatever in comparison. If the path is direct, there is no need of insulation; and if the path is roundabout, effective insulation is not practicably feasible.

A NEW NEPHOSCOPE.

By LOUIS BESSON.

[Translated from *Annuaire de la Société Météorologique de France*, February, 1903, p. 29.]

The vertical component of the movement of the clouds introduces into nephoscopic observations an error, the law for which I have recently studied,¹ at least as regards the direction. All along any great vertical circle, in whose plane a cloud moves, the error in direction is zero (or equal to 180°), but it is easy to see that the error in the relative velocity is at its maximum there. I have shown that by making two determinations at the same elevation, perpendicular to the movement of the clouds, the exact direction, and at the same time the inclination can easily be obtained; but this solution is only rigorous if the vertical component has the same value in the whole extent of the sky; moreover, the work of the observer is doubled.

If, neglecting the measurement of the inclination, it is proposed only to determine, under the best possible conditions, the direction and the relative velocity, it is best to observe at the zenith, because there the error in the direction is zero, and the error in the relative velocity is generally negligible. Now, it must be acknowledged that near the zenith the use of the nephoscopic herse² is very inconvenient on account of the fatiguing position that the observer must maintain. For such observations the dark nephoscopic room, such as is used at the observatory for dynamic meteorology at Trappes and at the municipal observatory of Montsouris³ is certainly the most convenient arrangement, but the pictures of the clouds upon

¹ *Annuaire de la Société Météorologique de France*, 1902, p. 180.

² *Annales de l'Observatoire Municipal de France*, 1901, p. 50.

³ *Annales de l'Observatoire Municipal de France*, 1901, p. 17.