

TWO STROKES OF LIGHTNING.*

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The record of the following strokes of lightning is interesting on account of the following facts:—

1. That for 33 years the buildings and fences of the enclosure described were exempt, although entirely unprotected and in an exposed position.
2. That within a month the highest and lowest structures were both struck.
3. That the highest was not protected with a rod.
4. That the lowest was, unintentionally, partially protected.
5. That notwithstanding the excessive violence of the storm, comparatively little damage was done in either case.
6. That in the case of the fence, an ordinary barb wire acted as a conductor, and
7. That the damage to the fence was all due to lateral discharges from points.
8. That the relative value of conductors and non-conductors is clearly shown in the building struck.
9. That the advantage of an extended surface of metal over a smaller surface is evident.
10. That sudden bends act disadvantageously.
11. That breaks in the conductor are bad.

No attempt is made to theorize in reference to any of the above facts.

Whether these strokes took place when rain was falling, it has been impossible to determine with certainty, although the evidence points strongly to the presence of rain. It has been said that a child was overcome by the "return stroke," several blocks away, on the occasion of the stroke to the building, but investigation has failed to connect the two phenomena.

The enclosure mentioned, consists of 30 acres of land in the suburbs of Easton, Pa., and is used for fairs. The situation is elevated, although not as high as some of the distant surrounding country. The principal building is 152 feet long with a projecting front 25 x 26 feet. It was built about 35 years ago, has never had a lightning rod and until two years ago escaped all damage from lightning. This structure is the highest in the immediate vicinity.

On the roof is a large dome, the extreme top of which is at least 90 feet from the ground. The roof of the small dome which surmounts the large one is tinned; also the roof of the dome proper; the walk surrounding the whole and the roof of the building itself. On the north side extending the whole length of the eaves, is an open tin water conductor, connected with a closed tin pipe, vertical in position. The lower end of the latter is placed loosely in a horizontal wooden trough, which carries the rain water to the cistern. A piece of old tin pipe is in this trough. An ordinary chain pump is in the cistern. On July 31, 1887, during a short but terrific storm this building was struck. The finial on the top was split, a panel in the small dome torn out, and part of a window frame demolished. A stud three inches by six was splintered into fragments smaller and thinner than matches. The tin roof of the building proper and its connections prevented any further serious injury. The open water conductor was beaten out of shape, presenting such an appearance as would be produced by the rolling in it of a heavy ball from side to side. All the solder joints in this and in the vertical pipe were melted. A "ground" was made in the cistern. A peculiar

corrugated appearance presents itself where the short weather boards abutting the wrecked window frame were torn up. This seems to have been produced by the lightning in some way acting upon the iron nails.

The damage was greatest in the poor conductors. The wooden finial was torn to pieces, the tin roof was unhurt; the wooden panel was destroyed; the tin roof of the dome was unscathed; the wooden framework below was torn to shreds; the tin floor was uninjured. The woodwork below escaped, probably because the charge had nearly spent its force. Then the large tin roof formed a protection—the charge passing from this to the smaller surface of the water pipes produced the effect on them already described.

A month later, Aug. 30, 1887, the western part of the fence enclosing the grounds was struck. This fence is less than three-eighths of a mile from the main building above described. It is an ordinary board affair seven and one-half feet high, surmounted by a barb wire fastened to small blocks, to prevent the access of trespassers to the race course. One end of this wire was lying coiled up on the ground, a part of the wire having been removed to renew a portion of the fence. The length remaining attached was about 1,000 feet. On the west side of the fence at a distance varying from 250 to 300 feet is a large cluster of high trees; on the east, 14 feet distant, is a stable 200 feet long; 60 feet further east is the grand stand—a high structure with two unprotected flagstaves. Facing the grand stand is the judge's stand, with another unrodded flagstaff. The fence is the least prominent of all the objects in this part of the enclosure.

The barb wire is of the ordinary kind with four sharp points at every three inches. It is continuous, excepting between posts 50 and 51 where there is a gate which leaned against the posts at the time of the flash. The posts are about nine feet apart; beginning at the north-west corner and numbering towards the south there are 82 posts. Numbers 6 and 82 limit the effects of the bolt. At 6, 36, 56 and 82 there are sharp corners, making sharp turns in the barbed wire.

The mechanical effects of the lightning are observable along the fence. Boards near numbers 6, 12, 14, 18, 20, 21, 22, 25, 27, 32, 33, 34, 40, 42, 47, 48 are splintered slightly or cracked. Near 51, the part of the gate next the break in the wire, is splintered. A board at 56 is split. Post, number 36—a l-cust—is split completely to the ground in two places. The wire touched the fence at this point. Number 42—a chestnut post—lost a piece five feet long, four inches wide and two inches thick. At 82 there is slight evidence of destructive action, after which nothing unusual is observed, although the wire runs 300 feet further and ends near a telegraph pole and a wild cherry tree. The "points" show no evidence of heating. At the four sharp turns the damage is more pronounced than at the other posts, excepting number 42. The distribution of mechanical action it will be observed is peculiar. No attempt will be made to explain it.

WOOD CLOTH.

Mitscherlich has applied the bisulphite process for reducing wood to the production of a fibre from wood which can be spun.

Thin boards or laths free from knots, but of any desired width, are cut into strips in the direction parallel with the grain, and are then boiled in a boiler containing a solution of sulphurous acid or bisulphite. This boiling effects disintegration without requiring that the strips of boards shall be reduced to very small pieces. After boiling the wood, it is

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