

them through life. The foundations of success or failure will be laid for them here. Let it not be done without your inspection. It is not enough that you have erected this temple; you must see to its administrations. This for yourselves, for your children, and for your country.

OBSERVATIONS ON TORNADOES IN IOWA.

BY THE EDITOR.

THE recent tornado at Grinnell and Malcom calls to mind former cyclones at Camanche and near Iowa City. It is proper to premise that Iowa is not the only State where whirlwinds or tornadoes prevail at intervals of years. They occur in Texas, Georgia, Ohio, Missouri, Illinois, and all over the old northwestern States, as well as in the Pacific States.

The old English word *whirlwind* is the true name and nature of the wind; *tornado* is the Spanish name; *cyclone* is the Greek or oriental designation,—all meaning a wind, whirling, turning around, or circling about, with the top of clouds enfolding themselves into a funnel-shaped cloud, the lower end or bottom whirling and taking up and overturning everything in its reach. The little eddies that gather up dust and straw resemble a tornado, on a small scale. So much for the shape or nature of the whirlwind, so destructive of life and property.

The only thing in art, which resembles nature in a whirlwind, is a balloon, in shape and ascent. The basket resembles the dust and broken fragments whirling and flying in every direction.

The laws of tornadoes are few. They seldom strike the same place the second time—unlike lightning, which often strikes in the same place.

1. Tornadoes or whirlwinds follow flat and low lands. They never strike high points or ridges of land, except when passing from one valley to another, and in their course they

must go over the high land to reach another vale. For example, the whirlwind south-southeast of Iowa City, twenty-five years ago, swept around Iowa City (situated on higher ground), destroying everything in its course,— fences, houses, barns, stock of all kinds, and vehicles of every sort. A little south-east of Crousetown it uprooted a cottage and shed, killing the owner and his son and grandson, leaving only the floor and cellar. One of the men was bent around a fence-post, almost stripped of his clothes, boots and all. The infant's face, in death, looked like one shot with sand, all mottled over— not at all pale, as usually in death. But mark! a little further on, a house and barn, now the property of W. P. Coast, of this city, was unharmed and unmoved, and scarcely stirred by the storm-current, as it passed, sixty miles an hour.

Seven miles east of Iowa City the tornado struck the Berry farm, killed Mr. Jesse Berry, the owner, who had fled to his barn, it falling on him and his horses, sending a splinter through the breast of his hired man, who died the next morning, and breaking the arm of his son, who was carried to the city on a stretcher. It made great devastation among vehicles and fixtures of all sorts,— smashing a double corn-crib, leaving only the floor, destroying the new buggy in which Mr. Berry rode out along with a man who went to view the farm for purchase. This man saved himself amid the storm by falling at the foot of a post and holding on till the blast was past. Not a whole spoke was left in the buggy-wheels— they were bare hubs when all was over. Two large lumber wagons, also, were so broken that there was not enough left whole of the two to make one,— one wheel having been carried five hundred yards into a field. Near a hundred fowls were driven into the hedges, featherless, only nineteen being found alive after the storm.

2. Tornadoes are always accompanied with storm-clouds; and, in Iowa, the storm-cloud goes from sixty to seventy miles an hour, enough, of itself, to overturn houses and uproot trees. But when the whirl is added, its force is incalculable and irresistible. The lightning generally plays above the storm-clouds, as they enfold into one another, with terrific brightness.

3. The main destruction is caused by the *vacuum* produced by the whirlwind around the building or object struck. For example, in the Camanche whirlwind, a Lutheran church, near what is now Ely, was unroofed on the windward side, or opposite to the storm current. It was by the sudden expansion of air in the edifice that the roof on the east side was burst off, while the storm struck the west side of the church. So, also, a house near Cedar Rapids was unroofed on the east side. The expansion of the air inside, with a pressure of about fifteen pounds to the square inch, gives enough power to throw out the wall of any building that man can erect. This is the main force that makes cyclones or whirlwinds so destructive and terrific.

The destructive power of whirlwinds is well illustrated by that which struck Camanche twenty-three years ago. A brick tavern stood in its way. A son of the owner heard the roar, and rose to shut the chamber window, when, the next he knew, he found himself in the street, stripped of his clothing, but not so injured that he was not able to help his father dig out his sister from the ruins,—the division walls and timbers having fallen upon her. The main walls fell outward, and hence the less damage to persons. Another large hotel, open and unfinished, was little injured. Three hundred buildings of all sorts were destroyed. Twenty persons were buried at one time, after the destruction of lives and property.

Some incidents of this whirlwind are worth reciting. It started in Hardin county, and was about an hour and a half in reaching Camanche. Near Cedar Rapids an occurrence shows how buildings should be located to avoid a tornado. A barn in a vale was removed some five hundred yards, while the house and buildings, on a bluff above the barn some seventy-five feet high, were safe and undisturbed,—illustrating the law that high localities are safe from whirlwinds.

Further down the valley, toward Camanche, a barn was carried off, except the floor and underpinning. The farmer went to look for a keg of nails, to fit up some of the broken things, and found that two empty nail-kegs, filled with chaff, were left standing, while the keg that had nails in it was

gone. Following down the track, he saw his nails sticking in the trees, so tightly that he could not pull them out with his fingers. At Camanche a shingle was blown through the siding and plastering of a house, butt-end first, the small end sticking outside. Nails from the broken buildings were stuck into the saw-logs at the mill. A joist indented a tree of elm-wood, partly barked and dried, so deeply that one could lay his fist in the hole. Another joist was driven into the same tree and broken off. A piece of stove-pipe was stuck so fast into a log that it could not be pulled out by hand. It was cut off and carried by Governor Baker to Chicago, to assist in procuring aid for the sufferers. A drug store, two stories, was struck, the lower story crushed out and the upper story let down on the spot, not out of the way. A barrel of molasses was thrown out of the back end of a cellar against a post, showing the expansive power of air, a vacuum being caused by the whirlwind, and the sudden force of the air expanding, throwing out the barrel.

Mr. Birge's family, at St. Mary's, near Mt. Vernon, Linn county, fled to a cave, as they had no cellar. They were all saved, but their house was utterly demolished. Mr. Birge stood in the mouth of the cave, and his hair was pulled straight sensibly. A neighbor was saved by holding to a post lying on the ground.

Of the latest destructive tornado at Grinnell and Malcom, there is not time now to speak, only that it was most destructive of life and property. Forty-four deaths at Grinnell, and six at or near Malcom, alone show its fatal effects. At both places it followed the vales, changing its course as the land lay low and level, leaving the high places unaffected by its destructive force.

The conclusion of this sketch is — build on the highest ground, and not in low places. Seek cellars and caves, westward of the storm current. Open windows and doors, rather than shut them, till the wind is past. The season for tornadoes in Iowa is May and June. They generally follow a dry spell of weather; but this year they have occurred in rainy weather, yet after hot days.

These practical observations should be remembered. More may be said at a future time. It would be well if the Smithsonian Institution at Washington, D. C., with all its means, would publish this sort of philosophy of whirlwinds, and give their laws. Yet it is true, as Job says: "The wind cometh from the south, and turneth round into the north." And Christ, the creator and Savior of the world, has said: "The wind bloweth where it listeth; and thou hearest the sound thereof, but canst not tell whence it cometh and whither it goeth." So little do we know of whirlwinds—the strange work of God.

EDITORIAL NOTES.

THE AMENDMENT.

THE following Amendment to the Constitution of Iowa was adopted by a majority of about twenty-eight thousand, on the 27th of June, 1882, and it is now a part of the State Constitution, and a matter of history:

"SECTION 26. No person shall manufacture for sale, or sell or keep for sale, as a beverage, any intoxicating liquors whatever, including ale, wine, and beer. The General Assembly shall by law prescribe regulations for the enforcement of the prohibition herein contained, and shall thereby provide suitable penalties for the violation of the provisions hereof."

FRONTISPIECE.

THE Artotype Frontispiece in this number is from the *Souvenir*, of Mr. J. F. HOOVER, to whose kindness the editor is indebted for a thousand impressions. It contains miniature portraits of twenty Professors in the several Faculties of the State University, who should consider it complimentary to them to appear thus in the ANNALS OF IOWA.

THIS number is printed and bound at the *Republican* office in Iowa City, the place of registry of this quarterly as second-class matter. As great facilities for publication are here furnished as elsewhere, if not greater than have been had at Davenport and Des Moines. The illustrative cut on the first page of this number is borrowed from the *Republican*, giving a very good miniature view of the State University buildings, including that now in process of erection for the Medical Department.

It is said that the celebrated "scientist" Tyndall amused his last days with seeing a shrub grow bottom upward,—a thing that every boy in America, that ever drove a stake in a wet place in Spring, has witnessed. When will men of science, true or false, have the modesty of little children?

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