

# Proceedings of the Iowa Academy of Science

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Volume 6 | Annual Issue

Article 13

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1898

## Effects of a Sleet Storm on Timber

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### Recommended Citation

Gow, James E. (1898) "Effects of a Sleet Storm on Timber," *Proceedings of the Iowa Academy of Science*, 6(1), 63-66.

Available at: <https://scholarworks.uni.edu/pias/vol6/iss1/13>

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*Ostrya virginica* Willd. Ironwood. Not uncommon along the Nodaway, and may be found on Middle river, but not abundantly.

*Crataegus coccinea* L. Hawthorn. White thorn. Red haw. Common on low land, usually in larger timber.

*C. tomentosa* L. Black haw. Not very common. Found in greater abundance on the west than on the east side of the county.

*Pyrus coronaria* L. Crab apple. Very common on all low land, whether open or covered by larger timber.

*Cornus paniculata* L'Her. Dogwood. Common in thickets, both in valleys and on the higher land.

*Rhus glabra* L. Sumac. Common in thickets along the side and crest of river bluffs and on the high prairie. Found usually with hazel and bur oak.

*Sambucus canadensis* L. Elderberry. Common in thickets on all waste, rich land. Prefers the bottoms.

*Prunus virginiana* L. Chokecherry. Fairly common on all low land. Usually found in hick ts of other timber.

*Corylus americana* Walt. Hazel. Very common on all rough, rolling land, especially near the larger streams. Very seldom found on low land. Originally a great part of the prairie was covered with hazel, but most of it has been removed. A good deal yet remains, however, and all along the larger streams it is very abundant.

*Salix nigra* Marshall. Willow. Tolerably common on all low, moist ground.

*Vitis aestivalis* L. Wild grape. Common in all timber.

*Lonicera parviflora* Lam. Not common. Found occasionally in heavy thickets.

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## EFFECTS OF A SLEET STORM ON TIMBER.

BY JAMES E. GOW.

On the night of the 9th and the morning of the 10th of February, 1898, a heavy sleet storm passed over Adair county, Iowa. The storm began not very long after midnight with a brisk rain which froze as it fell and adhered tenaciously to trees and other objects with which it came in contact. The

wind at the time was slightly west of north and was not blowing at all briskly. The day preceding the storm had been unusually warm, for the time of year, with a cloudy sky, a slight breeze from the north and a very humid atmosphere. About 3 o'clock on the morning of the 10th the trees, which had become heavily laden with ice, began to break. Had there been a heavy wind at the time, the damage to the trees would have been immense; as it was, the damage was very great and in the town of Greenfield the people were very generally awakened by the crashing of the breaking trees, which lasted almost continuously from 3 o'clock until daylight. Morning revealed the immense damage which had been done to the shade trees of the town. Most of these are soft maples and had yielded readily to the weight of ice, so that a large proportion of them were damaged and some were quite ruined. Owing to the stillness of the air the ice adhered about equally to all sides of the trees and, on trees of straight growth, the breakage was equal on the different sides.

The damage wrought by the storm was most severe on the soft maple trees, owing to the softness of their wood. Next, after them, the willows probably suffered most. In many places in the county willow hedges by the roadside were bent over until the trees nearly touched the ground and numbers of the trees were either broken short off or lost many of their branches. Hedges running east and west were worse affected than those running north and south, owing to the general tendency of the trees to bend toward the north. Hence in the former case the trees, having no support, were broken down by the ice, while, in the latter, they rested upon each other to some extent, and were saved from breakage. Box elder trees were badly damaged and elms were damaged almost as badly. Some handsome box elder trees in the town of Greenfield were almost ruined. A handsome weeping willow tree in Greenfield was literally stripped of all its smaller branches, not one being left unbroken. The accompanying illustration was taken of it just after the removal of the broken branches and may give some idea of how thoroughly the storm did its work. Oak, walnut and hickory trees resisted the ice well and were largely uninjured by it. Cottonwood trees suffered severely.

The amount of damage done to trees was largely determined by their position and habit of growth. Trees which grew

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PLATE II.



Weeping Willow Tree at Greenfield Stripped by Sleet.

upright shed the water and sleet well and were not greatly injured, while those which grew in a slanting position or were gnarled and straggling in their growth, did not shed it so well and consequently received greater injury. Limbs growing in a horizontal position were soon weighted down and broken while those more nearly vertical were saved.

In the native timber much damage was done and many trees were ruined, but the damage was not nearly so great as in the artificial groves, owing, doubtless, to the fact that the native timber tends naturally to grow in the best sheltered places and in such a manner as to protect itself, while, of the artificial groves, many are planted in exposed positions and in such a manner as to offer little resistance to a storm of this kind. In many of these groves the trees have been planted so close as to mutually choke each other, and consequently show a tendency to grow very tall, with a thin, spindling trunk and no branches lower than twenty or thirty feet from the ground. Wherever this condition prevails the damage done by the storm was very great. Throughout these groves we may see any number of shattered and maimed trees—evidences of the fact that the stunted trunks were unable to support the heavy masses of sleet which hung to the limbs. Trees which had distanced their comrades in the struggle for light and air by pushing up some distance above them suffered most severely and were almost invariably either broken off short or lost many limbs. The fact that most of the artificial groves are of soft maple trees also goes far to explain the great damage which they sustained.

Trees growing in the open, as a rule, showed a better and stronger development than those in groves, and, hence, better ability to resist the storm.

In the case of most groves there is a very evident tendency on the part of the trees to lean toward the northeast—a tendency which has never been very satisfactorily accounted for, but is usually credited to the prevailing southwest wind of summer. This fact was emphasized by the results of the storm. An examination of almost any grove which suffered from the storm would reveal the fact that the greatest damage was done on the north and east sides and that, as a rule, the broken trunks and branches fell outward, while on the south and west they fell inward, or toward the center of the grove.

Naturally, the trees on the south and west were, to some measure, supported by those within, while those on the north and east, having no such support, succumbed to the sleet. A like effect may be noted in the case of trees in isolated localities, and in hedges. In hedges running east and west the greatest breakage was observable on the northern side—especially in the case of willow trees—whose leaning habit of growth made them particularly susceptible. In hedges running north and south the damage was not so great nor the effect so well marked, but here, as a rule, the greatest breakage was on the east. However, although these conditions were so general as to be readily observable, there were many apparently inexplicable exceptions, but in the main the effects of the storm were as here given.

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### THE AUGUST CLOUD-BURST IN DES MOINES COUNTY.

BY MAURICE RICKER.

It is my purpose to give merely a statement of facts concerning the storm which deluged Des Moines county the morning of August 16, 1898. I believe it was the heaviest rainfall ever noted in the United States for the period of its duration, and while the area covered was not large, it proved to be very destructive. No doubt there have been storms in which the precipitation was as heavy, where no one saw fit to chronicle the event. Many great disasters, as the Johnstown flood, with a greater area and less precipitation, have become historic, because of loss of life.

My attention was called to the excessive rainfall that morning at daylight by the little swollen creek which divides South from West Hills in the city of Burlington. Yet this was in the very edge of the storm. The newspapers contained many sensational stories of narrow escape from loss of life, damage to county, city, railroad and farming interests. I read these with no special interest and dismissed their estimates of sixteen to twenty inches of rain in Flint valley as exaggerations so commonly found in popular accounts of natural phenomena. As soon as the tracks were repaired I had occasion to make