not speak of that, because that was a remarkably favorable season; last winter injured them. We have found that the best practice in grafting is to insert the graft on a level with the ground, or a little below it, piling up the earth a couple of inches so that you can afterwards take away the earth, when the union has become perfect, and thereby avoid, as far as possible, its forming its own roots.

W. C. STRONG, of Massachusetts. Would you recommend cutting down old established vines and grafting them?

I. BUSH. If you don't want the old vines, certainly.

W. C. STRONG. There is no objection to large-sized roots?

P. BARRY. No, sir. You may graft a vine as thick as your arm.

I. BUSH. The French seem to believe that the stock has an influence upon the graft, or else they would not import millions of grape cuttings to graft upon.

Prof. C. V. RILEY, of the District of Columbia. This is a subject which deeply interests me. I have a great deal of faith, from observation, not from any experience of my own, in grafting above ground. I believe that one of the causes of the failure of our more delicate vines (I do not say the principal cause), is their susceptibility to the injurious influence of the phylloxera at their roots; and this belief led me, in 1876, in one of my Missouri Reports, to strongly urge the grafting of certain varieties, just as I had recommended the grafting of the *vinifera* to the French, on some of our stronger stocks, and I induced some grape-growers in Southern Illinios to try the experiment of grafting the *Delaware* above ground, on the wild stocks, which proved successful, where otherwise they had failed. It is true that our grafting, as a rule, has given very poor satisfaction, but I think it is solely due to the fact, that in the course of time the graft makes its own roots, simply because the graft is, of course, below the ground, and I am satisfied that with similar care to that which the French are now giving to the grafting of their own *vinifera* on our native stocks, we could succeed just about as well. I do not know why we should not. I am satisfied that the main thing should be to keep the graft intact, and put it above ground, where it will not make its own roots. I am convinced that if that is done, many varieties that now fail in different sections of the country can be grown successfully. In proportion as the vine goes back to its original character, and makes its own roots, it becomes liable to attacks by the phylloxera, and in that proportion it fails. For the first few years it seems to do very well, but a year or two afterwards it fails.

S. B. PARSONS, of New York. I would suggest that every gentleman here who is interested in this question make the experiment, before our next meeting, two years hence, by taking a good strong root of the *Ives*, the *Taylor*, or the *Concord*, and grafting it three, four or six inches above ground, in that way insuring that it shall not go back to its original root.

Distinguishing Varieties of Pears by the Blossoms.

BY PROF. W. J. BEAL, LANSING, MICHIGAN.

It was my privilege to demonstrate, at our last meeting, held in Rochester, N.Y., that the different varieties of apples may be described and classified by their flowers alone.

I have recently attempted a similar work in reference to the flowers of pears. As in apples, so in pears, the persistent tips of the calyx have formerly been and are still employed in describing these fruits. The lobes of the calyx vary in several respects in different varieties, in their length, breadth, and the direction they take.

As a general thing, I find the petals of pears are smaller than those of apples. The petals of different varieties vary in shape and size in the same manner.

The stamens of apples and pears are generally twenty in number for each flower, and are of four different lengths; the longest in any one flower being about one-third longer than the shortest. The longest and oldest stamens form the outside row, and the shortest the inside row.

The latter are attached a little farther down the calyx tube than any of the others. The two rows of intervening stamens are between the extremes in their length and places of attachment.

The set of shortest stamens are placed opposite the lobes of the calyx. There were twenty-five each in two flowers examined. In one flower I counted twenty-seven. In several varieties it was not an uncommon thing to find 21 or 22, or 23 or 24 stamens, in which cases no definite order could be made out in regard to their lengths or places of attachment, though they varied in these respects. In some varieties the filaments are short, in others, long; in some stout, in others slender.

The stamens of the Kirtland pear were the longest of any seen. The longest set of these were nine millimeters, or about three eighths of an inch. The

shortest stamens seen were those of White Doyennè. These were five millimetres, or about three and one-half sixteenths of an inch, or about five-ninths as long as those of the Kirtland. The anthers of different varieties vary somewhat in size. The styles of apples unite at the base, forming a stem or *stipe*. The styles and the stipes of flowers of different varieties of apples differ in length and diameter. Some were very densely covered with wool or hair; some were perfectly smooth. Between these, in different varieties, we find all intervening stages.

The styles of pear blossoms for a very short distance at the base, perhaps one-sixth to one-tenth of their length, are firmly pressed together, but they readily separate. In most cases this portion of the styles is slightly hairy. In some cases it is perfectly smooth. The longest styles seen were those of Amire Joannet, and were a trifle over one decimetre or six and one-half sixteenths of an inch in length. The shortest styles seen were those of Howell and White Doyennè, and were over six millimetres, or about one-fourth of an inch in length. The shortest styles were about three-fifths the length of the longest.

The strongest points for describing and classifying apples by their flowers are found in the styles and their stipes. In pears these are their weakest points.

I have examined the flowers of about thirty varieties of pears, and these were mostly obtained in one orchard, that of H. E. Bidwell, Plymouth, Michigan. This is the orchard once owned by President T. T. Lyon. In three instances, flowers were examined from two different localities.

I have not thought the differences in their flowers were prominent enough to warrant much work in attempting to classify pears in this way. I have gone far enough to become convinced that the flowers should be described in connection with a description of every variety. In most cases, the description of the flowers might not be of much practical use, but in some cases it certainly would.

Protection to the Orchard.

BY DR. J. A. WARDER.

Fellow-members:

In the opening of this discussion, the first question that must arise in our minds will be: What dangers threaten us, and from what injuries are we anxious to protect our property?

Leaving aside and out of consideration the inroads of intruders, whether these be responsible human beings or their domestic animals, for whose intrusion their owners are made responsible by the laws of our civilization, let us address ourselves to the injuries effected by natural agencies, some of which may perhaps appear to be quite beyond our control as to to their movements, their coming and their going, and yet even these climatic conditions may prove to be, in a degree at least, within the control of our preventive measures by means of *Prevision* and *Protection*. For, though it be proverbial that the wind bloweth where it listeth, and the Frost biteth where it striketh, still we may, in a great degree, protect our orchards from the sweeping winds, both hot and cold, for both are equally injurious. We may, in many cases, avoid the disasters incident to driving storms of hail and sleet, as well as from those arising from frosts and thaws, or from sunshine and extraordinary heats, and we may protect our crops in a good degree from sudden changes of *temperature*.

All these may, and often do prove sources of greater or less injury to our orchards, and they may all be met or avoided as disturbing agencies, by the use of judicious preventives, or by avoidance of exposure to their malign influences.

The effects of some of these causes must be familiar to you all, who have seen the results of the wind's action in causing the growing trees to lean away from the stormy quarter, producing crooked and exposed trunks that become diseased. The same forces may shake off the fruit prematurely and will often break the branches, especially when laden with their heavy burden of fruit, and thus produce much damage.

In winter the winds often dessicate the twigs and buds so completely, in long continued sleety storms as to destroy their vitality and blacken the pith of the shoots, thus causing great injury.

In the spring-time, wind-storms, especially those which are accompanied by low temperature, will blow off the pollen, or prevent its proper development, and thus blast our cherished hopes of a bounteous fruit-crop; or, later in the season, when the hot south winds come with their desolating breath, we may see our brightest anticipations dissipated by the drying up of the sap, the dessication of the fruit and foliage, while the meridianal sun scalds and partially cooks the former, and browns or burns the latter, which looks as though it were scorched with fire: truly a dismal and discouraging spectacle to the ardent fruit-grower.

But, you may say, that these are natural conditions of the elements, and incidental to the climate of portions of our country, and you may con-