mulching (coarse, half-rotten manure is the best) should not be piled against the bodies of the trees, as is often done, but should be spread evenly over the roots, as much to destroy the sod as to furnish nourishment to the trees. If the soil has been exhausted by cropping, richer manure will be needed. Ashes, lime, muck, old leaves, etc., are always valuable. If the orchard is young, and just planted out, a few years of thorough cultivation is very important. Corn, potatoes or other hoed crops may be planted with profit if the soil is rich as the soil of a young orchard should be, but wheat, oats, barley or meadow should be very decidedly avoided. These crops are such absorbers of the moisture of the soil that young trees will seldom thrive while growing in connection with them.

One of the greatest losses that the fruit grower sustains in the raising of fruit for market purposes is an injudicious selection of varieties. This is a very important subject, and a subject too, that even those who have devoted some attention, and have had more or less experience in the cultivation of fruit, unfortunately, to some considerable extent, disagree. A committea appointed by the Grand River Valley Horticultural Society, as reported in the Pomological Report for 1876, report a list of seven varieties in a list of one hundred trees for winter market fruit, among which is neither a Baldwin nor a Russet, but thirty Canada Reds, ten Wageners, twenty Peck's Pleasants, ten Ben Davis, etc., while I. E. Ilgenfritz of the Monroe Nursery recommends twenty Baldwins, three Wageners, five Canada Reds, two Peck's Pleasants, three Golden Russets, etc. An orchard of one hundred trees of winter apples without a Baldwin or a Russet, in my opinion, would be very deficient.

There is no variety of winter fruit that will bear more bushels of marketable apples of the Baldwin, and their color and size usually make them command the highest price. The Golden Russet, too, is one of the hardiest of trees, a profuse bearer, and the fruit can be kept until it will bring a good market price in any season. So, too, is the Roxbury Russet, one of the very best of our long-keeping varieties. Its size, richness of flavor, excelling for cooking and cider, renders it hardly to be excelled. But the tree is somewhat tender, and the fruit quite subject to injury by the codling moth. Yet with all its failings it should occupy a place in every orchard. In fact a good line of the old varieties still stands nearly at the head of the best list of fruit. The Russet, the Greening, the Baldwin, the Talman Sweeting, the Wine, the Maiden's Blush, the Astrachan, the Sweet Bough, the Sour Bough, the Golden Sweet, etc. I refer to their places can hardly be filled.

ANNUAL REPORT OF 1878.

The secretary called attention to the report of the society for 1878 saying that 100 copies had been struck off for the members who attended this meeting. He called especial attention to the portfolio and gave an abstract of its contents, and also spoke of the two articles, prepared especially for insertion in this volume, the one by President Lyon on the "History of Michigan Pomology," and the other by Prof. Halsted on the "Origin, Structure and Function of Flowers."

The next paper of the afternoon was given by Prof. W. J. Beal, on

ACCLIMATION OF PLANTS.

In the discussion of this topic, I have started out with an unusual number of quotations from eminent scientists and horticulturists. As I proceed, you

will notice that the word denoting the subject under consideration is spelled or pronounced in several different ways.

AN ADVERSE OPINION.

Several of the first quotations are from an editorial in the Gardeners' Chronicle, page 492, October, 1875. He writes: "Incorrect terms are a great hindrance to the progress of natural science, because they not only convey false ideas but imply their acceptance as acknowledged truths. Now, if ever a word was unluckily chosen to express a fact or process, actual, possible, or only wished for, it is the word ACCLIMATIZATION. And the worst of it is, that it is now too late to make a change. Twenty or thirty years ago the world's expectations in this matter were probably more sanguine than they are at present; for endeavors made have not been crowned with the success anticipated." The author mentions begonias and some other plants as cases in which horticultural art has not been able to effect the slightest change in their constitutions in that respect,—they remain exactly what they were from the first. These plants were propagated by cuttings or layers. He adds, "What have the acclimators acclimated?" May we not venture to reply, 'Nothing whatever;' because, as we believe, the hardiness found to exist in plants and animals after their introduction to this and other countries, was already innate and inherent in them before they left their native shores. Their change of home has simply tested their robustness, but has not altered their constitution. Acclimatization has failed (in Britain) to make Bobbett's corn the staff of life; it has not made New Zealand flax grow as luxuriantly out of doors here as in New Zealand; it has not even acclimated the potato. With this experience of facts, may we not be permitted to doubt whether the process which we understand by acclimatization really and practically exists at all? Strange plants and animals introduced into countries, new to them, have immediately shown their fitness for the soil and climate and have multiplied and spread to such an extent as to become naturalized." Of this class of plants I may mention most of our weeds, nearly all of which are imported. In Australia, New Zealand, and many parts of South America, some of the introduced plants thrive better than the native plants and are fast crowding them out. The editorial so liberally quoted, says that the term "naturalization" would be better. "What may be effected by natural causes, in the course of millions of years, we cannot tell, what is done in the way of acclimatization by human agency during one or several human lifetimes, appears often to be infinitesimal and quite inappreciable. The original nature of plants is little changed by art. Much that has been written, and more of what is believed concerning acclimatization, is sheer fallacy. But little of actual fact can be sifted out of the masses of chaff to prove that any plant is one whit hardier than it was when first imported."

OTHER OPINIONS.

The late Mr. McNab of Scotland, was an eminent botanist and lived a long life as a most successful gardener. In 1874, in his opening address before the Botanical Society of Edinburgh, he says: "I am one of those skeptical individuals who do not believe in it [acclimatization], and still maintain the opinion that a plant is as hardy when first introduced into this country as it is after being half a century in cultivation." He gives numerous examples "to show that certain plants, although long grown in a conservatory and planted out will thrive during a series of good seasons, but will succumb after an adverse summer followed by a severe winter."

Dr. John Lindley, in Morton's Cyclopædia of Agriculture, writes, "That cases in support of this view are not numerous, however plausible the theory may be, and it may be doubted whether in fact any one example of acclimatization, in any considerable degree, if at all, can be produced."

The editor of the London Horticultural Magazine writes: "We deny that a seedling can be rendered more hardy than the parents; although we do admit that seedlings may be more hardy than their parents." Cases of some seedling dahlias and potatoes are cited as examples; that is, some of the seedlings will endure more frost than others." He adds: "The question of acclimatizing plants, therefore, is only tenable if we put another construction on the word, and instead of using it as meaning the making a plant more hardy than it naturally is, use it in the sense of proving how hardy a plant naturally is, for such is all we can do."

THE TERM DEFINED.

"A. R. W," probably A. R. Wallace, in the Encyclopædia Britannica, says: "Acclimation is the process of adaptation by which animals and plants are gradually rendered capable of surviving and flourishing in countries remote from their original habitats, or under meteorological conditions different from those which they have usually to endure, and which are at first injurious to them. The subject is very little understood, and some writers have even denied that it can ever take place. It is often confounded with domestication or with naturalization. Perhaps in most cases of naturalization there is no evidence of a gradual adaptation to new conditions which were first injurious, and this is essential to the idea of acclimation." The author goes on to say that "It is evident that acclimation may occur (if it occurs at all) in two ways, either by modifying the constitution of the individual submitted to the new conditions, or by the production of offspring which may be better adapted to those conditions than their parents. The alteration of the constitution of individuals is not easy to detect. Habit has little (though it appears to have some) definite effect in adapting the constitution of animals to a new climate; but it has a decided, though still slight, influence in plants, when, by the process of propagation by buds, shoots, or grafts, the individual can be kept under its influence for long periods. In most cases, habit, however prolonged, appears to have little effect on the constitution of the individual, and the past has no doubt led to the opinion that acclimatization is impossible."

TESTIMONY OF PROF. DARWIN.

I next make some extracts from the writings of Charles Darwin. He calls it "the much disputed subject of acclimation," and says: "The attempt to acclimate either animals or plants has been called a vain chimæra. No doubt the attempt in most cases deserves to be thus called, if made independently of the production of new varieties endowed with a different constitution. Habit, however much prolonged, rarely produces any effect on a plant propagated by buds; it apparently acts only through successive seminal generations." On the whole, he concludes that "habit does something towards acclimation," even where the plants are propagated by budding, layers or cuttings. As an illustration he mentions that vines taken to the West Indies from Madeira have been found to succeed better than those taken directly from France. This is the only example I can find.

Darwin and Wallace, and the editor of Nature use the term acclimatization in a broader sense than it is used by editors of the Gardeners' Chronicle, the

editor of the Garden, the editor of the London Horticultural Magazine, Dr. John Lindley, or Dr. McNab, of Scotland. The former set of authors believe that it is a legitimate part of acclimatization to produce new hardy varieties, races, or hybrids from seeds.

EXAMPLES OF ACCLIMATION.

In this broad sense, every one must certainly believe that most plants, if not all can be acclimated in a climate more or less uncongenial to them. One of the most remarkable cases of this kind is Indian corn. All of our races of corn have evidently been derived from one species. We have numerous varieties of pop corn, sweet corn and field corn; corn with long, pointed kernels, or with round kernels, or indented kernels. We have kernels which are hard or soft, red, yellow, white, violet, black or striped. We have ears with eight rows of corn, and from this up to thirty or more. We have ears of corn varying in length from one inch to fifteen or sixteen inches, and stalks varying in height from twenty inches to sixteen or more feet. We have in the United States corn which will ripen in ninety days, and other varieties which require in the warmer sections six or seven months to mature.

The cabbage (*brassica oleracea*) also varies much, and has produced all sorts of cabbage, early and late, all sorts of cauliflower, broccoli, kohlrabi, etc. The list of grains, vegetables and flowers might be indefinitely extended. The examples of a difference in the hardiness of seedlings of trees is also familiar to all of us. The Baldwin and Large Yellow Bough are tender in many portions of Michigan, where the Red Astrachan and Ben Davis are hardy. Examples might be given of a difference in the hardiness of pears, plums, cherries, peaches, grapes, blackberries and other fruits. The same thing was long ago noticed in the hardiness of seedling oranges in Italy. The previous example and the next example are taken from Darwin's "Animals and Plants under Domestication," to which all are directed if they wish for further illustrations.

Mr. Grigor states that seedlings of the Scotch fir *(Pinus Sylvestris)*, raised from seed from the Continent and from the forests of Scotland, differ much. The difference is perceptible in one-year-old, and more so in two-year-old seedlings. Closely similar facts have been observed with seedling birches. Pomologists of Iowa and Minnesota are raising seedling fruits some of which are hardier than the parent plants.

AN OPEN QUESTION.

In striving to obtain seedlings better adapted to any peculiarity of climate, I cannot find that any experiments have been made to decide the following point: Shall we plant seeds raised in a more congenial climate, or shall we be more likely to gain the point desired by planting seeds raised in the climate for which we want suitable trees or shrubs? I should expect the results would be more favorable by planting seeds grown in the same locality, or, still better, in one with a similar climate a little distance away, provided the seeds were from tolerably well-grown and healthy specimens of fruit.

Before closing, I will briefly refer to the matter of attempting to acclimate specimens of trees or plants. For example, we often hear people speak of acclimating a certain individual young evergreen tree. As we have seen, there is probably no such thing as acclimating a single tree or plant. We can plant it in the most favorable spot at our command. The soil should be of suitable texture and well drained. The cultivation should be such that the tree may

grow at a moderate rate and mature well. A young tree generally grows faster than an old one. It is more likely to be injured by extremes of heat, cold, drought or moisture than a tree which has become established and has arrived at the prime of life. We may shelter or otherwise protect a tree while it is young, and thus carry it through the most precarious part of its life. This is almost always done with seedling evergreens. When well established they may be allowed to take care of themselves. This early nursing of trees is not acclimation.

President Lyon.—Whether technically there is any such thing as acclimatizing plants, the fact is pretty well understood that plants become adapted to certain climatic conditions by following certain methods of caring for them. There is another matter connected with this subject that is worthy our attention. It is the selection of seed to produce the best plants. The thought has come to me from certain experiments performed by Mr. Downer and Mr. Hathaway in the production of new varieties of strawberries. Mr. Hathaway, I think took fully as much pains with his work as Mr. Downer and still the latter brought out several fine seedlings, while Mr. Hathaway brought out but one of value. My impression is that the difference lies mainly in climate; the seasons of Kentucky are more favorable to the perfecting of the species than those of Michigan; and it occurs to me that this is worth our consideration in developing any sorts of plants by means of seed. We should seek such a climate if possible as is the best adapted to the plant. A corollary to this might perhaps be added that is already taken advantage of by foreign seed growers—plants set apart for seed growing with the view of developing a better strain should at the time of seeding be subjected to the most favorable circumstances and conditions. A common example of climate affecting seed, is that of Indian corn; in the north it gradually deteriorates, while farther south where it is naturally adapted we may look for the best opportunities of perfecting the seed. If the germ of vigor is in the germ of the seed it is important that we make that seed as healthy and vigorous as possible.

Mr. F. A. Gulley next occupied the attention of the convention with a paper giving answer to the query,

SHALL WE USE HEDGES FOR FARM FENCES?

In the report of the Secretary of the State Board of Agriculture for 1876, Mr. John P. Finley of Ypsilanti gives some statistics and estimates, of the cost of fencing in Michigan. I copy the following: There are 32,000 miles of road fences in the state, that cost $10,000,000. The estimated cost of fences in Washtenaw county, in 1874 was over $2,000,000. He finds that fences cost the farmer more than twice as much as his taxes.

I give these figures merely to show how important this matter of fencing is. Although we cannot dispense with fences altogether, we might get along with less.

We must get rid of this notion of fencing out other men's stock, and only fence in our own.

It is a wrong idea or custom that compels the people of a township to build thousands of dollars' worth of road fences, just for the sake of fastening out a few cows and half starved calves, for an occasional family who must keep a cow, but own no land, and are too poor to hire pasturing. With great sympathy for the unfortunate, and believing it the duty of every one to give a weaker brother or sister a helping hand, I can't help feeling that neither charity nor generosity