A History of Grape Growing in Eastern United States

By Fred Elmer Gladwin

PART I.

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Probably few records covering the introduction of any fruit in the husbandry of the United States list as many trials and many failures as do those which tell of the experiences encountered by early colonists along the Atlantic seaboard who pioneered in grape development. In fact failure followed failure. Yet after a lapse of time the project would again be revived and strenuous efforts made to avoid the earlier mistakes, if such were recognized. As we now look back on their attempts and study the causes ascribed for the failures, which are many, one can readily understand that they were groping in the dark, but with the indomitable spirit that so often crowns success in most present-day undertakings. In their day there was no recourse to carefully recorded data from institutions devoted to agricultural studies, nor were there available climatic data of temperatures and rainfall, sunshine and cloudiness, nor was the relationship of large bodies of water and vine culture associated. In view of all of the difficulties encountered, many of which increased instead of diminished, it is surprising that they still had faith in an ultimate success.

Since much of this early endeavor to introduce grape-growing in the East is concerned with a species not indigenous to the United States, but rather that of the Old World, it perhaps will be well briefly to point out some of the most important differences between this species and our native American grapes. The Old World varieties of grapes are known generally by the species name Vitis vinifera. Many people, who are only familiar with appearance and taste apply the term "California grapes" to this species, with the belief that the varieties so designated are peculiar to or have originated in that State. As a matter of fact, all grapes of this type grown in California are introductions from foreign shores. Most of them have come from Europe and Asia. Vitis vinifera is now grown to some extent in Arizona and New Mexico, it having been introduced in these States by Spanish padres coincident with introduction in Southern California many years ago. The climate of these States has proven entirely satisfactory for most of the Vinifera species, while that of the southeastern seaboard, even thought Summer temperatures are sufficient, is lacking in other respects. Many of the commercial varieties native to the United States are of pure Vitis Labrusca blood, commonly known as the fox grapes; at least this species dominates in most hybrid varieties, as in such varieties as Isabella and Ives, both of which are a combination of the Labrusca and Vinifera. Concord, Moore and Worden are three of the best-known pure Labrusca. Of course there are many other native species growing wild in the United States, one of the most common of which is Vitis riparia. Some botanists choose to include Riparia with another species under the name of Vitis vulpina. For many years it was believed that such commercial varieties as Bacchus and Clinton were of pure Vulpina origin, but it is now pretty generally agreed that both contain some Labrusca blood. There are about 10 species of native grapes now growing in this country, but few of these have thus far proven of much importance in the development of Amefican grape-growing except in very limited regions. Some of them have contributed to the birth of varieties perhaps better adapted for Florida and Texas climates than varieties derived from Vinifera, Labrusca or Vulpina. In short we may state rather definitely that two species have thus far been all-important in grape growing over the United States as a whole, the Labrusca in the East and the Vinifera in the West and Southwest. However, many of the eastern varieties are a mixture of the two, while some, as the Delaware, are a combination of at least three species.

Now for a time let us consider the similar and dissimilar characters of the two principal species most grown in the United States, the Labrusca and the Vinifera. The first character that stands out when representative or typical clusters of the two species are brought under

comparison is the larger size of the Vinifera fruit. While it is true that the clusters from a few Labrusca varieties are larger than those from a few Vinifera, yet it can be said that the Vinifera yields large clusters, and that this is a rather constant species character. It cannot be said that compactness of the cluster is more common to one species than to the other. But the larger size and oval shape of the berries of the Vinifera are more common to the varieties derived from this species than with Labrusca varieties. The oval shape of an unknown hybrid variety suggests Vinifera blood, and this in turn may serve in finding the true classification of it. When the berries from the two species are eaten, the differences between them become more apparent. All varieties from the pure natives and most hybrids are now commonly classed as "slip skins;" that is, the skin separates readily from the pulp, the more or less solid portion of the berry. In the pure Vinifera the skin and pulp cannot easily be separated. With the fruit from Labrusca varieties, the seeds in most instances do not separate readily from the pulp, while with the Vinifera sorts it is rather easy to free them. Again it is noted that the pulp of Vinifera varieties is more solid than with the Labrusca. This lesser water content with that of higher sugar for most Vinifera varieties explain why raisins are possible from this species, while the high water content and lower sugar of most Labrusca eliminate this species from such a use. In an occasional season of drought, a few Labrusca varieties of high sugar content will raisin, but the smaller size of berry results in a raisin of no commercial importance.

Varieties derived entirely from the Labrusca species have a particular flavor or aroma that distinguishes it from the Vinifera and nearly all other native species. For some unknown reason this character has been termed "foxy." Various reasons hare been given for the adoption of the term, but as no one of them seems to offer a reasonable explanation, they will not be discussed here. To the average European taste, this foxiness is very objectionable, but to the native American of the Eastern States it is preferred to the mild or vinous flavor of the Vinifera. Perhaps as has been frequently stated, this taste must be acquired. If this be true it may be concluded that a great proportion of people east of the Rockies have succeeded in its acquisition. The foxy flavor of the Labrusca has at times given it an ill repute for wine-making purposes, but a selection of varieties and changes of manufacturing methods have resulted in some wines that were not in any way inferior to those from the pure Vinifera, and many have been made that were far superior. The higher sugar of the Vinifera varieties has yielded wines of higher alcoholic content than is possible with the Labrusca, yet tastes for alcohol have not always been favorable to beverages of high alcoholic content. Some native American grape hybrids approximate the sugar content of the better Vinifera, especially if the proportion of the latter predominates in the hybrid. Varieties, either pure Labrusca, or those in which the Labrusca is outstanding, are much superior for the making of unfermented grape juice than the Vinifera sorts. The thing termed flavor or aroma, now known scientifically as an ester, is lacking in the Vinifera species, or rather we should say, the particular esters that give the pleasant characters to un-fermented grape are not present in that species. For this same reason jellies and jams from pure Labrusca are much superior in flavor and color to those from pure Vinifera. The root systems of the two species are quite dissimilar, that of the Vinifera is fleshier and more fibrous. Cane growth of the latter is shorter and stockier than with the Labrusca. As a group the varieties derived from the Vinifera are more productive than the pure Labrusca, although some of the latter compare quite favorably in this regard. It has been stated that Vinifera varieties are adaptable to a greater range of soils than is the Labrusca, and while this may be true in general, it must be recognized that the pure Labrusca, Concord, possesses soil adaptibilities in the highest degree. The natural growth habit of the Vinifera, bushy and compact, makes it possible to train many varieties to stakes rather than wires supported by posts. Spur pruning, which is not generally desirable for Labrusea varieties, suffices very well for many varieties of Vinifera. Even though certain varieties of the latter be pruned to canes, these are usually of necessity, cut much shorter than in cane pruning of the Labrusca. The canes of Vinifera varieties are usually much lighter in color than are those of pure Labrusca, although

sometimes a pure native Labrusca variety, as Champion, shows this light color. The leaves of the former are thinner and as a rule glossier than the Labrusca varieties, and quite often they are more indented. The two species are subject to some of the same diseases and insects, among which are the mildews, chiefly the powdery form, black rot, the grape leaf-hopper, and root-worm. The species of the last named two may be different, but the ultimate effects on the vine are the same. Varieties of the Vinifera are subject to attacks by a root louse, the Phylloxera, which if it infests Labrusca causes no particular injury. This louse has been the bane of French grape-growers in the past, and to a lesser degree to the vineyardist in California and the Southwest.

It has been deemed advisable with an article of this kind to go to some lengths in pointing out the gross differences between the two species that have been and are the bases of American viticulture, the one, Vinifera, for planting in the West and Southwest, and the other, the Labrusca, for the grower of all that section east of the Rockies. The former has continued with the pure species, being only concerned with newer and better varieties of the species, while the grower of the East is constantly striving for varieties developed by the combination of two or more species. A great number of varieties now grown in the East are a combination of Vinifera and Labrusca, in about equal proportions. These terms will be used very often in the continuation of this series of articles as we trace the beginning of commercial grape-growing from but a few vines to an industry that in many seasons has been the predominant money crop of many sections. We shall see here the same indomitable spirit displayed that has characterized the development of this vast country, as it has forged to the forefront in agriculture and manufacture.

PART II.

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In the previous installment of the history of American grape-growing it was emphasized that much would be said later of grape varieties derived from two species, Vitis vinifera and Vitis Labrusca, since these two have played the important role in the development of American viticulture. Mention, however, should be made of another species, the pure native Vitis rotundifolia, which has had some part in the grape-growing of Southeastern United States. But few varieties have come from this species, these largely by selection from vines growing in the wild state. In "The Grapes of New York," Hedrick et al., of some 1,100 varieties described, 16 pure Rotundifolia varieties are mentioned, while but five are noted as having been developed or found growing in a wild state showing characters of both Rotundifolia and some other species. Thus it would seem that the grape breeder has not considered this native species as particularly adapted for the development of new grapes. In this book are mentioned 274 pure Labrusca varieties, and 318 hybrids of Labrusca and Vinifera.

It is probable that the first grapes planted in the United States on what is now American soil were started by Spanish padres at the old missions in New Mexico, Arizona and California. It is also probably true that these were started before any settlements were made in Eastern America. We know nothing of the success of this venture, but it is reasonable to assume that it went well, under the direction of the mission fathers, since they brought to the attempt years of experience from the Old World, and the climate was favorable. There was probably no thought of commercial gain, but rather the sole desire was to grow only a sufficient quantity that they might have an abundance of the wines to which they were accustomed. Even today the urge is the same. Immigrants from many countries bring to our shores their native plants and seeds that they may not be quite so completely disassociated from the mother country, and likewise the migrant from one section to another takes with him a supply of seed or cuttings that he may continue to grow his favorites in his new home. Whether the mission father had previous information as to the likelihood of success in his new southwestern home or not is problematical. But no doubt the first success resulted in extensive planting later. There can be no question but that this first venture has been of immense importance in the development of the viticulture of the Far West.

According to the best authorities the first vines of the Vinifera species were planted by the English in Eastern United States. As early as 1616 Lord Delaware wrote the London Company suggesting and urging the growing of grapes in Virginia as a source of revenue for the new colony. It is assumed that the revenue was to come from the wine manufactured rather than the sale of fresh grapes for dessert purposes. Lord Delaware found on his arrival in the colony a great many vines along the banks of streams, and he writes that nearly every tree is overspread and that thousands have been seen. But he soon realized that these grapes were much different in kind from those with which he was familiar. Yet he had faith that if men who had made the growing of grapes their business in the Old World were brought to these parts they would be able after a few years to make these native vines bear fruit comparable with that from the other side, if they should be pruned and brought under control. The London Company was favorable to the project and in 1619 they sent over a number of French who were experienced in the art of growing grapes, together with a collection of varieties of the best French varieties. Thus it would seem that with the importation of vines and the men familiar with their growing, that the venture got away to a good start. The vines were planted in Virginia. The Virginia Assembly was just as solicitous of success as the parent company, and in the year of importation passed an act making it mandatory that every householder plant 10 cuttings, care for and protect them from injury, and further provided that each was to acquire the art of pruning and general care of vines. The Assembly rewarded with gifts and other favors those who were particularly zealous in caring for

their vines. Under these subsidies the planting increased very rapidly, and vineyards containing thousands of vines were not uncommon.

Even with a virgin soil, apparently a suitable climate and with the expert advice of the French vineyardists, the venture lapsed. The failure has been ascribed to many causes. Certainly the three years that had passed since the starting of project could not tell much as to adaptabilities of the Vinifera introductions, insofar as climate, soil and the toll to be paid to insects and diseases are concerned. Vines grown from cuttings in 1619 would scarcely have come to the first full bearing in 1622, and unless native vine pests, and diseases had been imported with them, they could not have shown any great injury from such. Jealousies between the French workmen and the landholders have been assigned as the cause of failure, but it is a matter of history that the lands were abandoned after the massacre of 1622. It would thus seem that the first failure was due to the abandonment of farm lands and the outlying settlements because of danger. Perhaps the element of force used by the Assembly, then as now, is not the best way to accomplish desired ends. Be that as it may, again in 1623 the Assembly passed another act which compelled every four men in the colony to set aside a garden, a part of which should be planted to vines. If this edict was not obeyed the offender had to pay with a fine of a given quantity of corn. Whether this penalty inured to the, good of grape growing or not is unknown, but from time to time the Assembly included in its law-making articles looking to the rapid advancement of vine growing. In 1639 an enactment gave a premium to successful grape-growers, and in 1660 a premium of 10,000 pounds of tobacco was offered to each grape-grower in Virginia who produced two tuns of wine from grapes raised in the colony. These stimuli evidently had some effect, for we are told that a few years later some wine was exported to England. The French experts, at least in the beginning, believed this locality to be far superior in soil, climate and all other factors that make for successful grape culture, to any other with which they were familiar. The abundance and vigor of the wild vines found on every hand were so unlike anything they had ever seen that they could but foresee a most brilliant future. Yet in spite of all of the apparent favorable conditions, grape-growing did not flourish in Virginia at least to the extent that there was much export of wine.

For over a hundred years following the introduction of the vine in Virginia the culture was encouraged. In 1769 the Assembly furnished a certain Frenchman, land, buildings, equipment, slaves and workmen on condition that he make 10 hogsheads of merchantable wine within six years. In the event that he carried out his part of the bargain the entire plant was to be given him. He produced the requisite quantity of wine, but the quality was not up to standard, and it required another enactment of the Assembly before this Frenchman was finally given his subsidy. It seems to be generally agreed that the poor quality was due to a lack of fitness of the soil for the production of good wine. We do not know of course whether it was the soil, the varieties or some other factors that were responsible for the poor vintage, but it is suspected that in the light of the present knowledge of cultural requirements of the Vinifera species, Summer temperatures were not high enough to develop a high sugar content. At any rate we have before us the first failure on a large scale of the Vinifera grape in Eastern United States. But in spite of this other men came who believed that they could overcome the difficulties of the earlier growers. It is only within the past few gears that the hopes of the successful growing of pure Old World varieties on a commercial scale have been abandoned.

Again in the eighteenth century another attempt was made to grow the Vinifera grape in Virginia. Shortly after Alexander Spotswood took over the office of Governor in 1710 he brought over a colony of Germans from the Rhine country, and founded a settlement for them in Spotsylvania County. The Germans succeeded in making some palatable wines, but we are not told whether from native or Old World grapes. At any rate the venture did not persist. Thus far we have pictured the attempts made to introduce the Vinifera grape in Virginia under the tutelage of French and German direction, and after a hundred years success seems about as far removed as in

the first few years. We are told of how these experts, pruning varieties of grapes with which they mere thoroughly familiar at home, and growing them in fertile soil, were still unable to accomplish the desired end, the production of wines comparable with those to which they had been accustomed. In spite of the failures others were ready to carry on, and we next turn to the Carolinas and Georgia, where it was hoped that the Vinifera might find a more congenial home. French Huguenots had already settled in the Carolinas in considerable numbers, and they brought with them the love of the vine from their homeland. Near the close of the seventeenth century they made attempts to grow varieties from the Old World with which they were thoroughly famaliar. The Huguenots were expert vine-dressers, which term signifies that they were capable of performing all the labors necessary to produce satisfactory crops of grapes, at least they had done so in their native land. But even they with all the knowledge brought down to them through the experiences of their ancestors, were not successful. The vines perished after a time without having given much inkling of the reasons thereof. They thought they had found the causes of their failure in the overshading of their cleared areas, and the foggy nature of the climate at the period of maturity. Probably the latter explanation is more true than the reasons of failure so far given, and deduced from the earlier attempts. We now know that foggy weather, which in turn implies high atmospheric moisture, is not conducive to ripening and high sugar content. But we also now recognize that foggy situations are not desirable for grape-growing at any part of the active Summer period, especially if fogs persist for many, days in succession.

In Georgia, Abraham De Lyon, who also had the encouragement of the governing authorities, imported many vines from Portugal early in the eighteenth century, and planted them in a garden in Savannah. These persisted for a time and then perished. But in spite of the numerous failures to introduce the Vinifera into the agriculture of the new country we shall see that the attempts, while disheartening, did not discourage others who were to follow.

PART III.

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It has been made plain that the colonists not alone were eager to grow the fruit to which they had been accustomed in their native lands, but the authorities; in every manner possible encouraged the trials, even to the extent of subsidies and special privileges. In Maryland it seemed for a time that the problem was about to be solved. In 1662 Lord Charles Baltimore planted 300 acres of vines at St. Mary's. He was apparently successful for a time, for it is recorded that he made and sold some very good wine. Whether this was entirely from the Vinifera varieties, or whether it was a blend of those sorts with some of the better native kinds, is not established. The authorities were evidently impressed with the venture, for grapes were grown for many years after. In 1828 the Legislature authorized the formation of a society having for its purpose the culture of the vine in Maryland. The society as a part of its functions undertook the testing of grapevines, both native and foreign, and especially was it charged with the trial of native seedlings that were found growing in abundance. This is the first instance recognizing the idea that selection of pure and hybrid seedlings might solve the problem of an American viticulture. Thi s enactment resulted in the planting of many vineyards of fair size in the vicinity of Baltimore.

The Swedes who had settled dong the Delaware River, in what was then known as New Sweden, were encouraged by their queen to plant grapes and in every manner further their culture. In consequence many vines were brought in from France and Spain, and these were planted in the vicinity of Philadelphia. This attempt was started in an experimental way, but in spite of all that could be done the venture failed.

The Dutch in New Netherlands were much impressed with the abundance and vigor of the native vines growing everywhere about them, and sought the encouragement of the parent country to support them in vine culture, but naught seems to have come from their petitions. Here we have the first recorded instance where the governing powers failed to come to the aid of the new project. The first English governor of New York, however was most anxious to introduce wine-making as a permanent industry in the colony, and in consequence he gave to one Richards a virtual monopoly. This man through his monopoly could levy and collect tribute from everyone who later wished to grow grapes in the colony. Richards' grant, it appears, gave him the right to certain lands on Long Island. It is not known the degree of success attained, but the venture evidently did not thrive for any long-continued period, since later attempts were made at varying intervals.

In New England vine-growing was attempted, and in 1629 the governor of Massachusetts caused to be planted Vinifera varieties under the direction of experts from the Old World. Charles II, encouraged by the favorable reports of the good wines in the new country, encouraged the planting of Old World varieties in Rhode Island. The venture in each colony turned out the same way, failure.

The Jesuits in Louisiana seem to have been the most successful in the introduction of Old World grapes in Eastern United States. We are told that wine-making became of such importance that the French government forbade its manufacture, since it bid fair to interfere seriously with that art in the parent country. We are left in the dark as to whether their success was with the pure Vinifera varieties, or whether some native fruit was blended to produce wines of the quality and in amounts that would seriously affect wine-making in France.

Undaunted by the numerous total failures to introduce the Vinifera into culture in Eastern United States, later generations renewed the attempts in not only one, but in several States. Another failure is recorded for Virginia, but this was not so serious to the settlers as the project attempted along the Tombigbee River in Alabama. Several colonies were here established to

grow grapes and olives. Conditions were found to be entirely unsuited for either the growth of Old World grape varieties or the olive. The colonists went through a miserable and harrowing experience for several years, since the region was adapted at the time for none but the most healthy. The venture was doomed to failure from the start.

About this time literature on the vine and its culture began to appear. A Frenchman by the name of Legaux founded a company for the growing of grapes near Philadelphia, but for many reasons the project failed, not the least of which was dissension within the company. We nevertheless have to thank this man and his venture for the first good native grape. Like so many others of our desirable native sorts, the Alexander grape was probably a seedling of a native vine. It was so good that Legaux introduced the Alexander as an importation of the Cape of Good Hope. But if it was done intentionally we can excuse the man, as he served American viticulture well when he disseminated it. Cuttings of the variety were sent into Connecticut, Kentucky, New York and several other States in 1801. A large grape enterprise was organized in Kentucky under the leadership of John James Dufour, but as he did not entertain a very high regard for the quality of native grapes, Old World sorts were planted, and these of course failed. Again he tried the Vinifera in Indiana, along with vines of the native Alexander, and all failed but the Alexander.

There was still the belief that the failure of vines from France, Germany, Spain, Portngal and elsewhere was in some great degree due to the manner and methods of culture. Perhaps a secondary reason was the selection of unsuited varieties. And so for many years to follow individuals here and there concerned themselves with attempts to solve the riddle. Perhaps the most indefatigable of these was the Prince family of New York. It is recorded, that three generations of this family devoted themselves studiously to the experimental growing of many varieties of the Vinifera as well as a great number of native sorts under names and numbers. Wm. R. Prince of Flushing, New York, Who gave a lifetime to these studies, published "Treatise of the Vine" in 1830. This is the first authentic treatment of vine-growing in the United States. In the beginning of his experiments, he along with the others who had preceded, had an unbounded faith that Old World grapes could be grown in Eastern United States. To quote from the preface of his treatise, "In Europe the culture of the vine has been profitably extended to the 51st degree N. Lat., and 'in some cases to the 52nd. Allowing the present difference of climate or temperature to be 10 degrees between similar latitudes of that continent and our own, it thence follows that vines of the foreign varieties may be advantageously cultivated to 42nd degree in our own country, and perhaps the intensity of our Summer heat may extend the limit somewhat farther to the north. But even the differences of climate referred to, together with our occasional late Spring frosts and variableness of the atmosphere, will, it is anticipated be greatly diminished, and gradually subside as a more general culture of the soil takes place." Prince, it will be noted, sought to establish American viticulture on the basis of latitude, without taking into consideration the many other factors that have been shown capable of changing the anticipated performances of plants. Further in his preface we read, “It will also be the purpose of the present work to show that vine culture is in no wise difficult, that any failures that have taken place were far more the result of erroneous management than of any incapacity of the soil, and that the numerous difficulties which have been trilled in our ears for the thousandth time, exist only in the brains of those who have propagated them.”

It is rather interesting to note in this depressed period of American agriculture the reflections of Prince on supply and demand. He urges the adoption of grape-growing as a means of diversification should the time ever come when the other crops returned surpluses. Again he hopes to keep the balance of trade in America through the home-growing of wines. He further says, “It was not until after immense difficulties that the vine was brought to its present state of successful culture in France, and it should be no cause for discouragement, if some experiments are made in this country without the anticipated success.”

Prince grew some 420 varieties of foreign grapes in his nursery and experimental grounds at Flushing, and 90 or more native sorts and their seedlings. He imported vines from the most celebrated collections in France, Germany, Italy, the Crimea, Madeira and elsewhere, so that his attempt was the most noteworthy contribution up till this time on the variety question. After devoting nearly a lifetime to these tests with Old World varieties, Prince turned to the production and dissemination of native grapes.

At Cincinnati, Ohio, Nicholas Longworth spent the better part of 30 years in attempting to grow varieties of the Vinifera. He, too, was most thorough in the undertaking, as he procured his plants from many sources in the Old World. He planted these under many exposures and on many soil types. In fact it would seem that he left nothing undone insofar as man could exercise control. But with him as with the others naught but failure resulted.

Following the valuable work of Longworth, a Frenchman attempted to grow Vinifera grapes in the vicinity of New York. Accordingly he planted or caused to be planted a vineyard of 150,000 vines on Long Island, but after years of contention against mildew, sunscald and rots the attempt was abandoned. It is to be noted that in all these attempts to transplant foreign grapes into Eastern America the sole purpose seems to have been for wine-making. Not once is the grape mentioned as a dessert fruit or for jellies or jams. Yet most of the early colonists were puritanical in the extreme.

From time to time following the ventures of these early pioneers we see attempts, but more limited, to grow Vinifera grapes in Eastern United States. Even today there are many individuals who are growing a few Old World grapes in their gardens, or shall I say, attempting to so do. We now know that foreign grapes are adaptable to a wide range of soils, and we have these variations. We know that many Old World species are subject to diseases and insects, but we can control all these through spraying and grafting. We are well aware that most Vinifera varieties cannot stand the low temperatures of Winter in Eastern United States without covering. This we can do. Yet but an occasional variety will thoroughly ripen its fruit except in a season of prolonged high temperatures. Some recent investigations in the East seem to indicate that if some of these Old World varieties can be made to start into growth earlier than they normally do in the Spring, the chances that the fruit will reach maturity are much greater. But the methods for attaining this are costly, and in consequence applicable only in the home garden. It is an undisputed fact that the West and Southwest does and will continue to produce Vinifera grapes much more cheaply than will ever be possible in the East. Thus for years to come foreign grapes will serve the East best, in the development of new hybrids that may be grown without coddling.

PART IV.

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Thus far the attempts to grow grapes in Eastern United States have largely been with foreign varieties, imported from many countries, and in most instances cared for by experts or vine-dressers brought over with the vines. These experts knew just how the different varieties were pruned and otherwise cared for in their native haunts, and quite naturally they were given the same attentions in their new home. While practically all the vine-dressers had been successful in Europe, yet when they could not make the established practices work here, there arose much dissension among the various nationalities on many of the questions of culture here. Even today many of our recent immigrants undertake to grow native American grapes as they did foreign sorts in their homeland. The Frenchman, the German, the Italian, and the Englishman each has brought with him rule-of-thumb methods which he strives to adapt to very different plants, growing under very dissimilar conditions.

We know that many attempts were later made to introduce the Vinifera into Eastern United States in spite of all the failures that had gone before. But it is likewise apparent that the real reasons for the failures were not fully recognized. The knowledge gained from the pioneering efforts was, however, of the greatest importance in the later development of American viticulture, when based on native grapes as the foundation stocks. Considerable was learned of soils, length of growing seasons, etc.

We have previously mentioned the introduction of the native or near native variety, Alexander, through its dissemination by Peter Legaux. Wherever vines of this variety were planted they did exceedingly well, as compared with the foreign introductions. The news of the successful culture of the Alexander spread rapidly, and it was not long before it was quite extensively planted in widely scattered areas. Undoubtedly the Alexander was a direct product of the wild native Vitis Labrusca which abounded from Maine to Georgia with an admixture of the Vinifera. It is supposed to have been found first growing in the vicinity of Philadelphia in a mixed planting of Old World varieties. This variety ripened its fruit rather late, so that it did not mature well in New York or New England, but in the vicinity of Cincinnati it proved a sure cropper, and good vintages were the rule. When fully ripe Alexander is quite sweet, but too coarse and pulpy for dessert purposes. The clusters are of fair size with medium berries. These are placed rather compactly. The skin is thick and a deep black. There is some suggestion of a relationship between Alexander and the Catawba, which followed it in American viticulture, in that both quite commonly show several green berries among the normally colored and ripened ones. But even though Alexander proved unsuitable to some localities by reason of its late maturity; nevertheless it showed itself very hardy.

The introduction of the Alexander gave new life to American viticulture. The vine and its culture became the subject of many writers, and the virtues of founding and the rapid development of grape-growing were encouraged. Most of the writers of this period were of the firm conviction that the native grape must give the foundation on which a successful and permanent industry must rise. John Adlum, writing in 1809, and speaking of the Alexander grape, says: "I think it would be well to push the culture of that grape without losing time and efforts in search of foreign vines." Jefferson, it appears, much favored the rapid development of American grape-growing, and no doubt stimulated the writing of Adlum's "Cultivation of the Vine," the first American book dealing with American grapes.

The introduction of Alexander and the successes which it met generally, instead of checking the search for other and better varieties, only served to stimulate the hunt for other seedlings, with the hope that some would be found in which the faults of Alexander would be reduced or entirely lacking. Looking back over the many years that were devoted to trials of foreign grapes, one can

but wonder what might have been the history of eastern grape-growing, if the problem had been approached, as it was later, through the domestication of native wild vines and the seedlings therefrom. At any rate once this procedure was suggested directly as a result of the finding and dissemination of the Alexander, grape-growing in the East seemed to have leaped all the barriers that had seemed insurmountable. From now on, while the number of introductions were not great, each new variety marks a distinct advance over the previous one. The Catawba and Isabella were introduced into general culture at about the same time, although the former it would seem had been under observation a few years earlier. Since these varieties have meant so much in the viticulture of Eastern United States it seems desirable to write of them at some length. As Isabella would seem to have been under cultivation, a trifle earlier than Catawba it will be considered first.

The Isabella Grape

While this variety is of little consequence in the viticulture of the United States today it at one time was quite well thought of and considerably planted. It was introduced about the year 1816, although it was known some years previous, and for many years it and Catawba were the chief native varieties. Isabella does not require quite so long a season for ripening as the former, hence it was planted farther north than Catawba. The origin of Isabella is unknown, but it is suspected that its original home was in one of the Carolinas.

Before the Concord was introduced into American vineyarding Isabella was quite generally grown in the Chautauqua-Erie region, and it was at that time the best black or blue variety. Some difficulty was experienced in bringing it to ripeness in many seasons in the section, so that when the Concord, an earlier maturing sort, became available for extensive planting Isabella waned in popularity. Thus it may be said that the development of the section now known as the Chautauqua Grape Belt received impetus from the Isabella. Here as with the cultivation of vines in general, the principal usage of the fruit was for juice or wine. Had the Concord, and the subsequent seedlings from it not come into being very shortly, it is quite probable that Isabella would have been the foundation variety for many other new grapes. There is every reason to believe that its growing contributed much to the future of eastern grape-growing although the variety in itself was inferior. Men who had or were about to become interested in the culture of the vine were much encouraged by its behavior and came to believe, as was afterward proven, that there was to be a future in the growing of pure native grapes or hybrids in Eastern States.

The Introduction of the Catawba

The next most important event in the founding of a permanent American viticulture based on native vines, was the introduction of the Catawba grape. If this variety had not come when it did it is quite probable that eastern grape-growing would have lagged for many years. But the discovery of it and its rapid dissemination gave an impetus that was not to wane. The origin of the Catawba is to this day somewhat beclouded, although most agree that it is a derivation from the pure native Labrusca. Nicholas Longworth, than whom there was no other more interested in establishing the vine, writes, "I received recently a letter from Mr. Alves of Henderson, Ky. He was born in North Carolina, and says that he heard of the Catawba grape in the upper part of North Carolina nearly 40 years ago, and that it was discovered near the Catawba River, from which it derived its name." This was written in 1849, hence it would seem that the Catawba first came to notice about the year 1800. However Major John Adlum, soldier, surveyor, judge and author introduced it into general cultivation. Mr. Longworth, of Cincinnati, was one of the first to receive a goodly supply of the Catawba, and subsequently he distributed it in large quantities and in many localities. Indiana, Ohio and Missouri planted rather extensively of the variety, and its culture was encouraged in the region about Philadelphia. Catawba was a very decided improvement over the Alexander, since the latter was almost exclusively a wine grape, while

Catawba not only yielded a superior wine, but it was relished for dessert purposes. Mr. Adlum considered it to be worth all others, indigenous or exotic, for wine purposes. It would seem that the urge to better agriculture through new fruit varieties was no different in the early days than we now find it. From the writings of Adlum, Longworth and others it is indicated that the Catawba flourished under more diverse conditions of climate than it does today. Almost without exception it was reported as ripening well, and the wine made from it seems to have been satisfactory for most tastes. Then as later, this variety was used largely in the making of two types of wine, a sparkling juice, and a dry wine. Today one would not think of planting Catawba in many of the regions where it once apparently succeeded. But perhaps it did not usually attain the ripeness that we demand today, or else the large users did not insist on a high-class content than was actually necessary in order to produce a desirable juice. It is interesting in this connection to quote Nicholas Longworth on the subject of testing for maturity. “To test its maturity, press out a tumbler full of must, and if you have no saccharometer, put in it a fresh-laid hen's egg. If of proper maturity, the egg will then rise the size of a quarter of a dollar above the juice. If not rich it will sink. The Catawba should in favorable seasons weigh from 90 to 97 by our saccharometers.” As other native grapes were introduced, probably better adapted than Catawba for many of the localities, the latter was gradually eliminated until its cultivation was confined only to those regions where it attained the highest degree of maturity. In our day we recognize several limited, but well-defined- sections where the Catawba has been grown almost exclusively for many years; and even to this day if it is planted at all, it is only in those localities known to be especially favorable for its cultivation.

PART V.

(*Rural New Yorker, vol. XC, no. 5160, 16 May 1931, page 592-593)*

For many years the commercial growing of Catawba has centered near fairly large bodies of deep water. The several islands in Lake Erie off Sandusky, O., as well as some locations on the mainland have proven well adapted for the growing of this variety. And until the adoption of the 18th Amendment or a few years immediately following, many thousands of acres were devoted to this variety about the region. The writer had occasion to see a large part of the island acreage a few years since, when it was still a most important husbandry. It was plain that the section was ideally adapted to the growing of Catawba, formerly one of the most important varieties in eastern viticulture.

While the region about the southwestern shore of Lake Erie was largely devoted to Catawba, probably the larger acreage of this variety was grown and still is, in the section known as the Finger Lakes Region of Central New York. But even here not all the lands about the lakes are adapted to the growing of it. In fact it is only in favored areas about Seneca and Keuka lakes that the variety does its best. The relationship of natural surroundings, especially large bodies of water, will be discussed more fully when we come to a consideration of the grape districts of Eastern United States, as they are at the present. At one time Hermann, Mo., was the scene of rather large plantings of Catawba, but the introduction of other sorts gradually supplanted it. It is not recorded that the Niagara peninsula of Ontario, Canada, grew Catawba to any extent nor was it ever a very important variety in the viticulture of Michigan.

In the preceding articles we have traced the influence of native grapes, or perhaps hybrids of foreign varieties with native, as the Alexander, Catawba and Isabella, in eastern American viticulture. While all three could be grown in especially favored areas, no one of them was generally adaptable for all localities. However, the fact that these varieties would succeed, which was in marked contrast to the failures with Old World sorts, encouraged the development of other varieties that would more nearly meet the needs of a wide-flung viticulture. It is a good omen even today, that the fruit grower, or tiller of the soil, while growing the best known in varieties or strains, is still on the alert for new varieties of fruit or other farm crops. We must not assume that the best are the ones that are now grown, and that no further improvement is possible, for if our forebears had adopted this attitude, little advance would have come in agriculture.

The greatest acquisition to the viticulture in Eastern United States came with the discovery and introduction of the Concord grape. And further, its introduction came at the most opportune time. It has already been told how the Isabella grape had seemed for a time to be the variety on which a permanent viticulture could be established, only to be shown later that it possessed several very serious faults. The coming of the Concord hence supplanted it very rapidly. Probably no fruit variety has so stood the test of time like it. We have seen well-established varieties of apples, pears, peaches, and berries wane in the esteem of both producer and consumer, but the Concord grape today, three-quarters of a century after its introduction, is still the most important American variety; and so it is bound to remain for many years to come. Each decade witnesses the development of several new grape varieties, most of them selected with Concord as the standard, some greatly superior to it in one or more characters, yet lacking in others. Ultimately, however, Concord must go the way of most fruit varieties, and give way to something better. In proportion to its acreage, probably no variety of any fruit has returned so much money to its growers as has the Concord. Within the past decade, in one or more seasons, the money return from the Concord crop in New York has exceeded any other agricultural crop but one.

At the close of 1830 grape-growing in Eastern United States was firmly established with varieties of native derivation, the Catawba and Isabella, By 1850 it is reported that there were over 1,500 acres in the Ohio Valley within 20 miles of Cincinnati. The development in this lo-

cality, as has been mentioned earlier, was largely due to the continued efforts of Nicholas Longworth to find varieties that would thrive under the conditions there prevailing. In addition to this considerable acreage in Ohio, a few acres had been planted at Hermann, Missouri, some in Illinois, and some about New York, Philadelphia and Burlington, N. J. Doubtless in many other localities a few vines were cultivated in home gardens. It is likewise probable that some of these trial plantings paved the way for future commercial developments.

Back in, 1818 Deacon Elijah Fay planted the first vines in the now famous Chautauqua district in the township of Portland, These were native wild Labrusca, obtained from various sources. In 1824 he secured vines of Catawba and Isabella, but the planting was only a very small one. Between the setting of the wild vines and the two named ones Deacon Fay tried a number of other sorts. While the introduction of Catawba and Isabella into this region was a great step in the establishment of what has later proven to be the most important section devoted to the growing of native grapes, it could never have assumed this position if the development had depended on the Catawba and Isabella, since neither of these varieties, even today, can be grown with any assurance of success year in and year out. Both mature their crops too late in most seasons. However, it might be said that if the same attention had been given to the growing of these two sorts as has been bestowed on the Concord since its introduction, cultural care would possibly have made more probable better matured crops. But the newer more promising Concord received the greatest attention, and in consequence the others were neglected. Even the Catawba and Isabella could not stand the test of time; their culture served as a preliminary schooling in viticulture, and opened the eyes of this community to the fact that there was a natural grape region, climatically; and all that was needed was better and more adaptable varieties. The introduction of the Concord was the first and most important step in the fulfillment of this lack.

In 1830 the first grapes were planted in the region now known as the Finger Lakes district. These were started in the garden of Rev. William Bostwick at Hammondsport, N.Y. It is not known just how much this small venture later influenced the planting of grapes on an extensive scale in this region. We are told that Rev. Mr. Bostwick planted the two most important native varieties known at this time, the Catawba and the Isabella. Since the first named later became indelibly linked with the region, we must assume that his efforts had some considerable influence on the viticulture for many years to follow. A few years later small plantings of Catawba and Isabella were made in the Hudson Valley, in Ulster and Orange counties.

At about the time Concord was introduced, or shortly after, the area of grapes in the vicinity of Cincinnati had increased to approximately 2,000 acres, and 100 acres were growing along the southern shore of Lake Erie near Cleveland, Ohio. The acreage at Hermann, Missouri, had grown from 50 acres to 200; and Illinois, Kentucky, Tennessee, Indiana and Arkansas had either increased their acreages or had at least made a beginning in grape-growing. So that in it is estimated close to 6,000 acres of grapes were under cultivation. By the close of the same year, the Keuka Lake acreage reached 500 in the vicinity of Pulteney, and the Hudson Valley total rose to 300 acres.

During this interim the Concord was listed by the Massachusetts Horticultural Society, and introduced to the public at large. There can be no doubt that its introduction is responsible in a large degree for the increases in acreage, as we are well aware that the Concord from the time of its recognition as a worthy sort was eagerly sought.

It is deemed well to give some space to its origin and introduction, although this has been printed numerous times. On the whole it is generally agreed that Concord is a seedling of our native Labrusca species, as it shows not a single character of any other known one. That it was a chance plant, and did not result from selection except that possibly the parent vine from which the seed is supposed to have come, had been taken from the field, probably because of its superior

character. Close by these native vines Catawba was growing so that there is the possibility that the seed which was saved and planted, and from which the Concord arose had been cross-fertilized naturally by the Catawba. We can only speculate on the probabilities that this occurred, and while from the standpoint of the research worker the true facts would be highly desirable, yet the average layman is not much concerned as to just how Concord came into being. We are told that the seed from the wild vines was planted in 1843, by the originator, Ephraim Bull, of Concord, Mass., and that in 1849 the first fruit was borne. There seems to be a slight discrepancy in the dates ascribed to its inception as the inscription on the stone which marks the location of the original vine would indicate that the vine had been selected and planted in 1840. However, it may mean that the seed was saved at the close of that year. If the latter interpretation is the correct one it would seem that Mr. Bull held the seeds over three full years before they were planted. Of course from the practical standpoint this apparent conflict of dates is of no consequence. The Massachusetts Horticultural Society placed it on the recommended list of new fruits in 1858. Within a year it could be found growing to some extent halfway across the continent. Shortly before the year 1860 Concord was planted in a trial way in Chautauqua County, N. Y., and within the next decade it was rapidly accepted on its merits, since the acreage here rose from 20 acres of all varieties to 500.

Within the next 10 years, there were 14,590 acres of grapes under cultivation in New York and Pennsylvania alone, while Ohio, Indiana and Illinois mere growing approximately 17,000. Since that time the acreage for the two first-named States has increased to over 40,000 acres, while the last named with the possible exception of Ohio, has diminished. In 1880, Georgia, Kentucky, Missouri, North Carolina, Tennessee and Virginia were growing about 30,000 acres of grapes, but aside from Missouri all the others have ceased to be of any considerable importance in viticulture. At the present time, there are attempts to revive the industry in some of these and other States not then greatly interested in the grape. We now know some of the reasons why certain regions abandoned the growing of grapes as a commercial venture. Two of the most important causes were climate and markets. It is not to be denied that of all the regions that took up the culture of the grape and especially the Concord, the Chautauqua-Erie district is the most favored climatically. Today some other sections may be more directly accessible to large consuming markets, yet from the climatic standpoint there is none that can surpass it in so far as favorable climate is related to the growing of Concord. The writer had visited most of the Concord producing sections east of the Rockies within the past 20 years, and this statement is based on observations he has made from time to time. On the other hand other districts seem to grow better Catawba and Niagara than are grown in Southwestern New York, and doubtless there are several other varieties about which the same may be said. In a later article the principal eastern grape districts will be discussed more in detail, together with the varieties that seem to be most adaptable to them.

The original Concord vine still stands in Massachusetts, where it has been protected from injury through fencing, and a marker suitably inscribed has been erected. It is particularly fitting that the labors of Ephraim Bull should thus be recognized, since his efforts mark the high spot in eastern viticulture. It is stated that Mr. Bull realized but little in a financial way from the sale of his origination, yet this one grape has added millions of dollars to the wealth of America, and the end is not yet.

Some years ago when the belief was quite common that the decline in the production of many of our long-cultured fruit varieties was due to a “running out,” the writer secured cuttings from this original Concord, and from them grew several plants. These were planted along with vines of the same age and grade from the nurseryman. From year to year the behavior of the vines directly from the original plant has been compared with those vines several generations removed, or vines such as anyone will buy today from the nursery. The conclusions reached thus far are, that the

vines of Concord obtainable from any reliable nursery are not one whit different in fruit or vigor from those directly descended from the original vine. Hardiness has not been sacrificed in propagation or cultivation throughout these 80 years. Today Concord is just as truly “the grape for the millions” as it was so designated many years ago.

PART VI.

(*Rural New Yorker, vol. XC, no. 5161, 23 May 1931, page 613,615)*

It would seem that the introduction of the Concord grape was all that was needed to make grape-minded those many individuals, who with each successive introduction of a variety, had their hopes raised, only to find later that each and every newcomer had one or more faults that limited its culture to within rather closely prescribed areas. Late maturity of fruit, susceptibility to low temperatures, a lack of vine vigor or not sufficiently productive, were found to be associated with all thus far introduced. The pioneers in the development of vineyards with Concord as a foundation stock, early realized that with this variety, most of the weaknesses of former sorts were absent, or at least they were not so prominent. As we look back over the many years since the introduction of Concord, and compare its behavior with that of any other variety, it is recognized that not one will stand comparison with it from all viewpoints. Probably no other, either foreign or native, is so universally adapted to so many soil variants, nor have they the constitution that will endure so many extremes of heat and cold, drought and excessive soil water.

The next milestone in the viticulture of Eastern United States was the introduction of the Delaware grape in 1858. This sort is supposed to be a mixture of three species, Labrusca, Bourquiniana and Vinifera. The high quality of Delaware probably comes from the last named. Delaware is still the highest in quality of American grapes, and were it not for the small size of its berries it would occupy a position well to the front in commercial vineyarding.

From this time on many grape fanciers gave much of their time to the development of new varieties through the blending of the good characters of one species or variety with those of another. In short, the search for new and different sorts was taken from the more or less haphazard, chance method, and for it was substituted the more painstaking and thoughtful method of choosing the parents to be the basis of new varieties, having specific desirable characters deemed worthy of perpetuation. One of the leaders in this movement for the improvement of American grapes was E. S. Rogers of Salem, Mass. Rogers made a number of crosses with the Carter grape as the female parent, impregnated with Black Hamburg and White Chasselas. The choice of such parentage we now know gives to the progeny many characters of the Old World species, and this is what actually happened with Rogers' hybrids. From these crosses the Salem came, which was introduced in 1867. In 1870 others were named and introduced, and still others introduced, but not named; and even today some of these are still out under numbers. Some of the best known of Rogers grapes are the Agawam, Barry, Goethe, Herbert, Lindley, Massasoit, Merrimac and Wilder. While many of these have never attained commercial importance, most of them have been grown in all home gardens. Even today the call comes for the fruit of one or more of these for certain culinary uses. Some people are of the opinion that no grape renders quite so delicious jelly as comes from the Agawam. Others of the Rogers hybrids have served as the foundations for the development of still newer varieties. For instance, Herbert is one of the parents of the recent introduction Sheridan. Probably the chief reason that limited the growing of the Rogers grapes to the grape fancier was the susceptibility to grape mildews. It would seem that all his named varieties inherited this weakness from the foreign parentage. While it was common knowledge that the mildews could be controlled with Bordeaux mixture, yet the necessary machinery was not then in existence whereby the material could be thoroughly and economically applied in a commercial way.

About the time that Rogers was engaged in his breeding work with grapes, others as J. H. Ricketts, A. J. Caywood and Stephen Underhill were attempting to produce new varieties. These men brought forth a few sorts that showed some promise at the time, but their efforts so far as giving to the world outstanding varieties, were overshadowed by the labors of Rogers. However, they did add considerably to the sum total of our present knowledge of viticulture.

In 1877 Moore Early was introduced as a seedling of the Concord. There seems to be no reason to doubt that such is its parentage. While Moore has never been so generally planted as its parent, Concord, yet it has served to build the viticulture of certain limited localities. The chief asset of Moore is of course its early ripening season. Even today there are a few sections where no other variety is grown commercially. Were it not for its earliness Moore would have commanded but little attention, as it has given no progeny worthy of naming. Now it is being rapidly supplanted by newer sorts of the same or earlier ripening period, but possessed of higher quality and greater vigor of vine.

Worden, another seedling of the Concord, however, has left a deeper imprint on the grape-growing of Eastern United States. It was introduced about the year 1880. This seedling, like Moore, is possessed of more defects than its parent, but even today Worden is the second most important commercial blue variety in Eastern United States. However, neither the fruit of Moore nor the Worden can equal that of Concord for any purpose, though many people highly relish Worden as a dessert variety.

Again in 1882 Concord contributed in giving to Eastern United States a variety that has held front rank since its introduction. Niagara, the leading white native grape, is traced to a cross between Concord and the Cassady. Niagara, since its introduction, has enjoyed great popularity, and even today it seems to be more in demand than at any time within the past 20 years. The original vine of Niagara is still growing near Lockport, N. Y., and is marked with a suitable monument with inscription. It is particularly fortunate that the original plants of the two leading native American grapes are still growing and producing fruit after these many years. While Concord has played an important part in the development of other grapes it has seldom fallen to the lot of a single variety to be vitally concerned in the production of three such grapes as Moore, Worden and Niagara.

The United States census tells us that in 1890 there were growing approximately 188,000 acres of native American grapes in the United States. Shortly after this year the section about Lawton and Paw Paw, Mich., planted heavily, so that Michigan rose to fifth rank in the growing of grapes. In recent years the planting has been extended to the areas about Benton Harbor and St. Joseph. In 1900 Iowa grew 3,700 tons of American grapes. In this year grape-growing was of considerable importance in the following States: New York, Ohio, Pennsylvania, Michigan, Illinois, Indiana, Kansas, Missouri, Georgia and Oklahoma. In later years other States planted native American varieties. Some year ago Munson of Denison, Tex., sought to build up the viticulture of the Southwest, using the many native wild species abundant in Arkansas and Texas as the foundation stocks. Through his painstaking efforts several very meritorious varieties were bred, named and disseminated. In the main, the Munson originations are largely adapted to the South and Southwest, since most of them matured their fruit too late for northern latitudes. Within very recent years Florida has sought to establish grape-growing as a commercial venture, and the most promising varieties for the State seem to be some of Munson's introductions. At the present his Carman appears to offer the best foundation variety of any yet tested. In earlier days, Arizona and New Mexico attempted the growing of American varieties, but only a very few sorts seemed adapted to those climes. In later years it has been found that varieties of the Old World species thrive much better. At one time the growing of American grapes became an important husbandry in Eastern New Jersey, but the industry gradually languished. The States of Oregon and Washington have for several years been planting Campbell, Concord and Worden, so that today in limited areas, the growing of American grapes is of considerable importance. Within recent years grape-growing in Delaware has taken on a new lease, and many fine acreages are now to be seen in this State. Probably the largest development of native grape-growing in recent years is in the Ozark Mountain section of Southwestern Missouri and Northwestern Arkansas. Within the past few years several thousand acres of Concord have been planted, nearly all of

which, are now in full production. The early success of two or more Italian colonies in these States, covering a period of years, formed the nucleus around which the industry has grown. The growing of American grapes has been revived in a small way in North Carolina, South Carolina and Virginia within the last few years. Just now there is some revival of the industry in Illinois, Massachusetts and Kansas.

While grape-growing was never of great importance in Oklahoma, there was a considerable planting of Moore adjacent to the Missouri border. This acreage is rapidly diminishing at the present time. Georgia is apparently growing less and less tonnage each season, as is the case with Indiana.

Beginning shortly after the adoption of the 18th amendment, New York, Pennsylvania, Michigan, the three principal States now engaged in the growing of American grapes, greatly increased their acreages. But for the past five years the tendency has been to curtail, or at least to hold the production without further increase. During the same period Ohio reclaimed many acres previously abandoned, and at the same time established others, especially along the shores of Lake Erie. Within recent years grape-growing in the Niagara peninsula of Ontario has received an impetus which has resulted in a rather extensive planting of Concord and Niagara.

PART VII.

(Rural New Yorker, vol. XC, no. 5164, 13 June 1931, page 681)

In this part of the history of American grape-growing we will try to summarize the achievements of the past quarter century, a rather big task to be covered in so short a space, hence only the high spots will be touched. At the beginning of this period, Concord was unquestionably the leading general-purpose variety, and after a quarter of a century its place is still at the very top. All regions included, Catawba was the second most important, but at the close of the period its popularity has waned, though probably it is still second in point of acreage. The standing of Niagara as a commercial variety has fluctuated quite widely during the past 25 years. Only a few years ago its planting was on the decline, but within the past 10 years the demand for it has been increasing, so that today Niagara should be accorded third place among native American sorts. During the period Moore Early has steadily lost caste as a commercial variety, although this decline has been more rapid during the past 10 years. Probably the passing of Moore is not due so much to the changing tastes of the consumers as to the lack of vigor and productiveness of the variety. Of course these characters have not changed, or as it is commonly expressed, there has been no "running out," but rather the planting has of necessity been on poorer soils. Worden at this time is less numerous in commercial vineyards than it was 10 years ago, although as a home variety it is probably more extensively planted. This variety, owing to the tender nature of its fruit, can never become an important variety for shipping purposes, and it can have no place in the manufacture of juice unfermented or otherwise, because of the lack of proper balance between sugar and acid content. We may thus conclude that Worden has been in its heyday. The coming of prohibition has eliminated several very high quality American varieties. The Delaware, Iona, Duchess, Diamond, Elvira, and Norton for most of the quarter century were largely used in the manufacture of wines, and some of them in a lesser degree for dessert purposes. Of all, the only one that survives is the Delaware, and this is now used largely for dessert purposes. It is exceedingly rare to find even a few vines of Isabella today, where 25 years ago many were still growing this variety in considerably numbers. The variety Ives was quite extensively planted in the Finger Lakes district of New York early in this period, but now only an occasional small vineyard remains. At the present time an attempt is being made to introduce this sort into the Niagara Peninsula of Ontario, Canada. The passing of the Catawba is directly traceable to the adoption of the 18th Amendment, although many still prize it highly for dessert and jelly purposes, but its extensive growing in the early days was largely for wine uses. It would seem in view of these statements in order to meet changing conditions, whether brought about by legislation or people's tastes, that the best varieties to plant in the future are those that will serve several purposes equally well. It is probable that the diverse uses to which Concord may be put, coupled with its wide adaptability to climates and soils, has kept it in the forefront after all these years.

Now what have been the variety additions within the past 25 years that have made and are making an impression in eastern grape-growing? Owing to the writer's close connection with production of some of these, it may seem that his views are perhaps a trifle colored. So with this warning the reader is in a position to judge correctly some of the statements that will follow. In the beginning it should be stated that no grape introduced within the past 25 years possesses all the good characters of the Concord, and not a few of them carry some of its faults, yet some of them are very meritorious and fill a distinctive place in American viticulture. Early in the period Munson of Texas was breeding and introducing his varieties, developed in the main from the wild species abundant in the Southwest. Probably of all the Munson introductions, Carman has proven the most important commercial variety, although it will not ripen thoroughly in the North. Had it not been for the revival of grape-growing in Florida within recent years Carman would have remained just another grape. However, from the first it seemed to fill the demand for an American

type grape as no other up till the present in the development of Florida viticulture. The variety is very productive, vigorous, and the clusters are large and well filled. We have never eaten the fruit of this variety as produced in Florida, but in the North the ratio of acid to sugar is too high for a palatable dessert variety.

The Lucile, a large red-fruited sort, for a time enjoyed a great popularity, largely on account of its productiveness and in some seasons attractive clusters; but owing to its foxiness its consumption was limited to those only who preferred this flavor. Since there was no other use except dessert for it, it has been planted only in a very small way. At the present Lucile is on the decline, both as a commercial and home grape. Campbell Early, which is a misnomer, since it is not early, but only begins to color early, has been rather extensively planted in parts of Michigan. This variety, while introduced some years before the beginning of the era we are discussing, promised much because of its yield of large clusters, made up of large berries. However, its quality proved decidedly lacking, and under some soil conditions the vines were weak and easily injured by Winter cold. We may conclude that Campbell will be less grown in the future. Twenty years ago or more one of the western nurserymen brought out several sorts under various names that seemed to fill some of the needs in grape varieties, but trial of these over several years proved that all were surpassed by existing varieties. The impression seemed to prevail that the most important character sought in new grapes was earliness, and even today the commercial grower places this consideration first. With this in mind we can understand the introduction of Early Daisy, whose chief characters were earliness and productiveness. While Daisy was never planted extensively, most commercial vineyards contained small blocks of this variety. Fire years ago it was considerably in demand, but in recent years this has rapidly lessened. If Daisy had a larger berry and if its flesh were not so firm and hard, it possibly would be in the ascendancy, because of its season and productiveness. It too is a one purpose variety. The Caco grape, introduced within the past 25 years, has probably been more extensively advertised than any sort within the memory of most of us. Yet in spite of all this Caco has not been much planted in a commercial way. Its sweetness when well matured appeals to many, and hence it has found its way into the home garden quite generally. Shortly after the adoption of the 18th Amendment, many long-discarded varieties were brought forward, masquerading under new names. Fortunately for the prospective purchasers they were not generally bought. Varieties that would fruit the first year from planting were not uncommonly listed under various designations as Mammoth Concord, Improved Concord, Early Concord, etc. The first two in most instances proved to be the unworthy Eaton, which anyone who had tried it would not consider for any purpose, while the latter was quite often Campbell or Moore. From the experiences of the writer it would seem that there is more interest in new grape varieties than in any other new fruit in spite of the fact that for nearly 50 years there have been more sorts of grapes to choose from than any other. It should be kept in mind that in this discussion we are not considering the development of the viticulture of the Pacific Coast. There as here the variety question has been a leading one for many years, and in spite of the depressed condition of the industry there, the interest in new sorts has not waned greatly. Perhaps it has occurred to some of you that white and red varieties of grapes have not been near so plentiful as the blue, and this is true even today. Right now there is a wide open field for the introduction of a red grape that is as good as Catawba, but which will ripen at least two weeks earlier. The only sorts that in any way meet these requirements fall far short in several characters. Lutie and Little Wonder are early, but the clusters are small and the vines lack vigor. Brighton is vigorous, and the fruit ripens early enough, but when planted by itself the clusters do not set full, and in some localities mildew is the limiting factor in its growing. Regal, a fine quality red-fruited variety, matures too late for northern latitudes. Lindley and most of the other Rogers hybrids are not planted at all except in the occasional home garden, although Goethe has proven of some merit in Virginia and other Southeastern States as a commercial variety. Delaware has not been planted commercially during the past quarter century,

and but on a small scale for the home supply of fruit. Only a very few of the present-day city consumers are familiar with the variety and its high quality, while the small size of its berries does not appeal. Occasionally we are asked for the Delaware by name by the automobilist, but if it placed by the side of any large-berried sort on the sales stand, the latter is chosen nine times out of 10, and of course the choice is almost entirely on the basis of size. During the past quarter century a red sort, Butler, has been disseminated in a limited way, but probably today this is unobtainable in the pure form, since it resembles Brighton so closely. A comparison of Brighton and Butler over a period of years seems to show that the latter is self-fruitful to a greater degree than Brighton. However, like Brighton, it is quite subject to powdery mildew.

A new grape, the Patricia, is now being distributed to the Canadian grape growers in the Niagara peninsula, but as it has not been fruited yet in the States we know little of its worth under our conditions. In Canada it is seen to be very fruitful and fairly early.

PART VIII.

(Rural New Yorker, vol. XC, no. 5166, 27 June 1931, page 721)

During the past 25 years a number of meritorious grapes have been introduced in New York as a result of one of the fruit-breeding projects of the New York Agricultural Experiment Station. Much of the effort by this institution has been directed toward a blending of the high quality of Vitis vinifera with one or more of our native species, through the already existing sorts. Since all of these introductions have been described at different times, only the outstanding characteristics of the best of these will be discussed at this time. They will be considered somewhat in order of their introduction. Ontario and Portland, two early white varieties, were named and sent out very closely together. Of the two, the first named is of the higher quality. In fact, Ontario is almost unsurpassed by any American grape from this standpoint. To those who prefer foxiness, Portland is the more appealing. Both are hardy and productive, and are now quite widely planted in Eastern United States. Shortly after the introduction of these, Urbana, a meaty, red-fruited sort, was offered. This variety very closely approaches the characteristic firmness of flesh that is usually associated with most Vinifera grapes. It is large-clustered, large-berried and fairly compact. Urbana ripens its fruit a trifle too late for most of the old-established grape sections of the North and East. Many who have eaten its fruit pronounce it the equal of Flame Tokay, a pure Vinifera.

A few years after the introduction of Urbana, a large-berried blue sort was found to be superior in many respects to some existing varieties, and this seedling was given the name of Sheridan. This variety, since it requires approximately the same number of heat units as Catawba to bring to ripeness, can be successfully grown only where Catawba ripens well. Grown in the home garden under the skillful care of one who will make growing conditions the most favorable, a crop of Sheridan will furnish a sight that will excite the greatest admiration. It would seem from the reports of its behavior both north and south that Sheridan may be grown commercially somewhere between the extremes of heat and moisture of these latitudes. Then grown under too much heat and rainfall the berries grow so large that the pressure, one against the other, causes them to burst the skins. Within the past few years two other white varieties have been chosen from amongst several thousand seedlings, and given the names Golden Muscat and Seneca. Both of these sorts yield fruit that is quite similar in texture and flavor to the Vinifera. Golden Muscat is very productive and hardy, and as a part of its name implies, it possesses the muscat flavor that characterizes several of the Old World varieties. Its clusters are very large and handsome, and when ripe the berries are a golden yellow. Golden Muscat requires a growing season comparable with Catawba or longer to mature its fruit thoroughly. It is entirely hardy in Western New York latitudes. The Seneca is somewhat more meaty than Golden Muscat, being quite comparable with Malaga. The clusters are large, fairly compact, with large yellow berries. Seneca ripens its fruit relatively early as compared with many of the sorts just described. In fact, it would seem that it can be classed as early. The vines are vigorous in northern latitudes. Unless some unforeseen faults develop later it appears that Seneca has a promising future in the viticulture of Eastern United States. Within the past 10 years another blue grape has been chosen from several hundred seedlings and given the name Fredonia. This sort is being well received wherever it is being tested, and it promises to supplant many if not all of the standard early blue sorts now grown commercially. It is earlier than Daisy, Moore and Worden. It is just as productive, and the vine is vigorous and hardy. Probably if one had both Fredonia and Worden side by side he would choose the latter for eating, but the many other superior characters of Fredonia fix it as the better commercial sort. Fredonia is superior to both Daisy and Moore from the quality standpoint.

Several other introductions from the same source are now being tested under widely different climates. Some of these are Keuka, a red spicy-flavored meaty sort; Wayne, a large-clustered black variety of high quality, and three or more blue sorts that would seem to serve specific uses.

Several thousand seedlings are yet to fruit, the greater number of which have been bred with the objective of a high quality, mid-season, productive red grape.

In a forthcoming chapter we will consider changes and improvements in the cultural practices in eastern grape-growing during the vast 25 years. It will be shown that many of the old-time practices have given way to the new, yet many of the operations that have seemed to have been done in a more or less rule-of-thumb manner have much fact to support them.

The past quarter century has seen many of old-time cultural practices discarded, and this has come about through the wider dissemination of facts gleaned as a result of research and demonstration work conducted largely by the different experiment stations throughout the East and South. The contacts between the grape-grower and the investigator have been greatly increased through the establishment of the Farm Bureau in many States, and the more thorough functioning of the extension divisions of the agricultural colleges. The attitude of the grape-grower toward the various agencies concerned with research and extension has changed from one of indifference and aloofness to that of a keen interest and a willingness to put into practice many of the recent findings.

Most of the books and articles dealing with grape-growing of the earlier days emphasized the great value of farm manures for growing large and fine crops of fruit. If allusion were made to any other possible substitute, it was usually bone, or bonemeal, or some other material derived from animal sources. In later years rather low-analysis complete fertilizers, those carrying nitrogen, phosphorus and potassium, were recommended, but the grape-grower had very little confidence in their use. And if the vineyardist could obtain manure either from his farm or through outside purchase it was used in preference to the apparently inert chemicals. As a result of long-time researches in New York and other States it has been found that grapevines can be kept highly productive and in a vigorous state comparable to those vines shown with farm manures. Under many conditions it has been definitely established that the vine can be better maintained from the use of nitrate of soda, superphosphate and with the turning down of a green-manure crop, than can be done through an equal expenditure, in farm manures. Hence within the past 25 years the theory and practice of vineyard fertilization has undergone a complete change. It was impossible at the beginning of this period to purchase a 200-lb. sack of nitrate of soda between Buffalo and Cleveland, while now every rail siding within the area given to vineyarding unloads many cars of this material annually. In a lesser degree this source of nitrogen dominates all other fertilizers in practically all grape-producing sections of the East and Central West.

Within this period there has been but little change in the various grape regions so far as the methods of training are involved. There are a number of reasons for this, not the least of which is the adaptability of a grape variety to a particular method. For example, long-time experience has proven, that under the soil and moisture conditions prevailing in the Finger Lakes section of New York, the Catawba does its best when trained to the high renewal method, and that much deviation from this is disastrous. The Chautauqua method of southwestern New York is still most commonly employed, although researches have proven that the single-stem four-cane Kniffen method is a better one. However many newly planted vineyards are being trained to the latter. It seems too big a task to change old vines from the one to the other, even though the Kniffen is seen to be superior. Michigan still adheres to the Kniffen method, as does the Hudson Valley. Pennsylvania prefers the umbrella Kniffen to the four-cane, while Arkansas in her recent grape development makes use of the latter. There has been a marked turning from the fan method which has persisted from the early days to some other training method as the umbrella Kniffen, four-cane, or Kniffen Chautauqua. On the whole, methods of training in vogue 50 years ago are not far different today. There has, however, come the conviction that vines in the old-established sections cannot be pruned as long as was the custom 25 years ago. It has come to be realized that the size of the crop is not directly proportional to the number of fruit buds left after each pruning. It is

unquestionable that the grower of today is more conversant with the relationships of pruning to fruit production. And if he is growing more than one variety he knows that nearly every variety is a pruning problem in itself, and in a lesser degree the training. We are safe in concluding that of all cultural practices the lapse of time has least affected training methods.

PART IX.

(*Rural New Yorker, vol. XC, no. 5168, 11 July 1931, page 757)*

While the greater number of commercial grape regions have long practiced intensive cultivation, yet a few have been quite indifferent, and have allowed weeds to occupy the soil over much of the growing period each season. During the past 25 years the value of weed control has come to be more appreciated. It would seem that generally speaking the cultivation of commercial vineyards is now done with a greater understanding of the objects for so doing, and the necessity of timeliness is recognized as never before. In some instances vine cultivation has been considered a substitute for fertilization, and as a result some injury has resulted from intensive working of the soil. With the passing of the years it has become very evident that, while the grape is most versatile in its soil adaptabilities, there are many situations given to vineyarding that have never been profitable, nor can they ever be. The value of soil drainage for grape-growing has been given greater consideration within recent years, to the end that rarely are vines now planted until provision for the removal of surplus soil water has been made.

The relationship of vineyard surroundings to insect infestations and diseases has come to be more appreciated. It is only within recent years that vineyard sanitation is recognized as a valuable adjunct to spraying. The correlation of nearby woodlots, depression, gullies, or undergrowth with black-rot and the mildews and certain insect cannot now be denied. And it is only through provision of good air drainage by the removal of obstructions, that mildews and rot can most effectively be controlled by spraying. It has come to be recognized that a number of insects injurious to the vine may be quite effectually controlled through the destruction of the rubbish in which they are protected over Winter. Formerly the vineyardist knew very little about the hibernation of any of the vine pests, except that they seemed to attack certain portions of his vineyard year after year. Now he knows or can learn why.

The control of vine insects and diseases through spraying, in common with the control of other fruit pests, has made great advances during the past 25 years. At the beginning of this period arsenate of lead was little used as a poison for chewing insects, but rather white arsenic was the common one for grapes, Nicotine sulphate preparations for the control of sucking insects had not been introduced, but dependence was placed on whale oil soap and oil emulsions. These latter were not so effective nor were they so easily prepared for use, as much more time was necessary and they had to be thoroughly worked into condition before they could be added to the other components. The only spray material for grapes that has survived from the beginning is Bordeaux mixture. Today this is just as standard for mildew and black rot control as it proved 30 or 40 years ago. Many attempts have been made within the past quarter century to combine copper sulphate and lime into a dust that when mixed with water either in the spray tank, or with dew and rain on the leaves would give a Bordeaux mixture comparable to the homemade preparation, yet such substances are apparently just as ineffective today as when first brought out. There can be no question that the past 25 years have witnessed a great improvement in grape spray machinery. Sprayers that develop the necessary power from the wheels are made sturdier and capable of developing and maintaining a greater pressure for a longer period than formerly, while the introduction of the gasoline engine has made possible very satisfactory power grape sprayers.

The use of green manure crops in the vineyard is a practice that has grown within the period we are considering. While it is by no means generally adopted, yet each year finds more and more the seeding of some crop that later will be turned under. When it is realized that green manure crops serve some purposes well if consistently used year after year, but that too extravagant claims have been made as to their values, they will more generally be used to supplement farm manures.

Probably the changes in grape containers has been more pronounced within the past 25 years, than in all the gears previous to the beginning of this epoch. And we might add that the uses to which American grapes have been and are put have been responsible for the changes in packages. As has been pointed out, the pioneers in grape-growing were solely concerned with the production of grapes for wines, and for many years the transportation from place to place could be made in any sort of container. Later when wine grapes were shipped by rail or otherwise to considerable distances, shallow crates or trays were used. But when the time came that grapes were grown for dessert or other table uses, various basket containers in suitable sizes for all demands were devised to carry the fruit. One of the most popular containers was the eight-pound climax basket. Later this was superseded by a smaller one, and finally the two and four quart climax baskets became standard for the users of small quantities of grapes. But before the latter came into use, certain customers made known their wants for a package of grapes larger than the eight-pound basket, but smaller than the bushel or crate. Hence the so-called jumbo or 20-pound basket, but which now has been standardized to 12 quarts, soon became the predominant package in practically all eastern grape sections. And with the general use of the 12-quart basket, the smaller packages almost disappeared from the markets. This size basket seemed to serve many uses, since it holds about 16 pounds of fruit. The consumer who wishes to make grape juice, jelly or jam prefers it, while for restaurant and hotel trade it is a good container for carrying dessert grapes. Within the past few years the pendulum has swung somewhat away from the 12-quart package to the two and four-quart sizes again, and the bushel basket is now much used.

One of the important advances within recent rears has been the establishment of central packing-houses for American grapes. The handling of grapes through such houses insures a most uniform lot of fruit. Those who do the packing have certain definite standards before them, and as they know not whose grapes they are working with at any time, each and every basket is like every other. And as they are packed after the fruit has lost some of its water, it can be so filled that there will be but little slack when it arrives at the distributors. The packing of grapes in the central house also makes for much higher quality fruit, as the unfit or imperfect is eliminated.

In concluding the discussion of the changes in grape-growing and marketing methods of the past 25 years, it would seem from the foregoing that the grower of American grapes possesses the knowledge and the equipment to produce and get to market this delicious fruit to better advantage than has been possible at any period since grapes became of commercial importance in the East. May not the possession of all this information be the answer as to the why of the present surplus?

Probably some of you who have read this series of articles will have wondered why there have been so many ups and downs, so many shifts from one region to another, even after many native varieties had been introduced. It will have been noted that with the exception of a very few, grape-growing has at one time or another been attempted in nearly all the States east of the Rockies. Yet today the regions that are growing American grapes commercially and with some semblance of success can be counted on the two hands. It is quite understandable that distance from large outlets and lack of transportation may account for the decline in many instances, but even when these conditions are satisfied it can be shown that some localities that promised well made little or no progress; even at a time when the problem of the surplus was not with us. Quite often many individuals are carried into a project because of the enthusiasm of others, only to find later that they are ill-fitted for the undertaking. Such mass action is still with us today, as witness for example the various land booms that are exploited and exploded almost simultaneously. No doubt many sections took to grape-growing under somewhat similar stimulation, though less spectacular. The motives that induced the pioneer to try over and over again after repeated failures the culture of the Vitis vinifera in the East and South were entirely different. First he wished to grow a crop that he was familiar with in his native land, and which still linked him with it, and secondly he wanted a home supply of the wines to which he had been accustomed since

childhood. But today the opening of any new development, or the introduction of a new crop, has back of it many agencies, which in turn expect to profit by the success of the project. Some of the grape developments of recent years have been stimulated by just such agencies, a few with the most honorable intentions. Much of the planting made under get-rich-quick propaganda was doomed to failure from the start; in other localities the end is not yet, but inevitable.

PART X.

(*Rural New Yorker, vol. XC, no. 5172, 8 August 1931, page 837)*

Why is it then that the important regions first devoted to the growing of American grapes commercially still hold the same rank as 50 years ago? However important nearness to large markets may be, this alone cannot answer the question, for two of the largest producing areas are situated several hundred miles farther away from one or more important outlets than other localities that have gone out within the past 25 years, while another city that uses large quantities of Concord grapes and can get its supply within 100 miles, yet goes 500 for this fruit. The consumer of Concord grapes has learned to distinguish between the fruit from the various sections, and there is every reason for believing that the differences are real, and that they are more or less indelibly linked with certain conditions peculiar to the localities from which the superior fruit comes. A recent survey of the consumers of native grapes, chiefly Concord, made in three cities of the East, brought out the fact that Concord grapes are preferred from a single State, and that the prospective purchaser asks for such grapes year after year. In this instance the prospective purchaser represents the majority of the consumers interviewed.

Let us now briefly consider some of the characteristics of the regions that still remain the leading native grape-producing areas, and perhaps we will discover the reasons therefor. There can be no doubt that New York is the leading division of the United States engaged in the growing of purely American grapes, hence we will consider the specific areas within this State, and then pass in order to the others and examine them in the same critical manner. The principal area devoted to grapes In New York is a narrow strip, from two to four miles in width, and about 40 miles in length, in Southwestern New York, bordering the south shore of Lake Erie. The land gradually rises from the shore of the lake for about four miles when an abrupt rise or ridge is met. Extending east and west, this ridge forms a barrier between the foreland and upland. At the extreme west it is only about a mile distant from the lake, while at the eastern end of the strip it is four or five miles back from the shore line. Throughout the 40 miles there is a continuous bench which at one time was lake beach, while over parts of this length are two such benches. Since all of the area between the higher bench and the present lake beach were under water at some time, the soils vary greatly in their composition as one traverses the section from the present lake level to the foot of the bounding ridge. With this picture before us, it can be stated that in most instances the ridge, or rather the northern slope of it, is the southern boundary of commercial grape-growing in this famous region. In many seasons the differences of temperature, snowfall, etc., are just as marked between the region to the north of the ridge and that to the south of it as would be encountered in traversing through several degrees of latitude. Occasionally a valley extends back from the Lake Erie Basin through the bounding ridge, and along these the Concord grape ripens in a particularly favorable season several miles farther back. It is believed that there is a flow of the warmer air of the lake plain up these valleys which makes possible a partial success in these outlying areas.

It has long been known that large bodies of water have an ameliorating influence on the temperatures immediately surrounding them. Spring frosts do not occur so late as at points farther in the interior, and the expanse of melting ice retards the starting of grape buds until the season is so far advanced that they ordinarily escape injury from late frosts or freezes. The water of the lower lakes one foot below the surface throughout the month of May shows a temperature of but seven degrees above the freezing point. Usually about the middle to the latter part of July it gradually rises to the atmospheric temperature, and from August till late Fall the temperature of the lake water is several degrees higher than the air temperatures. In September it is three or four degrees warmer, while in late October it is often warmer by six degrees. These ameliorating influences of course vary from season to season. If the Winter has been one of relatively high temperatures and no ice of any considerable amount forms, the retardation of grape buds is at a

minimum, but if ice forms over a considerable area of Lake Erie, very rarely are the buds injured from late frosts or freezes. Growth normally starts in the Spring in the region immediately bordering the lake shore considerably later than a few miles inland. And in the Fall, the fruit ripens later the closer to the lake. The warmer air, more or less confined to the lake plain because of the ridge paralleling the lake to the south of it, wards off early Fall frosts and thus gives to the region several more growing day than sections several degrees farther south. It has been repeatedly noted that as the ridge approaches the lake shore or in other words the narrower the area confined between lake and the ridge, the later the occurrence of frosts and freezes in the Fall. For example, ice may form at one place, while 15 miles to the west and at the same elevation freezing temperature may not occur until several days later. The presence of large bodies of water, as Lake Erie, assures an optimum humidity, and at the same time days are very few during the growing season that the air is not undergoing some motion. With excessive humidity lacking and air currents almost continuous, this region is unfavorable for the infection and spread of vine diseases.

In a considerably lesser degree the soils of this region exert a favorable influence on grape-growing, but nothing near the importance that has been ascribed by earlier writers as being the reason of the extensive development of the industry. The old lake beach soils vary from coarse gravelly loam to a very fine mixture of sand and loam. To the north of the first beach, the soils are Dunkirk silt loam, Dunkirk clay loam, and occasionally sandy loam. Between the two lake beaches similar soils are found, and with the addition of a shale loam. The hillside soils are largely shale loams. All of these types are found in many other sections of New York, still they are not fitted for commercial grape-growing.

All that has been said of the influence of large bodies of water applies to the grape sections of Pennsylvania, and Northern Ohio. The several islands off Sandusky in Lake Erie, being situated several miles from the mainland and surrounded by water, have been famous for the growing of the Catawba for many years. In fact this section of the great lakes area is the sole one in which this variety can be ripened well year after year. Even on the mainland nearby Catawba does not attain the same perfection that it does on the islands. At one time grapes were grown commercially along the south shore of Lake Erie from a point east of Cleveland to Sandusky, and even to the west of it. The topographical features are just as favorable for the growing of Concord in this strip today as ever, but the industry has languished, except over small areas.

The second most important area given to the production of American grapes not only in New York, but in the entire East is the section known as the Finger Lakes region. Here as elsewhere the acreage has gradually diminished within recent years. This lake section enjoys many of the topographic features that are so important in the region of the great lakes, but since the bodies of water are smaller, grape-growing is confined within narrower limits. Here there are several lakes extending north and south, and mostly parallel. The length of these varies from a few to 30 miles. The greatest width of any one of them is not over two or three miles, and all are quite deep. The land rises rapidly from the shore lines. It is along the steep slopes abutting these lakes that the vine has been established. It is worthy of note that the varieties that require the longest season to mature their fruit are planted on the lower levels or nearest the lake, while those sorts that are classed as early or mid-season are on the upper portions of the slope. On at least one of these lakes a line of demarkation is plainly evident that divides the slope into two strips, that nearest the lake will bring Catawba through to maturity, while just above this line it will not ripen, but Concord will. This is one bit of evidence which shows the influence of bodies of water in their relationship to grape-growing. Rarely do grapes ripen well on the elevated benches that separate these lakes. Catawba, Concord and Niagara are the principal varieties grown in the Finger Lakes region. In the region about the Great Lakes and in a lesser degree of the Central New York

section, Winter temperatures are more moderate than they are inland, and it is only in an occasional year they get so low that injury to root and cane is serious.

Extending east of the Niagara River and not far from the shore of Lake Ontario, the Niagara grape has been somewhat extensively planted, and in recent years Concord has been added. While the vineyards of this section are located much farther back from the lake than those of the Lake Erie basin, this is largely compensated for by the fact that the ridge or escarpment which lies to the south and extends east and west is much higher than that which bounds the Lake Erie belt. All varieties in the latter section ripen from a week to 10 days earlier than along Lake Ontario's shores, and Winter temperatures are somewhat lower.

Parts of the Hudson Valley, as we have already noted, have long cultivated the vine, and today many acreages of considerable extent are still to be found. The ameliorating influence of the river, which in places is of some width, coupled with a lower latitude, insures good maturity in most seasons. Successful commercial grape-growing is confined rather close to the river banks. The Concord has here become the most important commercial sort. Owing to the fact that many other fruits thrive well in the Hudson Valley, and probably have been more remunerative, the planting of grapes has not kept pace with the loss of many vines from neglect or natural causes.

PART XI.

(*Rural New Yorker, vol. XC, no. 5173, 15 August 1931, page 857)*

There are a few outlying sections of New York in which some commercial vineyards are still existent, but quite often these are subject to extremes of cold, heat and sunshine which makes grape-growing more precarious than in regions near large bodies of water. In Central New York commercial vineyards must have their vines protected from Winter cold, and this is done annually by laying them down and covering with earth.

From the foregoing it is evident that the commercial vineyarding sections of New York, Ohio and Pennsylvania, have become such because of certain real topographical peculiarities and it is these same advantages that have kept them in the forefront. While man is capable of changing methods of vine culture in order to meet certain emergencies, he cannot simulate natural land features that are so necessary in the growing of specialized crops. Later a discussion of other commercial grape regions will be attempted.

In the previous articles we tried to show why the four principal grape sections of New York, and certain Ohio and Pennsylvania areas, are adapted for the production of American grapes, and in each instance it has been emphasized that the nearness to large bodies of water wields the greatest influence, and that soils are of secondary importance. We will now pass to a discussion of a few other regions, and briefly point out some of the outstanding features that contribute to success from a commercial standpoint.

The State of Delaware has grown grapes for many years. But within the past 10 years there has been quite an awakening in the industry. The latitude of the State coupled with closeness of the grape section to the Delaware River and Delaware Bay, makes for a long growing season and mild Winters. Over and against these advantages is the high humidity during the Summer months. In consequence the disease problem is quite often a serious one. We are not prepared to state that this latter is the limiting factor, but it no doubt is a deterrent to many who would otherwise engage in grape-growing. The nearness to two or more large markets should be an incentive to at least maintain the acreage at its present level, provided of course growing costs are not in excess of those in other commercial sections.

Previously the Niagara peninsula of Ontario, Canada, has been mentioned a as region that produces many grapes annually. Within recent years practically all the available soils within the confines of the escarpment that extends east and west paralleling Lake Ontario, and the lake to the north of it, have been planted with vines. This region is considerably to the north of the Lake Erie section, but the nearness to a large body of water and a high ridge bounding the area on the south, approximates the topographic features along the southern shore of Lake Erie. However it requires 10 days to two weeks longer to ripen the Concord here than in Southwestern New York. The land features of the peninsula and those of the Niagara region of New York are very similar. In fact the bounding ridge or escarpment traversing each is one and the same, and would be continuous were it not for the cutting through by the Niagara River. The Niagara peninsula is likewise famous for many other fruits, but as long as there exists a demand for American grapes in Canada, they will be grown commercially there for many years to come. Winter temperatures there, while ordinarily somewhat lower than in the Lake Erie section of New York, do not usually cause much injury to the vine.

The commercial grape region of Michigan is located in the almost extreme southwest part of the State, and a considerable part of the acreage is close to the shore of Lake Michigan. The Lawton and Paw Paw portions of industry are somewhat inland, but the lake influence ameliorates the climate so that Concord matures well in most seasons. However more Winter injury occurs in the inland section than in that close to the lake. Vine diseases are more prevalent

in the Michigan belt than in the Niagara peninsula, or the regions of New York, Ohio and Pennsylvania. The closeness of the grape district of Michigan to several large cities is of course a decided advantage, and if the surplus of all types of grapes were not so large, Michigan along with most of the sections already mentioned, could because of favorable topographic features, produce profitable crops almost annually. For after all is said, that grape region which is freest from climatic extremes is bound to enjoy the greatest prosperity.

Some American grapes have long been grown in parts of Iowa and Illinois, but the area that is adapted for commercial grape culture is extremely limited in both States. Because of many uncertainties it is probable that planting will not be extended there. Nearness to several large markets is of course an important consideration, but with improved shipping facilities grapes produced many miles away under the best of climate will compete more and more successfully with the smaller producing areas even though they be next door to large outlets.

The largest development of recent years has taken place in southwestern Missouri and northwestern Arkansas. As we have already stated, grapes have been grown for many years in parts of Missouri, but until within recent years they have been largely of the early maturing sorts, notably Moore. Largely through the influence of one of the manufacturers of unfermented grape juice the industry was recently revived in Missouri and given a start in Arkansas. There are no large bodies of water near these regions, and in consequence temperatures fluctuate widely both Summer and Winter. The control of vine disease is also a serious consideration. Both of these States under favorable conditions produce large crops of fine Concords, many of which find their way into the markets of the Middle West and East. The fruit produced in the Ozarks, as this section is best known, ripens earlier than the same varieties in any other region of the East. In fact Carman grapes from Florida and Thompson's Seedless from California are its only competitors.

A few vineyards are still to be found near Cincinnati, but these furnish only a small part of the fruit that this city consumes. The Summer temperatures of this region are rather too high for the best production of the leading American grape, the Concord. On the other hand climatic conditions, in a limited area, are ideal for the production of first quality Catawba, if the mildews and black rot be controlled. Many consumers in Cincinnati still prefer the latter variety if it can be obtained.

From the foregoing statements it is to be seen that many sections of the East can grow and ripen some varieties in some seasons, and that there are but few regions that seem to possess most of the requirements that are necessary to successful commercial vineyardiug year in and year out. Grape-growing in the latter has persisted over many years in spite of many vicissitudes, the greatest of which has been overproduction of all grapes, both foreign and native. Many of the newer, promising sections have passed from the picture, because of a lack of those land features which insured fairly uniform crops year after year. This lack coupled with the production of a surplus made the continuance impossible. It is very obvious that a region habitually subject to vine and fruit disease which require for their control four or five spray applications in a single season, cannot compete with another locality where spraying ordinarily can be omitted. Again the section that is habitually subject to late Spring frosts and freezes, thereby destroying a considerable portion of a crop in three years out of five, cannot produce to sell in competition with the region where the chances of frost injury are much less. The section that has a growing season sufficiently long to insure full maturity in four out of five years is in a much stronger position to survive than the one that fails because of early Fall freezes three out of five.

It is not because the individual grower was any better equipped to grow grapes that the older regions are still in the ascendency, nor is it because the newer widely scattered plantings were made on soils poorly adapted for the vine that they have not been able to compete with the already existing sections. The leading commercial grape regions of the North and East are still

such, because they have been located amidst surroundings that temper the climate, supply an optimum of air humidity, furnish sufficient air currents that in turn lessen the likelihood of vine diseases, are in belts of moderate Summer rainfall, and receive a fair amount of Summer sunshine. Regions near large bodies of water are relatively free from temperature extremes in Summer or Winter. A long growing season, coupled with a moderate annual rainfall, and freedom from heat or cold extremes, just about sums up the requisites for successful commercial vineyarding in the East and the North.

In concluding this sketch of the rise of grape-growing in the East it should be stated that it is but a fragment of the complete story, which in itself would require several volumes, even though the past 50 years were deleted. Some of the statements of the early history are still controversial, but in the main the authorities consulted are agreed on most points. And with these statements we will terminate this sketch of the beginning and rise of vineyarding in Eastern United States.