

THE
AMERICAN
VINE-DRESSER'S GUIDE,
BEING A TREATISE
ON THE
CULTIVATION OF THE VINE,
AND
THE PROCESS OF WINE MAKING;
ADAPTED TO THE SOIL AND CLIMATE
OF THE
UNITED STATES:

BY JOHN JAMES DUFOUR.

**FORMERLY OF SWITZERLAND, AND NOW AN AMERICAN CITIZEN,
CULTIVATOR OF THE VINE FROM HIS CHILDHOOD, AND FOR THE
LAST TWENTY FIVE YEARS, OCCUPIED IN THAT LINE OF
BUSINESS, FIRST IN SWITZERLAND, AND NOW ON THE
BORDERS OF OHIO, NEAR VEVAY, INDIANA.**

Then said the trees to the vine, come thou, and reign over us:
And the vine said unto them, should I leave my vine, which cheer-
eth God and man, and go to be promoted over the trees?

Judges, c. ix. 12 & 13 vs.

Cincinnati:

PRINTED BY S. J. BROWNE,
AT THE EMPORIUM OFFICE.

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1836.

**THE UNITED STATES OF AMERICA,
INDIANA DISTRICT, ss.**

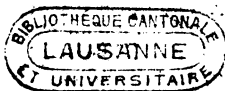
BE IT REMEMBERED, that on the fourth day of July, in the year of our Lord one thousand eight hundred and twenty six, and in the fiftieth year of the American Independence, **JOHN JAMES DUFOUR**, of said District, hath deposited in this office the title of a book, the right whereof he claims as author, in the words and figures, to wit:

"The American Vine Dresser's Guide, being a treatise on the cultivation of the vine and the process of wine making, adapted to the soil and climate of the United States, by JOHN JAMES DUFOUR, formerly from Switzerland, and now an American citizen; a cultivator of the vine from his childhood and for the last twenty five years occupied in that line of business, first in Kentucky and now on the borders of Ohio, near Vevay Indiana.—
"Then said the trees to the vine, come thou and reign over us: and the vine said unto them, should I leave my wine, which cheereth God and man, and go and be promoted over the trees."

IN CONFORMITY to the act of Congress of the United States of America, entitled "an act for the encouragement of learning, by securing the copies, of Maps Charts and Books to the authors and proprietors of such copies, during the times therein mentioned, "and also of the act entitled "an act supplementary to an act entitled an act for the encouragement of learning by securing the copies of maps, charts and books to the authors and proprietors of such copies during the times therein mentioned, and extending the benefit thereof to the arts of designing, engraving and etching historical and other prints.—**ATTEST,**

H. HURST,

Clk. Indiana District.



SOME explanatory notes, written after the book had gone to press, will be found at the end of the work.

The **AUTHOR** having been absent part of the time while the work was *in press* and not so well acquainted with the English language as he could wish, an *errata* has become necessary, to correct several errors, which some how have been overlooked and impair the true meaning of the text; those of a minor importance being left to the discretion and indulgence of the readers: Nevertheless, should some sentences still be found obscure, they will soon become clear and intelligible to those who make themselves familiar with grape vines by manual and daily attendance on them, especially where treating of *Vine Dressing* and *Wine Making* is the predominant object of this work.

PREFACE.

IT will be found something like presumption in me, to write a book in a language, to which I am a stranger. All that is to be published now a days, ought to be stamped with perfection: But as I had, and yet have to answer so often, verbally and by writing, queries about my avocation, I have attempted to write down, and give to the public at large, the answers to any questions which may be made about the **CULTIVATION OF GRAPE-VINES**, in the **UNITED STATES**—all at once; and have thought I should be better understood, than by letters, often written in a hurry. The importance of the subject, and the great need of such a work, will plead for the indulgence of the readers, who I expect will be able to understand it—for no pains shall be spared to render it intelligible, especially where it is intended to give the practical or manual part of **VINE DRESSING**. A little of the history of the introduction of that precious plant into Europe from Asia, translated from the Dictionary of Agriculture of **LABE ROZIER**, and particularly in the United States, by our Colony, cannot be thought improper: Likewise, an outline of the different modes of culture, and of preparatory works to establish Vine-yards, followed in different parts of the world, and seen by the author, who, in his repeated travels between Switzerland and the United States, avoided

purposely to follow the same route, that he might see more vine-yard countries, and find out the mode of training and cultivating the vines, that would suit best this country, and would offer the largest produce, with the least work and attendance, without regard to the quantity of ground employed, being so plentiful, that the main object ought not to be, to get a rent for the land, but to obtain the most wine from the least labour; nevertheless, our vineyards, by the mode of training adopted, have proved to be as productive by the acre, as the generality of the vineyards in France—as CHAPTAL says. To obtain what was intended, I found it to be necessary to lay aside the mode of cultivation I had been accustomed to, as not suitable for a country where there is too much land, and a lack of people, and invent a new way—for none of those I had seen, would suit a new country; it will be found, however, in the sequel of the book, where I have seen something nearly similar. As this country, like Lombardy, may and ought to entwine the grape-vine with the mulberry tree, and make good silk with our own indigenous mulberries, I think I shall not intrude on my subject by trying to encourage that branch of rural economy. When I last came from Europe, I purposely travelled through silk countries, to obtain information about it, from the farmers themselves; and what knowledge I have acquired, will make the subject of a good part of a chapter, and I expect it will be an acceptable addition to the work: Likewise, I shall notice briefly something of the quadrennial rotation of culture, adopted as the best by our intelligent agriculturalists, and followed in Lombardy among their mulberries and vines, since time immemorial; to show the possibility of making good and rich farms out of the poorest land of

the Southern States, by imitating Lombardy. That way of cultivation being very little known, hints of its practicalness and enriching character, on both the land and its owner, can never too often be given; besides, it will suit very well any farm on which there is a vine-yard, by the abundant production of manure, so much wanted by vines, On manure I shall go somewhat into detail—for it is the main pillar in good husbandry, especially in vine-yards, about the use of which, I shall differ in opinion with many book-makers, but not with a single practical vine-dresser that I know. I will also try to save the character of our Cape grapes from being made merely wild grapes, because some are now found in the woods; and, to put any one in the way to distinguish wild from tame grapes, I will give the description of the botanical characters of the blossom of both sorts. I shall try also to encourage those who can do it conveniently, to keep sowing grape seeds, to produce some new variety of grapes, which would perhaps answer better than any we have. Raising vines from seed, is the best means we have to obtain varieties. Particulars about that sickness of vines through the United States, which prevent the European grapes from growing well here, shall be noticed, to excite the attention of the people to it, that the cause may be found, and of course the (remedy) preventive. The history of a curious discovery to make brandy out of water, found out the last year I was in Switzerland, [1815,] of which I have great reason to believe I was the cause, will, I expect, be acceptable: but more so, of another discovery of my own, in the making of wine, of which I can aver, that it is a very valuable thing to any man who has to make wine; and I expect it will prove the same for cider. If the United States

were planted with vine-yards like France, as they will be at some future day, the patent right for it alone, would produce ten fold the income for this book. Another invention of mine,—the best way to *graft grape vines*,—must not be omitted, and many other experiments and remarks I made, to study their nature and their way of growing: they will be found through the book where I think they will be necessary to illustrate some of my positions.

I might have begun this preface, by the praise and encomium of the grapes and wine, and show the consequence on the health, temperance and cheerfulness of the people generally in any country, where there is a sufficient supply of genuine wine, which is equal to the provision of bread stuff; and as evidences and authority, I shall copy here what Mr. SPEECHLEY says in the preface of his treatise on the culture of vines:—"Of all the numerous sorts of fruits, indulgent nature produces for the use of man, that of the grape must be esteemed her noblest gift: For although various others not only afford comforts, but many of them even contribute to the luxury of the human race; yet none of them tend so eminently as does this fruit, 'to gladden the heart.' Hail then precious vine! Let me modestly presume to treat of thy culture, and to set forth thy virtues—a theme worthy of the immortal gods! O may thy superior excellence everlastingly inspire man with duty, and with unfeigned gratitude to the all bounteous Giver." What Mr. Speechley says here, is highly corroborated by what we read in ECCLESIASTICUS, ch. 31, v. 27 & 28,—“Wine is as good as life to man, if it be drank moderately: what is life then to a man that is without wine, for it was made to

"make man glad? Wine measurably drank, and in season, "bringeth gladness of the heart and cheerfulness of the "mind." It is, to contribute all in my power, that I undertook to write this treatise, to engage and enable the people of this vast continent, to procure for themselves and their children, the blessing intended by the Almighty; that they should enjoy, and not by trade from foreign countries, but by the produce of their own labor, out of the very ground they tread, from a corner of each one's farm, wine thus obtained, first handed from the grand Giver of all good, pure, genuine, and unmixed by avarice, that it may have the effect on his heart and family intended by the Creator: Then in the cheerfulness of his heart, he will bless and thank him, who thus so bounteously provideth; then that offspring of fire—distilled liquor—so corrosive and acerb as its parent, which crisps the heart and maketh man mad, will be left for the poor inhabitants of frozen countries, to whom both grapes and apples have been refused: and if this my humble performance, should contribute to bring such blessing in the country, I could rejoice to have quitted my first home to come here.—

When I took the resolution to come to America, to try the cultivation of the grape, I was but fourteen; and I came to this determination by reading the newspapers, which were full of the American Revolutionary War, and contained many letters from the officers of the French army aiding the Republicans, which complained of the scarcity of the wine among them, in the midst of the greatest abundance of every thing else; and by inspection of the maps, I saw that America was in the parallel of the best wine countries in the world—like Spain, South of France, Italy and Greece: I then made the culture of the grape, of its natu-

ral history, and of all that was connected with it, my most serious study, to be the better able to succeed here. It is that resolution which made me a vine dresser, although some may think I am not fit for it, being maimed in my left arm. It was it, which made me lose several chances of getting rich, in my journeying through America, because it had so completely absorbed all my other thoughts; and it was also that resolution, which made me accept a proposal of an association for the culture of the grape in Kentucky, under the same principles of the one established at Philadelphia, though not knowing, however, which of those societies had been the first; but the Kentucky Vineyard Society, may be with great propriety considered as the beginner, the true introducer of the cultivation of grape vines into the United States; although it proved to be a ruinous affair, both to the shareholders and their vine dresser—nevertheless, millions will accrue to the country at large, from the school made there. Some of my readers, who may, like me, have been losers in that undertaking, will see here with satisfaction, the reasons why it has failed, and how by a ~~different~~ management, it may now be a more profitable establishment even than the United States' Bank. When I first came to Lexington, I was requested and encouraged, to make a trial on the culture of the grape; but I was left with little courage by what I had seen done: They offered to help, and the following scheme of an association was agreed to:—To subscribe 200 shares, at \$50 each—40 of the shares were to be mine as my salary to conduct the business, until it would become productive; after that, I was to have \$1000 per year out of the produce, and nothing, if there should be none,—so that the subscribers put their money, and I my

time, at stake. The produce of the 160 shares, was to be appropriated as follows:

For 633 acres of land,	\$ 633
For 5 families of negroes,	5000
For tools, vituals, and other support, until the place would be productive,	1000
Expenses of getting vine scions,	800
Incidental expences,	567

TOTAL,	\$8000

The plan was well laid, if we had perfected it; but in 1799 too anxious to begin, we went into business before all the 160 shares were subscribed for, and while there was but very little money collected—five acres were planted with 35 different species of the best grapes, a great part was obtained by purchase from Mr. Legau, at Spring mill, near Philadelphia, and others gathered in the gardens of New-York, a small part bought at Baltimore from a German nursery-man, and another small part brought directly from my own vineyards in Swisserland, when my brothers came over to join me; three years we were in full expectation, and worked with great courage—a great many species of vines showed fruit the third year; one vine of the sweet water was full of eminently good grapes, fully ripened by the first of September. A few bunches that I carried to Lexington, were admired beyond any thing. But alas! it was the first and last year that that vine ever bore fruit, a sickness (of which I shall make the subject of a chapter) took hold of all our vines except the few stocks of Cape and Madeira grapes, from each of which we made the fourth year some wine, which was drank by the Shareholders in Lexington in March next. The failure of the first plantation caused a relaxation among the

shareholders, and not only a great difficulty was experienced in collecting the subscribed money, but the subscription of all the shares was never performed, so that all our stock was made use of, for paying the hiring of negroes and other hands, and we were never able to purchase a single share or even to pay for the land: then the whole burthen of the establishment rested on our family, who kept good courage, for we had begun anew, with the Cape and Madeira grapes, of which we had so few at first, that it required several years to have enough of them; although we used great industry to multiply them; thus we went on until 1806, when I was obliged to go back to Europe, and our family parted. My two young brothers, who tried to keep the place, found themselves too weak to support it; and one frosty spring having took all their crop; and knowing that those of the colony, who had begun in 1802 on the borders of the Ohio, were successful & had suffered nothing by the frost, they abandoned the place to an American tenant, who supposed we had a bad title to the land, obtained a new warrant, and became owner by a patent, & let all the vines go to destruction. At my return, which was in 1816, an account of the war which prevented my coming sooner, I found the vineyard grown up with briars, and I had to have recourse to law, to have the intruder ejected. Now let us see the difference, if we had punctually followed the plan, and began first by the collection of the \$8000, and the purchase of 5 families of negroes, for five thousand dollars, we could then have had from 15 to 20 head, big, and small, I could certainly have procured by our joint labor, enough to support us all, after the second year, besides planting as many vines as we have done; and although the first planting had failed, we would surely, in

1809 or 10, have at least 20 acres of bearing vines of the Cape grapes, which, at the average of 180 gallons per acre, as that is the product on the Ohio, would give about 15 gallons per share, besides paying what was coming to me. The wine then fetched \$2 per gallon, and the vineyard would have been yearly increasing. By this time, with only common good luck among the slaves, there would be at least thirty able hands of both sexes, besides a great many youngsters, with whom I could tend 100 acres of vineyards, beside raising enough for the support of all, at 180 gallons per acre, would give 85 gallons per share, worth as many dollars besides my reserve: and the capital stock would be worth about tenfold. Those who doubt the aforesaid calculation, have only to come and see our vineyards and vintage on the Ohio, and calculate for themselves. If by chance my opinion differs from others or I should express some original ideas, I shall not enter into contradictory arguments: as I do not pretend to infallibility, I submit all to the judgment of candid readers, who however are respectfully requested, to postpone, pronouncing, until experimental trials have been consulted, as well as the grand book of nature, from which most all I have to say has been taken, for want of other books, and even, if I had them, among the many I have read on the culture of the vine, but few could be quoted, for none had the least idea of what a new country is.—I had the loan of CHAPTAL and ADLUM for a few days, and I owne ROZIER, PEECHELY and COXE, to all of whom I have made some few references, of facts unknown to me before, or when I had to say the same thing. PEECHELY, an English author on the cultivation of vines, in hot houses in England, where they can get no good grapes out of doors, studied the

vines by handling them himself, and not in books; and has made several remarks on their nature in England; as I have done in Switzerland and in America, the author I would have quoted often, had I his book it would be the OLIVER DE SERRE, who was with propriety called by the French authors the father of agriculture; because, all those who have written after him, on that science, have chiefly been his copiest, but it is more than ten years since I have seen his "*Theatra*" of agriculture: although it has been lately reprinted in its original old French, by LASTERIE, or was intended to be reprinted; when I left Europe last.

J. J. DUFOUR.

THE AMERICAN VINE DRESSER'S GUIDE.

CHAPTER I.

Brief history of the introduction of Grape—How it was introduced into Europe—Domitian's disastrous law to destroy vines in Gaul—Restoration of them by Probus, two centuries after—Emigration of the Helvations to where grapes grew—Introduction of vines into the United States—The Jesuite vineyard at Kas-kaskia—Wine made at Marietta with sand grapes—Tradition among the French on sand grapes.

THE Scriptures of Holy Writ, tell us that Noah was the first man who made wine from grapes; profane history, says that it was Bacchus for the Greeks, or Janus for the Latins. It is very probable, that all those different names have reference to the same man, and that

they have the same meaning, but in different languages. Be it as it may, we learn at least, by it, that the culture of the grape, and the art of making wine, are old; and that it was in Asia that it begun, and from thence came to Europe. What follows, is the translation of part of what the celebrated CHAPTAL has told us in the '*Dictionary of Agriculture of Labe Rozier*,' in the tenth volume, at the article vine:—

"Europe is indebted to Asia, not only for civilization and arts, but for most of its grasses, fruit, pulse and vines. The Phenicians, who often explored the coast of the Mediterranean, introduced its culture on the Islands of the Archipelago, in Greece, to Sicily, at last into Italy, and in the territory of Marseilles, that culture had made but a small progress into Italy in the time of ROMULUS—for that prince forbade the libations of wine, which were in use in all the sacrifices of Asiatic nations. It was RUMA who first permitted it; and PLINY adds, that it was one of the means made use of by the politicians, to encourage the propagation of that culture:—for soon after, its produce became, in fact, so abundant, that the people could make a free use of wine, such that the Roman Fair were

“accused of going too far in that enjoyment;
“which abuse by the ladies, caused a law to
“be enacted, that women were forbid to drink
“wine under penalty of death; and at Mar-
“seilles, the same law had been enacted for
“that republic; but there, as well as among
“the Romans, the too great severity of the
“law was an obstacle to its execution, and
“soon after they fixed at the age of thirty years
“on both sexes the right of drinking wine; but
“they soon found out that that restriction was
“too great on the use of such a precious pro-
“duct, which had become very common and
“abundant, that they were obliged, at last, to
“leave the use of it entirely free.

“However, the culture of the vine, was gra-
“dually extending among the Gauls; it occu-
“pied already a part of the hill sides of the
“Department of the middle and south of
“France. When DOMITIAN, either by ignorance
“or weakness, as MONTESQUIEU says, gave or-
“der to root out unmercifully all the vines
“growing in Gaul; because one year, the crop
“of wheat or grain had failed—as if any thing
“analagous exists between the way of living
“and growing in these two sorts of plants—as
“if the produce of one might ever be an obsta-

“cle to the crop of the other; and as if then,
“as well as now, the ground occupied by
“vines in France, was not the worse for the
“production of grain. Any how, our forefathers
“by the disastrous law, found themselves con-
“demned to drink beer, metheglin, or a sorry
“decoction of bitter plants. That privation,
“which began about the ninety-second year of
“the new era, continued two full centuries. It
“was the wise and valliant **PROBUS**, who, after
“having given peace to the empire, by his nu-
“merous victories, restored to the Gauls, liber-
“ty to plant vines. The remembrance of that
“culture, and of the great advantage procured
“by it, was not yet all gone from the memory
“of men; the tradition had kept even the details,
“the most necessary in the art of vine dressing.
“The vines, brought again from Sicily, Greece,
“the Archipelago, and Africa, became the
“origin of those innumerable species of grapes
“that now cover the territory of France.” It
was accordingly the saying of **DUNOD**:—“A
“charming and grand spectacle, to see crowds
“of men, women and children, spontaneously
“and eagerly devoting themselves, with enthu-
“siasm, to that grand and sublime restoration
“of liberty—to re-plant vineyards: Effectual-

“ly, all could take part in it—for the culture of “grape vines has that peculiar to itself, that in “the details, it offers occupations to suit the “strength of both sexes of all ages.”

In the time of Julius Cæsar, about 600 years before the Christian era, there were no grapes growing yet in Swisserland, called then Helvetia; and, probably, none in the whole of Gaul; for a Swiss blacksmith, having crossed the Alps into Italy, whence he brought back to his native country, some grapes and some figs. The whole nation of the Swiss undertook to emigrate into that desirable country, where such fruit was growing, after having set fire to their towns and villages; but were repulsed by Julius Cæsar on the passage of the Alps, as, indeed, they were in attempting, to cross the river Saone again and go round the Alps by Nice.

The precise epoch when grapes first appeared in the United States, is not easily ascertained: if a few vines, planted here and there in gardens, or even the making of a little wine, for one or two years, and afterwards abandoned, could be counted for the beginning of the culture of the grape, and making of Wine in the United States, it may be traced back very near to the beginning of the establishment of the

whites on this side of the Atlantic. But none of the different and numerous trials which were made in several parts of the United States, that I visited after my arrival in 1796, were found worth the name of vineyards. All of them, except the vines planted in the gardens of the cities of New York and Philadelphia, and about a dozen of plants in the vineyard of Mr. Legaux at Spring mill, near the latter place, did not suffice to pay for one half of their attendance. I went to see all the vines growing that I could hear of, even as far as Kaskaskia, on the borders of the Mississippi; because I was told, by an inhabitant of that town, whom I met with at Philadelphia, that the Jesuits had there a very successful vineyard, when that country belonged to the French, and were afterwards ordered by the French government to destroy it, for fear the culture of the grapes should spread in America and hurt the wine trade of France. As I had seen but discouraging plantations of vines on that side of the Alleghany, and as the object of my journey to America, was purposely to learn what could be done in that line of business; I was desirous to see if the west would afford more encouragement. I resolved therefore on a visit to see if any re-

mains of the Jesuits, vines were still in being, and what sort of grapes they were; supposing very naturally, that if they had succeeded as well as tradition reported, some of them might possibly be found in some of the gardens there. But I found only the spot where that vineyard had been planted, in a well selected place, on the side of a hill to the north east of the town, under a cliff. No good grapes, however were found either there, or in any of the gardens of the country. A thick forest was covering that spot, with a luxuriant undergrowth, and of asparagus in the place where the Jesuits had planted a bed of that vegetable. This last circumstance made me think, that the vineyard had not been so successful as represented to me; but had been subject to the same sickness which afflict now all imported grapes, of which I shall speak more at large hereafter; the existence of which I have seen on the vines now growing in the gardens of St. Louis & Kaskaskia, where I have been lately. The grapes are such a good fruit that the inhabitants would have kept some in their gardens, in spite of all the governmental restrictions, as has been done in Brazil; and even, if there would have been grape vines of a hardy nature, as many sorts

are in Europe, some vestiges of them would have remained, and climbed up some of the forest trees and become wild, as the asparagus had done. Traditions among illiterate men, are not to be depended upon. In my journeying down the Ohio, I found at Marietta a Frenchman, who was making several barrels of wine every year, out of grapes that were growing wild, and abundantly, on the heads of the Islands of the Ohio river, known by the name of Sand grapes, because they grow best on the gravels; a few plants of which are now growing in one of our vineyards, given by the Harmonites under the name of red juice of the Islands. I drank some of the wine, when about 4 months old, and found it like the wine produced in the vicinity of Paris, in France, if not better. All the French then living on the borders of the Ohio, were fully of the opinion, that those vines were of French origin; that they had been planted first at fort Duquesne, now Pittsburg, and when the English took that fort, the French rooted them out, and threw the vines into the river, which carried and lodged them at the heads of the Islands, where they have multiplied, and produce abundance of grapes, because they are most regularly pruned by the floating ice of the river,

which acts on them, as the pruning knife of a vine-dresser. The tradition was handed down with so many peculiar circumstances, and the grapes, which are the best, that I know among the wild, resembling partly the species known in France by the name of *de la Madelaine*, that I believed it, until I found the same kind of grapes, up the Kentucky, and Mississippi rivers, where it was impossible they could have been brought, from the Ohio by floating on the water; and, by the inspection of their blossom I found them to possess the generic characters of the indigenous American wild grapes; of which I shall speak more hereafter.

CHAPTER II.

Divers attempts at vineyards in the United States, viz.—at Monticello—Spring Mill near Philadelphia—at Carol Manor near Baltimore—near the Susquehannah, in the vicinity of Middletown—Fate of them all with the exceptions—Cape grapes, the only one reared near Vevay; prejudice against those grapes, and description—Coarse grapes and bad apples often make the best Wine or Cider—Spirituuous quality of Wine—Sexes of Vines—Wild being of the Dioeciae family and the Tame Hermaphrodite of the Potendria Monogenia family of Lineus.—Wild American vines, found also in Europe—Description of the blossoms of both sorts—Burgundy grapes planted at the Cape of Good Hope, underwent a great change—Expectation of an amelioration of our climate—Obstacles met by the first vine-dressers in Indiana—Home-made wine, will in time stop the distillation of grain.—Vineyard Association at Philadelphia—New Mexico vineyards—Madeira grapes.

THE various attempts at vineyards that I heard of, which I went to see, at Monticello, President Jefferson's place; which, in 1799, I

perceived had been abandoned, or left without any care for three or four years before, which proved evidently, that it had not been profitable: At Spring Mill, on the Schuylkill, near Philadelphia; planted by Mr. LEGAUX, a French gentleman, and afterwards supported by a wealthy Society formed by subscription, at that City, for the express purpose of trying to extend the culture of the grape. I saw that Vineyard in 1796, 1799 and 1806. On the estate of Mr. CAROLL, of Carrollton, below Baltimore, in Maryland; whither I went on purpose from Philadelphia in 1796, there was a small vineyard kept by a French vinedresser, and where they had tried a few sorts of the indigenous grapes. At the Southern Liberties of Philadelphia, I saw in 1806, a plantation of a large assortment of the best species of French grapes; which a French vinedresser had brought over the Atlantic. They were at their 2d or 3d years: they had not been attacked by the sickness: their nursery was yet full of hope.—In 1796, I saw also, near the Susquehannah river, not far from Middletown, a vineyard that had been planted by a German; but who having died some time before, the vineyard had been wholly neglected. I was told, it had produced some wine; but it

had suffered so much delapidation, that I could not recognize the species of grapes—And at last the trial we made in Kentucky, in 1799, under the auspices of an Association made similar, and for the same purpose as that of Philadelphia, before stated, with 35 different species of the best grapes, procured from different parts of the world, but principally from the gardens of New-York and Philadelphia, Mr. LEGAUX's vineyard, and a nursery lately established near Baltimore by Mr. Kewster; all shared the same fate; being destroyed by the sickness above spoken of, except about one hundred plants that I got from the few that were prosperous at Spring mill vineyard, that we have called Cape grapes, because Mr. LEGAUX certified having received them from the Cape of Good Hope, and with which we the Swissers have made our subsequent and prosperous plantation near Vevay, on the borders of the Ohio, in Switzerland County, State of Indiana, and which must have now spread much through the country: for we have sent, and have to send abroad a great quantity of the scions every year. I have drank some good wine made from these Cape grapes, near Glasgow, in the barrens of Kentucky: and I have no doubt but the same grape is the one

which succeeds best with the Harmonites, near the Wabash in the State of Indiana: and I doubt if any other sort will do well with the French at Demopolis, in the State of Alabama; but they will meet with the same fate as all those I have yet seen on any other. As no things in this world,—be it good and useful as it may—but has met with enemies when first introduced: The cape grape has been slandered and cryed down to a mere wild grape. It is true, that it is a very coarse grape, unfit for table use, for those who have eaten the best sort in Europe, or who can get a better one. It has a very thick skin and pulp, but the juice is very sweet, when perfectly ripe and has the taste of the strawberry, which gives a fine perfume to the wine; such as made the President Jefferson say, that there was no other such tasted wine within his knowledge in the world.—It requires, about twelve pounds of grapes to produce a gallon of Clear wine, They are similar, as to roughness and thickness of skin, with the grapes from which wine is made in the warm countries of Europe, where they distinguish the fruit by the respective appellations of wine grapes, and table grapes; the former being commonly too coarse to be pleasing at a dessert, and the other

countries too delicate to make strong and durable wine. The same case happens in cider countries. Among the apples, it is well known, that in Normandy the best cider is made with ill flavoured apples: and here the Hughes' Crab, which makes the best cider, cannot be eaten. The Cape grape is, besides, not a very productive sort, yielding only from 100 to 250 gallons per acre; while the best are cultivated in the Canton de Vaud, in Swisserland, produces from 500 to 2800 gallons per acre in one year, and ten pounds of grapes makes a large gallon of clear Wine, and is, at the same time, one of the best table grapes. As to strength, it will depend on the climate, and on the sort of soil which produces it. It would be a good deal better and stronger if raised on the pine hills about fort Stoddert, in the Alabama States, or the sand hills of East Florida. Here it gives from one eighth to one sixth in brandy by the distillation. The strongest wine known in the South of France, gives one third; and the weakest one, in the north of Europe, about the twelfth or fifteenth. The good cider in the State of New Jersey one tenth; however, there is a great difference between the wine of one year to that of another, although produced from the same vines: An early and

warm summer will make wine two fold stronger than a late and cold one. If only the enemies of American wine had said that the Cape grapes are wild or indigenous, I would make no observation here on it: but it is the opinion of one of my particular friends, whom I hold in the highest estimation, of whom I claim his indulgence if I differ in opinion, and doubt of the assertion, until I see it in its original state: for if it existed in the United States, particularly in the State of Pennsylvania, where they said it is to be found wild now, I ought to have met with it in my travels through so many of the States of the Union, undertaken and performed with the only purpose to study all that had, or that may have, any relation to the cultivation of the grapes in the United States. How could it be, then, that the best of the wild or indigenous grapes, if this is one of them, should have alone escaped my sight. Beside all the indigenous grapes I have met with, are what Botanists are classing in the dioecia family, or male and female on different plants, like hemp, hops, persimin, one species of the laurel and several other plants—while all the cultivated sort that I am acquainted with are hermaphrodites, or with the faculty, of fecundation in itself, the male and female

organs being together in the same blossom, like the apple tree, the peach being of the *Laternaria monogenia* class of *Sinuous*. I made that discovery first at Frankfort in Kentucky, in the garden of a gentleman, who had procured some vines of the sand grapes, from the Islands of the Ohio; but happening that he had got only male-plants his vines never bore, but large branches of blossoms I pruned and dressed those vines once myself, with no better success; that raised suspicion in my breast, of what it was, and at the next succeeding blooming time, I plainly saw all the indigenous grapes that have fallen since under my inspection were of the *diociae* family. The famous botanist, MICHAUX, in a Latin flora of South Carolina, tells it also positively, and since, I have found that same plant, which is a different one from the viniferous vines in different parts of Europe, particularly in the vicinity of the river Rhone, before its entering the lake of Geneva; and in the hedges of a farm in the neighbourhood of Bordeaux, called Laguiria, belonging in 1806 to Mr. GALAY the Swiss Consul at Bordeaux. It is in favor of my readers, who may have the chance and wish to ascertain that fact by themselves, that I have been so particular. The distinction is easily

perceived in the bloom, the male has no embryo of the berry nor pistil in the bottom of the calix but has five long stamina, topped with big anthera, the blossom being naked as in all other grapes, the five petals not opening by the top as in other five petaled blossoms, but quitting the calix fall off as a cap, at the opening of the flower. The blossom of the female kind, has a large embryo of the berry, and the pistillum on the top of it, and no Stamina nor anthera, and in the place, there is a little crooked leaf; while the blossom of the hermaphrodite sorts, or the wine yielding vines, which have been classed by Linnæus in his sexual system of botany in the Petendria Monoginia, or the flower having five stamina and one stile or pistil; there is the embryo, the pistil, the five staminas topped with their anthera, all in the same blossom, although a little less voluminous than in the diociae kind, having besides five petals, that are also quitting the Calix at the opening of the blossom, and fall off, leaving the organs of generation uncovered, differing or unlike in that respect any other blossom that I know. Yet I have seen grape flowers, whose Petals had opened by the top and remained adherent to the calix, and made a

handsome rose-like blossom; but it was on a sickly plant, and the fruit appeared to have been imperfectly fecundated; for if any fruit remained and grew, their berries were smaller than their usual size, and had no seed or stone in them. The vinedressers of Switzerland took that way of blooming of the grapes, as a bad sign for good fecundation, and prepared themselves to meet a small vintage.

Considering all I have said above, and that it may be possible, that, in Pennsylvania, some of the Cape grapes may be now growing wild in the woods, having been sowed there by the birds, which have taken them from where they were cultivated; for it is past 30 years since Mr. LEGAUX got it at Spring mill, I think to be sufficiently authorised to believe, that the Cape is the only one we have in the United States, to say completely successful; is an imported grape; and Mr. LEGAUX having asserted that it came from Africa, it ought to be believed until proof of the contrary, and Mr. M'MAHON, in his gardening, speaks of it as a fact beyond doubt. The question now remains to know from what place grapes came to the Cape of Good Hope; for the Dutch, who planted the vines there, could carry none from their own country: Portugal,

Teneriffe, and the Canary Islands are probably the place from whence the Cape of Good Hope has been provided with that precious plant; and I have read somewhere, that they had much trouble at first to make their vines flourish; it requiring all the phlegmatic patience of a Dutchman, to bring it to a successful end. CHAPTAL tells us in the Dictionary of agriculture, that the Burgundy grape was planted there, for the purpose of having the same wine, but that in a few years, the grapes grew quite different, being large in the bunch and in the berries, and the juice so extraordinary rich, that it could not flow from the press without the addition of water. I was told also, when at Bordeaux, that the same Burgundy grape, planted in the vicinity of that town, underwent a total change, and made a quite different wine. Although this Cape grape, is a coarse fruit, or, as it is said, a wild one, it is nevertheless a very precious plant to the United States, and well worth the attention of all good citizens; if I had not met with that grape, the cultivation of the Vine would be in these western countries, and, perhaps, in the United States, very near as it was before; for I would myself give up the job as impracticable, but we may anticipate the hope that

the climate of our country will gradually change, and become more congenial to good grapes. I have seen with great pleasure, in the American Farmer, that in York County, in Pennsylvania, some of the European vines that I tried in vain, are now doing very well there.

The additional trouble and expense attending the culture of the grape and the making of the wine; as well as the time the vine dresser has to wait for its produce; the large preliminary expenses, for cellar, press, and vessels to the making and storing the wine, the patience to await its maturity, are sufficient to be dreaded by beginners in the world; and in the woods, too, are of themselves sufficient, without the addition of the fear, that such a coarse grape would at last, not be fit for to make palatable wine: to that may be added another obstacle, that the first vine dressers of a country have to encounter; it is the prejudice against home-made, of a people who are used to imported wines only, which are, or ought to be of the best sort, and of the strongest, naturally or by mixture, with spirits, to support the transportation; the home grown wine which is to appear first among such a people, must resemble exactly the one he is used to, to engage him to pay for it: Such was our case at

first, but we gradually found a market for all we made; I saw a great many, who would at first not taste the Swiss wine, because it was not as strong as the imported Madeira, which is about one third of brandy, or as sweet as Malaga wine, nor as mild as it would be, if kept only one half the age of the imported one, but having drank of it a few times for company sake, they have become great lovers of it; so that, by the by, the consumption having pretty well kept pace with the product, old American wine has always been scarce. This alone, ought to give encouragement to cultivate the grape more largely, and prevent the doubt of not getting a sufficient market for the wine. Let us have it plentiful and cheap, and the distillation of spirit from grape will soon be at an end. As a sort of illustration of the above, the following anecdote will naturally find here its place. In the year 1806, as I was passing thro' Philadelphia for Europe, I saw Mr. McMAHON the Secretary of the Philadelphia vineyard Society, who invited me to attend a meeting of that Society, which he had purposely called, and whose members were very numerous. Knowing that that the Swiss had good success on the borders of the Ohio, while their vineyard at Spring

mill, was yet of little profit, although it was from that vineyard, I had drawn our plants; they were desirous to get as much information about our success as I could give; and wished, that I should see the state of their vineyard: I briefly answered, that all the mystery of our success consisted in nursing only the vines that were prosperous, no matter how good or how bad their fruit was; for I was fully of the opinion, that no other existing this side of the Atlantic, would ever remunerate for the trouble of attendance; that the Cape grape was the only one reared by the Swiss settlers; that it was a hardy and thrifty plant, giving regular if not large crops of grapes, equal to a majority of the French vineyards; according to CHAPTAL's account—making a good wine inferior but to a minority of the European wines, and that it rewarded its cultivator if industrious, as well as any other American produce. But as they were rich, and connected with a great portion of the world, by a new trial, on as many species of grapes as they could procure, that about forty sorts had been tried to my knowledge. Out of them one was fully prosperous, and another most so: At that proportion, if they could get four hundred new sorts, there

would be a chance to get eight or ten which would succeed: And if I had known as I do know, that the Spaniards have vineyards in the Texas, or New Mexico, on the river *Rio del Norte*, I would have added, that it was from thence, that they ought to get all the species growing there. The Spaniards having cultivated the grape in America for many years, must have found out the very species which suits the climate, and perhaps they got a new native variety, produced by seed. If any imported vines shall flourish in the United States, the one coming from Texas, have the best chance. The first gentleman who by chance, has to travel in that country in the winter time, and will take the trouble to bring as many sorts of the vines growing there, as possible; and, if they are numerous, of the sorts which have the double advantages of producing a good quality and quantity of wine, (in the Chapter where I shall treat of the preparation of the Scions of vines to plant, I shall tell how to pack them, to be sent safe at a great distance,) that gentleman would bring the worth of Millions to the country, if he could succeed to introduce among the vine dressers of America, such a grape as the one called in Languedoc the *Enragea*, from

which much of the French brandy is made, and would be as thrifty and hardy as the Cape grape is here, or as that in Languedoc. The vineyard Society was pleased with my advice, and in my presence, resolved to have it carried into execution. After I had been to Spring mill to see their vineyard, I proceeded on my journey and arrived in Switzerland, after having been taken and carried to England; which gave me the chance to see a great many of the French vineyards, in the north and middle parts of that kingdom; after my return, which was only in 1816, I met with a newspaper where Mr. McMAHON answered to a bitter criticism of a Frenchman, who happened not to be a lover of our grapes and wine; because they are not as those of Medoc, LuneHe, Cotterotic, and other parts where the best French wines grow, but who had been careful to tell that it is better than most of the wines which appear in the Paris market, where I have tasted myself a great many sorts. Mr. McMAHON, after a conclusive and victorious defence of our grapes and wine, positively said, that the Philadelphia vineyard Society had procured a great many new species of grapes from most all parts; but that all shared the same fate. There

is a sort of grapes which succeed a little better than all the rest, the Cape grape excepted: it was called Maderia grape by Mr. HEWSLER, gardener at Baltimore, who procured it for me. I found some of the same sort among those I got at New York. It is a brick red grape turning nearly brown when full ripe. It is more palatable than the Cape grape; it is also to be ranked among the coarse grapes. It makes good white wine, having some resemblance to the imported Maderia when old and mixed with French brandy—but very late to ripen. It requires a more southern country, than the shores of the Ohio. In Tennessee, or Alabama, it might probably do well; a great many of them have been planted in the gardens of Lexington, Kentucky, and were, for some time, very prosperous, but have lately gradually all perished.

CHAPTER III.

Anticipation to get varieties of grapes, by sowing the seeds—Climate of Germany as bad as ours in old times—Now vines at fifty-one degrees north latitude—Creation of new varieties of grapes, by seed discovered by peeping into the secrets of nature—How that miracle is performed—Crossing of the breed—Vines have the same chance as apples had—Long childhood of vines—their duration, and Pliny's six hundred years old one—Solicitation to existing associations, and wealthy people to be sowing grape seeds—Speechely's method of doing it in green-houses—How the experiment ought to be repeated.

SHALL the United States be condemned forever to have but one species of grape? I think not. We learn by history, that in the time of the Republic of Rome, Germany had a very bad climate, perhaps such a one as we have here, but which has gradually undergone such a change, that now vines are cultivated with profit as far north as fifty-one degrees of north latitude: Besides, the Wise Creator has endowed the seeds of every sort of fruit, with

the faculty of producing varieties, almost *ad infinitum*: at the same time, he has permitted students and learned men, to raise a corner of the veil of nature, and to peep into some of its secrets—among which they have observed, that it is by the mystery of the fecundation of one plant by another of the same family—like the crossing of breed among animals, that that miracle is performed. The time will come, when country-born varieties will equal our most sanguine expectation. Why should it not be with the grapes as it happened with the apples? the native surpassed the imported; and most of the apple trees produced from American seed, bring good apples, such that some farmers of my acquaintance, prefer seedlings to grafted trees, to plant in their orchards, while the nursery-men of Europe, almost think it a miracle if they obtain but one good sort of apples by the seed, out of one hundred trees.

I have raised vines from seed almost from my infancy, but I have, as yet, had only two vines bearing good fruit—one sixteen years, and the other seven, after sowing the seed. I have now some vines growing from seed, some of which were procured at London, out of a green-house—some from that collection at Pa-

ris—some from my own vineyard, in Switzerland; but they have yet produced no fruit, although they are six years old, and are not very thrifty—being obliged to bury them in the ground every winter. The greatest quantity of sorts that I obtained from seed, and I believe that are generally obtained, are worse than their parents, and it must be but seldom when good species are procured in that way. It requires industry, steadiness, and much patience, to obtain good things. The grape vine is a plant of great duration. I have seen some of more than one hundred years old, and **PLINY** speaks of one six hundred years old, in his time, and that there was then an image of Jupiter at Populonium, a city in Italy, made out of the body of a grape vine, and incorrupted after so many ages; and, at Metapontum, the temple of Juno was supported by vineal columns: all which proves the great age to which vines attain, to obtain such bulk: And it must be with plants, as with animals, that the time of their infancy, or the time they take to become a tree, bears some proportions to the common duration of their life. **BUFFON** says, that that time is about the fifth of the whole life, and so it is, as to men; and if we give one

hundred years for the common life of the vine, fifteen or twenty years may be the time of its infancy. Such a law of nature admits great and many exceptions. Art may force nature to come to perfection sooner. As it is a very slow way of getting fruit, I would advise nobody to plant a vineyard that way, but I would earnestly solicit people who can do it, to make the trial on a small scale—very particularly with seed of grapes grown in the country. The man who will first get such a grape, yielding as much and as good fruit, and being as hardy as the sort I have before spoken of, reared in the Pais de Naud, will make a most rich present to his country. It should be corporations or associations, which live longer than the common life of man, (like as the Shakers and Harmonites,) that ought to undertake a regular job of such trial; and I shall on that account, copy here what SPEECHLY, an English gardener, who gives the method of rearing grape vines in green or hot-houses, has said about it, and what discovery he has made of the seeds of grapes grown in a green-house, having the faculty of producing almost always good species of grapes, often better than the parent; and how he could get a new species almost as he

pleases, by crossing the breed when the secondation is performed in the bloom. (It is Mr. SPEECHLY who speaks:) "The vine may
"be easily propagated by seed; for seed,
"carefully preserved through the winter, rises
"very freely, and especially from the seed of
"grapes brought to early maturity. This, undoubtedly, is the only way to obtain new
"kinds of grapes; but, nevertheless, it is little
"practised, partly on account of the distant
"prospect, and length of time, and partly from
"the hazard of obtaining better kinds than the
"original grapes, from whence the seed were
"taken. The prospect, however, is not so distant as many persons may imagine; for a
"seedling vine, judiciously managed, will produce fruit the third or fourth year; and as to
"the doubtfulness of obtaining a better sort of
"grapes than the original, it certainly will be
"but too well founded, should you make your
"experiment with seed indiscriminately saved;
"but when proper care and attention is had to
"the seed you sow, the prospect will wear a
"more favorable aspect, and the very best
"species may be hoped for, and reasonably
"expected.

“When vines are intended to be raised from seed, in hopes of procuring new kinds of grapes, that design ought ever to be kept in view. In hot-houses, where various sorts of vines are trained, it is an easy matter to bring the branches of two different kinds together, and it may be best done at the time of pruning.

“As soon as the vines shew their fruit, the young branches of each should be so brought together, that the bunches of two different kinds, in the same state of maturity, may admit of being entwined—whereby the two bunches being in flower at the same instant, and the parts of fructification brought together, there will undoubtedly be a mutual impregnation, from which it may reasonably be expected, that new and improved kinds of grapes will be produced. Great regard, however, should be had in respect of the sorts intended to be brought together, and the advantages to be gained by this junction, should be duly considered. They are principally the following: First—a superiority in size, both in the bunch and the berry: Secondly—a superior excellency in flavor, and a delicacy in the skin and flesh of the fruit. The

“form of the bunch, and the length of the foot-stalk of the fruit, are also valuable objects, and ought to be considered as advantages; close-growing grapes, which always have short foot-stalks, being subject to many misfortunes.*

“The advantages to be gained by this method of producing, being thus shewn and displayed, I shall beg leave to make a few observations on the manner of reducing it to practice: and the hints once given, it will be at the option of persons of taste and genius, to run the parallel agreeably to their own fancies. All the five sorts of Frontignac grapes, are proper to add an excellency of flavor to other kinds; but there is a superior richness in the black, blue and red Frontignacs, and they do not partake so much of the strong Muscat flavor as the white and grizzily do. But it must be considered, that the blue Frontignac grows close upon the bunch; and, therefore, is only proper to be coupled with the loose-growing kinds that have long foot stalks. The white Muscat of Alexandria

* For wine, close growing grapes, are those which give the biggest crops; none but small vintage can be expected from the others.

“ produces large loose growing bunches; and
“ the berries being very large and well flavoured,
“ it must be a proper kind to couple with many
“ other sorts.

“ There is a peculiar delicacy in the flesh of
“ the white Sweetwater: it is also a remarkably
“ thin skinned grape, with large berries; conse-
“ quently it is a proper kind to couple with vari-
“ ous sorts that are small and less delicate.
“ Were the red Frontignac and white Sweet-
“ water wedded together, their union, would
“ probably produce a very valuable, sort as
“ there would be a good chance of its being
“ both large and delicate, and well flavoured.

“ The Syrian vine is only admired for produ-
“ cing most astonishingly large bunches, of
“ which one was produced at Welbeck that
“ weighed 19 pounds and a half. And, there-
“ fore, I would not advise the joining this coarse
“ sort to any other, except the following; as, in
“ all likelihood the offspring would only pro-
“ duce bunches much less ponderous. But the
“ white Muscat of Alexandria, having large
“ berries and longer foot stalks, there would be
“ a probability of producing a kind between
“ this and the Syrian grape, that would ex-
“ ceed the original parents both in size and

“flavour. Although the black Hamburg is a
“thick-skinned with coarse flesh; yet it has
“many good properties: It is a fine vigorous
“growing Vine, that will stand forcing, and is
“a very plentiful bearer. The bunches too are
“generally large, and furnished with well sized
“berries of a tolerable flavour. These, again,
“having long foot stalks, do not want much
“thinning; and therefore are not liable to de-
“cay, as is the case with most close-growing
“kinds. If this sort were to be coupled either
“with white Frontignac or Sweetwater,
“there is great reason to suppose that the
“offspring would be an improved kind. The
“following kinds also admit of a junction with
“great propriety, viz the black Damascus,
“and grizzily Frontignac—the white Muscat
“of Alexandria, and white Sweetwater—the
“black Frontignac and white Muscadine,—
“the St. Peter’s grape and white Muscat of
“Alexandria. It is probable that some of the
“foregoing advantages may be gained by an
“alliance between various other kinds, but I
“shall forbear to recite any further examples,
“enough having already been said on this sub-
“ject to stimulate persons of taste and curi-
“osity, to pursue an amusement that, one may

“venture to pronounce, will contribute both to
“their advantage and pleasure.

“It is evident that the present very extensive
“variety of valuable kinds of grapes have been
“obtained from seed, either sown by hand and
“raised with care, or from seed accidentally let
“fall by birds, or by other chances, whilst the
“grapes continued in their wild state. I shall
“go so far, on this occasion, as to predict that
“the best sort of grapes hitherto known, will,
“at some future day, be esteemed only as se-
“condary or inferior kinds. Since we know that
“the collection of goosberries have been im-
“proved by seed, within the space of a few
“years to a most astonishing degree; and with
“public encouragement, as much may be done
“in the list of Vines. This I can aver, that
“the method of raising seedling plants, is
“neither uncertain nor difficult, as seeds from
“grapes, perfectly ripe, will vegetate with the
“utmost facility and certainty. In this place
“it will be necessary to observe, that the branch-
“es entwined together should be separated as
“soon as the farina has fallen, and the grapes
“begin to swell; since the important parts of
“fructification have then performed the office
“for which nature intended them, viz. the pro-

“pogation and increase of the species. The
“grapes for seed should be permitted to remain
“on the plant till they are perfectly ripe, as the
“seed is not till then quite matured, when it
“generally is of a very dark-brown colour. As
“soon as the seed is taken from the pulp, or
“flesh of the grape, it should be laid on a sheet
“of paper, or the like, in some airy, but shady
“place, to dry, and then carefully preserved till
“spring. If, however, the seed were to be im-
“mediately sown, and the pots kept in the Hot-
“house, and moderate watering given them du-
“ring the winter, the plants would rise and
“come up in the spring: But the great dis-
“advantage attending this method, is, that
“the plants would be liable to come forward
“too early, and of course come weak. For
“although the seed would lie dormant during
“the winter, notwithstanding the artificial
“warmth of the Hot house; yet as soon as the
“days began to increase, and the sun to regain
“his force, the genial warmth of his rays will
“soon, and, perhaps, too soon, bring them up.
“It will, therefore I think, to be the most eli-
“gible to sow the seeds about the end of Febru-
“ary, or the beginning of March. For this pur-
“pose, let small pots be filled with very light,

“ rich, sandy mould ; into each pot put eight or
“ ten seeds ; lay them at regular distances, and
“ press them into the mould with your finger to
“ the depth of half an inch ; then fill up the
“ holes, and make the surface of the mould
“ smooth and even.

“ The pots should be plunged either in the
“ tan bed in the hot house, or in a temperate hot
“ bed ; for a moderate warmth will, at that sea-
“ son of the year, soon cause the seeds to vege-
“ tate. As soon as the plants appear, they will
“ require from time to time, gentle sprinklings of
“ water ; but this must be given them very spa-
“ ringly, especially during the time they remain
“ in that state : and, should the weather prove
“ either gloomy or rainy at that juncture, let the
“ water be entirely omitted. When the plants
“ have so far advanced as to have three or four
“ joints a piece, they must be carefully shaken
“ out and planted each in a separate pot, filled
“ with the same kind of mould as was before
“ recommended. The greatest care will be re-
“ quired in the performance of the above opera-
“ tion, as it will be beneficial to preserve as
“ much of the roots as possible. When the
“ plants again are placed in the tan, or the hot
“ bed, a gentle sprinkling of water should be

“given them; thenceforward they may be treated exactly in the same manner as will be recommended hereafter for plants raised from cuttings.

“I shall go on, therefore, to observe, that it would not be prudent to furnish a wall or any part of a hot house, with seedling vines in their untried state, or before they have produced fruit. For although the prospect of obtaining good kinds from the seed saved in a hot house, be more promising and certain than that of getting them from seed of grapes in vine countries (because, there when the vines flower, the very air is impregnated with the *farina* of the grapes of the vineyard, which are generally of sorts only esteemed for making wine; but in a hot house the best eating grapes are only planted): yet many of the new kinds from seed will prove to be a worse sort than the originals from which the seed was saved. A specimen, therefore, of the fruit, should be obtained from each plant, be tried and tasted, before it be permitted to be planted against the walls, or transferred into the hot house. Hence you see it will be proper to keep the plants until they are three or four years old, before you dispose of them either on the wall

or in the hot house; and then, if they be managed as will be hereafter directed, they will produce the fruit you like and approve, and with the greatest certainty.

I never had the chance of trying Speechely's experiment; but it is worth the attention of wealthy citizens who have a green-house, and I respectfully solicit all of them to make the trial. Let them have two or three of the best grapes in their green houses, to operate the crossing of the breed as aforesaid, and have always a number of seeds growing, and the next spring take the young plants out of the pot, and plant them in an open vineyard, or even (to save labor) by the side of a young tree, on which it may be suffered to climb at liberty, to try its character; for I am doubtful that a great many of those young vines raised in a hot house, will not be hardy enough to bear our climate. But, among a great number of vines, some few may be found to answer. It is not necessary that the vines should be planted within the house: they may stand out side, and be brought in by an aperture and trained along the frame which supports the sashes and the ceiling, and along the top of the back wall; or otherwise, where they are not in the way of other plants;

provided; they get full light, they will succeed, and be an ornament to the place. Plants in a green house must be constructed differently from those out of doors—As I never owned one, I am not able to give the necessary details of such nursing; any one able to have a green or hot house, must have either that knowledge himself to conduct it, or keep a gardener who knows his trade: or be provided with Speechely's treatise.

CHAPTER V.

Of the immense number of grapes—Species of grapes existing in the world—Collection at Paris—What constitute the character of a species—Size of bunches—The most prolific sort—English nomenclators admired—Speechely's description of grapes.

The number of the different species of grapes now existing is immense, each country has some of its own kind. The French government, since the revolution, have ordered, that a collection of all the species cultivated through the whole of their dominions, should be made in one of the public gardens at Paris: I saw that immense collection soon after its establishment. It will be of great benefit to France: it will give birth to the knowledge of the best grapes, both as to quality and productiveness, and of the best way of cultivating and training them as well as to economize labour, as to obtain the most plentiful vintage. It must also become the grand store house to furnish grape vines of all kinds growing in the world, to any

man of any country,—and will fix the nomenclature of that precious fruit. The colour of the grapes constitutes one of the most distinguishable characters among them. The black, or deep blue, the brick red, the gray or white with russet spots, the white, the green, and the yellow are the predominant colours. The shape of the bunches and of the berrie, serve also to make a subdivision: Likewise the softness, or the firmness of the pulp or flesh, makes all colours into two divisions, the soft and the cracking; the berries of the former cannot be opened without the juice's running; and the other, a berry, may be split, and no juice will run.

Some sorts have their bunches made up of several other bunches, or branches, as if they had shoulders, and others are a single stem; in some, the berries are so crowded, as to take their form from that circumstance, while others have their berries very loose: Some again produce small bunches and others large ones. The largest bunch I have seen, was of the Syrian kind, and weighed six pounds. But, we have before noted one produced in England, and weighing nineteen and a half pounds, and Hue-tius speaks of bunches growing in the Islands of the Archipelago, to the enormous size of from

thirty six to forty pounds, probably of the same kind; and of that sort which the Spies sent by Moses into Syria, brought back to the Jews. The biggest bunches of the Cape grapes weigh about one pound; so, probably, might the Maderia, where it would best succeed. The Burgundy grape, called the Miller, on account of a white dust or down, which covers the young leaves, is a good deal smaller yet. The most prolific species that I know, is the one nursed in *Canton of Vaud* before spoken of; its bunches often weigh three pounds. It is of that kind of the Sweetwater which is whitish-green, with russet toward the sun when ripe, and the flesh firm and cracking; nevertheless so juicy, that, six pounds of grapes give five of clear juice.

Chaptal, in the *Dictionary* of agriculture of l'Abbe Rozier, gives the description of a great many of the French grapes; and Speechely, the aforesaid English gardener, describes fifty of the best kinds for table use, and I cannot do better than to give here the copy of what he says on that head;—preserving, as better adopted to this country, the English nomenclature of grapes. Although the greatest part of the English grapes is of French extraction. But they have also a great many from all other parts of

the world, where they trade. If the climate of this country should undergo a favorable change, so that it may be more congenial to imported grapes, as I hope it will; we have the same chance as the English to procure good vines from any part of the world, and it would be proper to have the same name given in all parts, where the same language is spoken, to the same grape. The many different names given to the same grapes throughout France, and the confusion caused by it to the scientific part of the community, has been one of the reasons to engage the government of that country, to establish the collection spoken of;—therefore there is little to learn by this description, until we have the one which is to be made of that collection. It is also in favour of those who may chance to live in some part of the country, where the climate, or the soil, would answer better to the rearing of different species, than it does in other places I have seen, that I give here the English description of grapes: Or, for those who may take the pleasure to raise some grape vines in a Green or Hot house, for I fancy any kind would do there.

It is the English author who speaks.

“I have, for a long series of years, exerted

"my utmost endeavours in obtaining different
 "varieties of grapes from various parts of the
 "globe; and I flatter myself, that many of the
 "sorts will be deemed real acquisitions to this
 "country. I shall not however enumerate all
 "the varieties that compose the list of grapes
 "now growing at Welbeck, (which consist of
 "above one hundred sorts) and some of them
 "have not yet fruit; and many others are es-
 "teemed only on account of being proper for
 "making wine. Some of the sorts, moreover,
 "are so much alike, that no distinct difference
 "of species can easily be discovered. The
 "following sorts, however, appear to be distinct
 "species; and among them, are grapes of the
 "first and best quality. (||)

|| 1. *White Muscat of Alexandria.* *

"The berries of this species are large and
 "oval; and when perfectly ripe, are of a
 "fine amber colour. The skin is thick, and the
 "flesh, or pulp, hard, and not very juicy, but of
 "a high musky flavour; the berries hang loosely,
 "and compose long well formed bunches.

"This grape is in great estimation, and is at

(||) An Asterisk (*) marks the proper sorts for a hothouse. A dagger (†) for a Vinery. A double dagger (‡) for a common Wall.

“present more generally planted in hot houses than any other sort.*

2. *Black Damascus.*

“The berries of this species are large round, and of a fine black colour; the skin thin, the flesh delicate, rich, juicy, and of an exquisite flavour. The same bunch commonly consists of berries of different sizes: The small berries are without stones, and the large contain only one in each berry. This, although a late grape, is a most excellent and a very valuable sort.*

3. *Black Grape from Tripoli.*

“This grape seems nearly allied to the former species; but the bunches are always composed of large berries of an equal size, and with one stone in each. This circumstance of berries being equal in size renders the bunches of a more agreeable appearance. The foliage in both is exceedingly beautiful in the autumn, and very similar. This may be reckoned a truly valuable grape.*

4. *Aleppo grape.*

“This is a middle sized roundish grape, with a thin skin, and delicate, juicy flesh, of an exquisite vinous flavour. The colour is commonly very various. I have seen on the same

“bunch some berries quite white, others entirely black: But what appears most remarkable, is, that the colours do not intermix, but are divided by straight lines, as if painted. The leaves of this sort are, in the autumn, very curiously striped, with red, green, and yellow, something similar to the Aleppo lettuce.*†

5. *Lecour or Morocco grape.*

“This is a very large grape of a red colour, and of an oval figure, somewhat irregularly formed: The berries hang rather loosely on the bunches which are pretty large. This noble grape is but little known in this country.*

6. *Red grape from Syracuse.*

“This species produces large berries, in figure somewhat in the shape of a heart, and of a tawny grizzily colour. The bunches are often composed of unequally sized berries, some of them being exceedingly large; these never contain more than one stone a piece, and the lesser sized berries are always without stones; the foot stalks of the berries are short, and singularly large, differing from most other sorts. This is a much esteemed grape, and is very scarce.*

7. *Golden Gallician.*

"The berries of this species are large, and
"of an oval figure; the flesh hard, but of a
"tolerable flavour; these, together with the
"foot stalks are of a light yellow colour.*

8. *Black Muscadel.*

"Of this species the berries are large, oval
"and of a black colour; the skin thin, with a
"delicate juicy flesh; the same bunch con-
"tains berries of different sizes, some of them
"large and long, but somewhat compressed and
"flat at the ends. The leaves of this grape
"change in autumn to a beautiful scarlet.*

9. *Red Muscadel.*

"The berries of this sort are large, oval and
"of a beautiful red colour; the skin is thick
"and the flesh hard, something like the raisin
"grape. The bunches frequently weigh six or
"seven pounds, and are most elegantly formed
"of an equal size. This is one of the latest
"grapes. The leaves change in autumn to a
"beautiful red and green.*

10. *White grape from Alcobaca.*

"This has a large oval white berry, with a
"thin skin and juicy flesh. This species, with
"many others, was sent from Portugal.*

11. *White Frontignac.*

"The berries of this species are round, of
"a moderate size, and of a greenish yellow,
"and compose longer shouldered branches.*††

12. *Grizzily Frontignac.*

"The berries of this grape are somewhat
"larger than the former, are round and their
"colour brown and red intermixed with yel-
"low, both these sorts of grapes possess a high,
"musky, perfumed flavour.*†

13. *Black or Purple Frontignac.*

"The berries of this species are black; but,
"when produced under glass, are generally of
"a dark purple colour, are moderately large,
"round and a most excellent flavour; they
"compose very long bunches; this has been
"hitherto generally called the red Frontignac,
"and is one of the very best grapes. I had it
"from the Cape of Good Hope, by the name of
"black Constantia.*†

14. *Blue or Violet Frontignac.*

"This has a small black berry, powdered
"with a fine blue or violet bloom, and is of an
"exalted vinous flavor; the berries grow close
"upon the bunches, which are very small; this
"is commonly called the black Frontignac but
"the French name it Muscat Violet.††

15. *Red Frontignac.*

“The berries of this fruit are of a moderate size. I must beg leave to observe, that I have only seen two or three bunches of this grape, produced here last summer, from a plant (which came from France the preceding year,) growing in a pot about a foot diameter. It is undoubtedly the true Red Frontignac, which has induced me to change the name of the foregoing species. †

16. *White Sweetwater.*

X “This is a very large, round, white grape; the berries grow close on the bunch, which is of a moderate size, and are replete with an agreeable juice; the skin and flesh of this grape are more delicate than of any other sort; in some situations, the berries on the sides of the bunches, next the sun, are clouded with spots of a russet colour, and they are generally most admirable; this grape is propagated in the forcing houses in Holland, in preference to any other sort. It is, by the Dutch, called Parel druif.* ††

17. *Black Sweetwater.*

X “The berries of this species are much smaller than the former; are black, grow in small short close bunches, and are replete with a

very sweet juice. The skin being thin, and very subject to crack, it is improper for a hot house.††

18. *Black Hamburgh.*(||)

"The berries of this species are large, inclining to an oval figure, and of a black colour; they hang loosely on the bunch, and compose well formed handsome bunches. The skin is thick, and the pulp hard; but notwithstanding these defects, it is a very valuable grape, being well flavoured, and a plentiful bearer.*†

19. *Red Hamburgh.*

"The berries of this sort are of a dark red, with thin skin and juicy delicate flesh; the size and figure of both the berry and bunch are nearly like the former; it is sometimes called the Gibraltar grape.*†

20. *White Hamburgh.*

"This has an oval berry, with a thick skin, and hard flesh. As this species is a very plentiful bearer and forms large bunches, it is much admired by some; but is not so valuable as either of the two preceding kinds. It is sometimes called the Portugal grape.*

(||) This is the grape whose description comes the nearest to the Cape grapes.

21. *Malvoisie.*

“The berries of this species are small, rather
“inclining to an oval figure, and of a brown
“colour; the skin is thin and the flesh delicate,
“replete with a vinous juice.” As the berries
“are powdered with a blue bloom, it is some-
“times called the Blue Tokay.*†

22. *Genuine Tokay.*

“This is a white grape: the berries incline to
“an oval figure, and grow rather close on the
“bunch, which is of a moderate size. The
“skin is thin, and flesh delicate, abounding with
“a very agreeable juice. This species is very
distinguishable by the foliage; the underside
“of the leaf being covered with a fine soft
“down, having the appearance of satin; this
“species was sent to the Duke of Portland,
“from Hungary, some years ago.*†

23. *Lombardy.*

“This has a large berry, inclining to an oval
“figure, of a beautiful flame colour. The bun-
“ches are regularly formed with shoulders, and
“frequently attain the weight of six or seven
“pounds, the leaves are much more divided
“than most other sorts, and the upper surface
“is of a dark green colour. This is by some

"called the Rhenish grape, and by others the
 "Flame coloured Tokay.*†

24. *Smȳrna Grape.*

"This is a large red coloured berry, of an oval
 "figure, with a thin skin, and delicate juicy
 "flesh. It forms long bunches with shoulders
 "loosely connected. The leaves in autumn
 "die with purple edges; this is a good grape,
 "though but little known in this country.*†

25. *Brick grape.*

"The berries of this species are small, in-
 "clined to an oval figure, and of a pale red or
 "brick colour; they grow close on the bunch,
 "which is very small; this is a sweet grape, but
 "not much esteemed.††

26. *Black Spanish, or Alicant.*

"The berries of this species of grapes, incli-
 "ne to an oval shape, are moderately large,
 "and black, and form exceeding long unshoul-
 "dered bunches. The flesh is soft, juicy, of an
 "agreeable flavour. The leaves in autumn
 "are beautifully variegated with red, green and
 "yellow; this is a pretty good fruit, and is some-
 "times called the Lombardy grape.

27. *White Muscadine, or Chasselas.*

"This has a round white berry, is moderately
 "large, with a thin skin, and delicate juicy

“flesh; the bunch is well formed, and of a pretty
 “good size; this species is generally propaga-
 “ted against common walls; and as the fruit is
 “constantly eaten before it is well matured, it is
 “rather in disrepute: But still, when well per-
 “fected, it is an excellent fine grape; the same
 “observation might have been made on the
 “White Sweetwater with equal propriety.*††

28. *Black Muscadine.*

“The berries and bunches of this species are
 “both somewhat smaller than those of the pre-
 “ceding; this is a very prolific grape, and
 “makes a fine appearance on account of the
 “black berries being powdered with a blueish
 “bloom: but the flesh is not so delicate and
 “juicy as the former. I procured a plant of this
 “grape from Holland, by the name of Franken-
 “dale.*†

29. *Royal Muscadine, or Darboyce.*

“This has a round white berry of a moderate
 “size, a thin skin, and a juicy soft flesh; the
 “bunches are generally exceedingly large,
 “sometimes attaining the weight of six or seven
 “pounds. This species is very distinguishable
 “by the wood and foliage, commonly growing
 “remarkably gross and strong.*†

30. *Malmay Muscadine.*

"This seems nearly allied to the preceding;
 "but the bunches and berries are somewhat
 "smaller, and the juice of a higher flavour, be-
 "ing remarkably sweet. However as I have
 "only seen the fruit of this sort from a plant
 "growing in a pot, an allowance for the size of
 "the bunches should be made.*†

31. *Claret grape.*

"The berries of this species are small, black,
 "and inclining to an oval figure; they grow
 "close, and form small bunches. The juice
 "is of a blood red colour, it may be considered
 "rather as an agreeable delicate fruit. The
 "leaves change from green to a russet red early
 "in summer, and die a deep red in autumn.*†

32. *Syrian grape.*

"The berries are white, large, and near an oval
 "figure, the skin is thick and the flesh firm and
 "hard; the bunches well formed, and commonly
 "large. Now, though this is generally consid-
 "ered as a coarse fruit, it has properties that
 "ought to introduce it into every large collec-
 "tion, and especially the hot house. It is very
 "prolific, and the bunches commonly grow very
 "large, making a most noble appearance; and,
 "when well perfected, may be called a very

“eatable fruit, to which I may add, that they
 “may without difficulty, be kept many weeks
 “longer than any other sort. I have often had
 “them in good perfection in the month of Janu-
 “ary, and sometimes even in February*.

33. *Miller's Burgundy.*

“The berries are small, rather inclining to an
 “oval figure; are black, and grow close on the
 “bunch, which is commonly short and small;
 “the skin and flesh are delicate, possessing a
 “sweet and pleasant juice; the leaves are dis-
 “tinguishable from most others by a hoary
 “down, especially when young, being then
 “almost white.††

34. *Small Black Cluster.*

“The berries and bunches of this species are
 “little different from the former; but the leaves
 “have less down, and are somewhat smaller;
 “this is a delicate sweet fruit, and is sometimes
 “called the Burgundy grape.

35. *Large Black Cluster.*

“The berries of this are large, and grow
 “more oval than the two former species; are
 “black and not so delicate, the juice being of
 “a harsh and rough taste; the leaves in au-
 “tumn when dying, are of a beautiful bright
 “scarlet; this species was sent me from Lis-

"bon, and I was assured it is the identical grape
"of which red Port wine is made.†

36. *White Morillon.*

"This has an oval white berry, of a moder-
"ate size, with thin skin and delicate juicy
"flesh. It grows close on the bunches, which
"are small; the leaves are soft, being greatly
"covered with down on the underside, some-
"thing similar to the genuine Tokay grape, to
"which it appears nearly allied.

37. *Early Black July grape.*

"This has a small black round berry; the bun-
"ches also are small, but it is a prolific bearer,
"and comes to the table at an early season even
"without fire heat.††

38. *Cat's grape.*

"This has a small oval berry, of a greenish
"white colour, with a thin skin and soft juicy
"flesh; the berries grow close, forming small
"bunches; the taste of this fruit, before it is
"quite matured, is exceedingly disagreeable;
"but when perfectly ripe, is very sweet and
"pleasing to some palates.*†

39. *Black Raisin grape.*

"The berries of this species are large, oval,
"and black; with a thick skin, and hard firm
"flesh; it forms long handsome bunches.*

40. *White Raisins.*

“The properties of this grape are nearly similar to the preceding, but the berries are white.*

41. *Damson grape.*

“The berries of this species are very large, oval, and of a beautiful purple colour; they grow loose on the bunch, which is large; the leaves of this grape are large, and more thick and succulent than those of any other, and have something of the appearance of green leather.*

42. *Early white grape from Teneriffe.*

“The berries of this species are round, white, and of a moderate size; with thin skins, and delicate juicy flesh of an extraordinary sweetness; the berries and bunches much resemble the common Muscadine to which it appears to have a near affinity.††

43. *St. Peter's grape.*

“This has a large berry, nearly globular in figure, and of a black colour: the skin is thin, and the flesh very delicate and juicy; this vine produces large bunches, but as the berries are very subject to crack, it is not generally planted in forcing houses; the leaves are much more divided than most other sorts.‡

44. *Black grape from Palestine.*

"This appears nearly similar to the preceding. But I have never yet seen but two bunches of this grape, which were the production of a plant that was growing last summer in a pot, and engrafted last spring; and though its situation was in the hot house, not a single berry cracked in either of the bunches; it may probably, therefore, be a distinct species.*†

45. *White Parsley-leaved grape, or Ciotat.* x

"This is a species of parsley-leaved grape. The berries are round, white, of a moderate size, with thin skins, and delicate juicy flesh, very sweet, but not a vinous flavour; the bunches are of a pretty good size, almost similar to the Muscadine; the leaves are finely divided, differing from any other sorts; there is a species of the parsley-leaved grape which produce red berries.†

46. *Black Lisbon.*

"This has a large globular berry, black, thin skined, and juicy; it has also large shouldered bunches, which not a little resemble the black Hamburg. It is a pretty good grape but scarce in this country†*.

47. *Greek grape.*

"The berries of this species are of a moderate size, rather inclining to an oval figure, have a blueish-white colour, and grow close; forming moderate sized handsome bunches, the leaves grow on very short foot stalks, and bear a resemblance to those of the Sweet-water. It is a delicate and justly esteemed fruit.

48. *White Corinth grape.*

"This has rather a small white round berry, with a thin skin, and very delicate juicy flesh, of an agreeable flavor; the bunches too, are rather small; the berries, when perfectly ripe, are transparent, so that the seeds appear very distinctly.†

49. *White Muscat, from Lunel.*

"The berries of this species are large and oval, and when perfectly ripe, of a fine amber colour, sometimes clouded with brown or russet, especially on the side next the sun; the skin is thin, and the flesh delicate, replete with vinous juice. As this grape is a very plentiful bearer, and forms pretty large bunches, it may justly be deemed a valuable sort, though at present but little known in this country.

50. *Cornishon.*

"This is a remarkable formed grape; the berries are above one inch and a half long, their breadth not half an inch; they taper from the stalk, (but not in a regular manner,) and end in a blunt point, according to the French, something like a horn: But its figure is more like the long end of a small fish's bladder; the berries are white, with a little thick skin, and a firm, sweet flesh.* I might add to the foregoing list; two or three seedling grapes that have borne fruit; one of them is the product of the black Frontignac, impregnated by the white Sweetwater, and may be considered as a valuable sort; the berries are black, like its parent, but the bunches are composed of unequally sized berries like the Sweetwater, and ripe early in the season."

I expect the above description of the different sorts of the best grapes that are growing in Europe, will satisfy the most inquisitive of my readers on that head; otherwise it is rather useless to describe fruit that we are threatened never to be able to get in this country, except in houses.

CHAPTER VI

Wild grapes—Several species—Different plants from the viniferous sort—Not willing to nourish grafts of imported grapes—Nature making the birds her agents to create new varieties—Men may help nature—Means employed by her to sow her fields—What is left to man, perishes without his unremitting care.

THERE are several species of wild grapes growing in the United States almost every where; and all those I have met with, are a tree or plant different from the vines yielding wine: although they seem to be of the same family, almost every part in them being similar; yet they differ in the very thing on which the father of modern botany, the famous LINNEUS, established his classification of the plants, the organs of the sexes in the blossom, which are, as I have already said, the male on one plant, and the female on the other. I have another inducement to believe, that they must be of a different family from the cultivated vines. I made a hundred attempts to have several species of the last sort grafted on wild

ones, but without success: and I here beg leave to ask any gentleman who may think he has a tame vine growing on the root of a wild one, to make a particular inspection of the seams, or place where the re-union of both woods has been made—for if the graft has been inserted into the wild vine, only half an inch below the surface of the ground, the sap running from the wound of the wild vine, will give such a watering to the scion put there as a graft, that it will strike freely its own roots and branches, and grow independent of the wild root, but will not unite with it: if it is not inspected, it seems a good growing graft. I made also hundreds of grafts, one sort on the other, of the cultivated vines, in every way I could imagine, and they have grown very freely, although I was rubbing off all the roots as they were shooting. I have found in many parts of Europe, as I have said before, several species of the wild grapes of America growing wild there; but I have seen there, also, wild vines of the same kind as the cultivated. Since several birds are eating grapes in our vineyards, it is no wonder if some of them which have been sown by the birds, are found growing in hedges and bushes: And since there are vines yielding wine, grow-

ing in the gardens of our cities, it would be more to be wondered at, if none of those sorts should be found growing wild in the neighborhood, or even at a great distance. A black-bird or a wood-picker, eating a berry of the Sweetwater, in a garden at New-York, or one of the Cape grapes at Spring-mill, may travel hundreds of miles before he sows the seed of it; and we may naturally foresee, that the number of wild grapes having some similarity to the European sorts, must increase gradually; and if nobody in America should undertake to create new varieties, by the arts already mentioned, nature will do it, but will take her own time—and centuries are but short periods to her; while, by art, a new variety that would answer every purpose, may be got, by the first man who will undertake it. If we look with some attention into the laws of nature, we soon discover, that that esculent meat, grows round the seeds of a great many fruits, is intended by nature, not to be altogether the property of man, who, however, wisely took advantage of it, but of which the superficial man proudly exclaims, the whole is made exclusively for me; while, in fact, the object of nature is altogether the propagation of the species, and the sowing

of her field. To some seed, she gives wings, to make the wind her agent; and to some others, hooks, to put the travellers at contribution; and to most of those esculent fruits, the seeds are shaped to escape easily the action of the teeth, that they may be swallowed unbroken; in which state, they are indigestible, and some of them seem to be incorruptible.

The honey-locust seed, which may stay several years in the ground without sprouting, rises immediately where it is dropped from the cow, which has eaten the pods, in which nature puts a sort of honey to entice her to eat them.—

Squirrels are also her hands to plant almost all sorts of nuts, by their instinct of secreting them into the ground for future provision. The object of nature is, that her immense field, the whole world, be sown with all her seeds. The plants that have been given to man, for him to take care of, to be his exclusive property, are found no where else but in his field: such as corn, wheat, &c. and seem to be forgotten by nature; they are soon smothered and killed by weeds, if not rescued from them by the industry of man:—thus, teaching us plainly the obligation our Creator has imposed on us, to work.

CHAPTER VII

Different vineyards seen in Europe—and how managed—How reared—Old Hoc—Vines as far north on the Rhine as Boon—Champagne Vines, Wines & Grapes—Franche compte—Their mode of training thought awkward—Same way at Madeira, besides watering the Vines, as it is done in part of Swisserland and in New Mexico, as report says—Lionais vines—Lower down the Rhone no stakes to their Vines, as in that beautiful level in Langedoc—Best country in France for vineyards—Their mode of planting—Grapes reared purposely to make brand—Pruning and ploughing there—Mode the best for dry countries—Vineyards along the Garonne, and in the vicinity of Bordeaux—Late Spring frost—Vines in a swamp below Bordeaux—Same near Calmar in Alsace, mode of pruning the one adopted herewith—A difference in the training—Hautins of Savoy.

IN my travels between Swisserland and America, I pursued a different route each time; while travelling, I saw most of the vine countries over all France; and, in a journey to Maastricht from Swisserland, I saw nearly all the

vineyards on the Rhine.—But as I could not land on the right shore of that river—being then the line between the contending powers of Europe—I had only a partial glimpse of those on the opposite bank, from the deck of the boat. That famous vineyard, where the most renowned wine, known in England by the name of Old Hock, is produced. From where the river Seine falls into the Rhine a little above Mentz, the Rhine runs about thirty miles, near a west course: then it turns to its wonted north course, and is bordered on the right bank by a gentle declivity facing the south, and covered with villages and vineyards in terraces with stone walls, (but not with lime and sand mortar, as in Swisserland) planted in rows at two and a half or three feet wide, and staked with stalks five feet long; the vines being kept pruned to three or four short horns or branches, six inches from the ground; and the shoots growing at the top of said horns, are regularly and handsomely tied to the stakes, and at pruning time all cut off but one to each horn; and that one cut down to one eye. Being in company on the boat, with some vine dressers of that side of the river, while we were floating along, I understood, that the grapes there, were a spe-

cies of the Sweetwater, or the same sort we used to cultivate in Swisserland, about thirty years ago,—an early kind, but of small increase; while on the opposite, or left shore of the river, they had a species called the Gouet or Gowet, very prolific, but, indifferent for wine. They told me, that the Hollanders used to buy the grapes of those vineyards and carry them to Holland, for which they often paid a French crown per gallon; while, on the left side, the wine sells for a few cents only—and, for fear, some of that cheap sort should be mixed, they keep as many Clerks, as they have carriers of the grapes, from the vineyard to the press, to have them overseen all the time. I had drank some of that wine at Rotterdam; and as I found it not answering its renown, I took a small bottle in my bag, of some I made in Swisserland; when I came to Maestrickt, and at Mentz, I called for a bottle of Old Hock, for which I had to pay one French crown, and compared it with my own, which was found to be nearly of the same quality, but much better and stronger, although only 10 months old, and carried three hundred miles in the hottest of the summer, in a pint bottle. If the navigation of the Rhine was as free as that of the Mississippi, the

Swiss, could furnish Holland with the best of Old Hock, for about the fifth of the price, but the Powers who rule along the Rhine, keep that market for their own subjects; there are vines along the Rhine as far north as the Boon. About Paris, and a part of Burgundy, the vines are kept much like those on the Rhine, which is also the way along the Lake of Geneva, except, that many of them are not in rows, but all over as if sown broad cast, about one plant on each square yard; it is chiefly, red wine which they make. In Champagne, they have found a way to make a frothy white wine with black grapes; of which the Russians are fond, and procure a good market for that country, which otherwise would be but dull—their wine being much tartarized, and weak, if made in the common way. In Franche Comte, the vines are kept quite differently: they keep no stakes, but have small poles set horizontally about two feet from the ground, resting on forks provided for the purpose, and often on the forks of strong vines. The vines are trained along these poles, on which there is a spur or horn left every eight or ten inches, and very short. The new shoots grow at random; and, when they are one or two feet long,

the vineyard looks like a field sown with vines, to the leaves of which nothing is done. The vinedresser has to creep under, to keep the weeds down. All the grapes are hanging underneath in the shade. I could not for a moment, approve of that mode of training vines, particularly in a country so far north as Franche Compté. At Saline, there is a large vineyard on the side of a high and steep hill, facing due north, which is trained that way. I thought the grapes had not the chance of the sun, and I took it to be the cause of their vintage being always small, compared with ours in Swisserland; but I found afterwards that the fault lay in the kind of grapes they are nursing, and that way of training their vines suits their north climate, I shall speak more of it. I read somewhere that at Madeira, the vines are trained mostly in the same way; but there they do not pretend to plant a vineyard, if they have not some water or rivulet at their command, for watering their vines in summer if needed. There is some place in the Canton of Valey, among the glaciers of Swisserland, where they also water their vineyards with great advantage. And I think I have been told that the Spaniards who cultivate the grape

on the shore of the Rio Grande, in New Mexico, do also water their vineyards. But, I know not of any other place, where it is done. *It ought to be tried in this country where they have situations fit for it; for they are but few in the United States.* In the Lyonois, along the Rhone, the vines are kept much after the practice of the Rhine; as to the pruning; and the terraces with dry stone walls, except they are not in rows; but, in going down the Rhone, as soon as the *Cottéroties* are passed, there is no more states to be seen: and in Languedoc, to the west of the hills, which border the Rhone, there lies that beautiful and fertile level, in which are seated, Nimes, Montpellier, Lunell, &c. the best part in France, for the vine, and the olive.—There, the vines are planted in regular rows, at five and a fourth to six feet distance, each way; one way parallel to the meridian, and the other to the equator. They raise a quantity of white Muscat, and make sweet white wine that sells very high, but do not produce as much as another sort, a black grape that they call Tarell, which they raise abundantly to make brandy with; the wine made from those grapes, abounds so much in spirit, that it yields in the distillation, one third of

good brandy, as the vine dressers told me, when I passed through that country. The vines are kept low, about ten inches high, with four horns, or short branches to each plant, regularly, forking all at once from the stem, making a beautiful cross to the same height; to which, only one shoot has been left, and that one cut down yearly to the two lowermost eyes. They plough cross ways among the vines with oxen yoked to a long yoke, that they may pass both sides of the vines. They have no stakes, nor do they do any thing towards budding or sukering. When the shoots become very long, they lodge on the ground and entangle so much, one with another, that, at the vintage, they are obliged to open a path with the hatchet, to carry the grapes out of the vineyard. The women who gather them, have to hop among them as they can. About Lunell, they have the vines planted nearer, and they work the ground with the spade, it not being so gravelly as the rest of the country; which, indeed, is little else than a bed of gravel. Their mode of planting, pruning, and working the ground with the plough, would have been the one I should have adopted here; for it is the cheapest way. But our ground is too much subject to weeds. As they are obli-

ged to quit ploughing, and even hewing, after the middle of June, on account of the quantity and the length of the shoots which entangle and cover the ground, and which would be hurt, if disturbed. That mode suits the dryness of their ground and of their climate, which will not allow weeds to grow much in the summer, since very little rain ever falls there in that season, and will permit the grapes—of which a great many lodge on the ground—to ripe, without rotting, as would be assuredly the case here in our damp and weed-generating ground. But where the soil is thus dry, and the rain so scarce in the summer, that few weeds would grow after the middle of June, I would advise that mode of rearing the grape vines; it is the cheapest and the better way, the grapes hang near to the ground, will then ripen the sooner, provided they do not rot before ripening. The saving of the stakes alone, makes a difference of about twenty nine dollars per acre,—even here, where the wood is so very plenty. The pine hills of Alabama, would very probably admit that mode of cultivating the vines. Along the Garonne, from Toulouse to Bordeaux, the vines cover almost all the upper land to the right of the river; they are com-

monly planted in rows, about four feet apart, up and down the hill, the vines being very irregularly pruned, some as high as three feet from the ground, and some other at eight inches only, having from four to six, and even eight horns or branches at different heights, to which one shoot is left at the pruning, cut to two or three eyes, and to strong plants, they leave one shoot eighteen inches or two feet long, and bend it down in a curve and tie the end to the main stem; they pull off all the young shoots which show no grapes, and tie to a stake all the others, when long enough, or about the time the grapes are in bloom, and work the ground by hands with a hook. Their vineyards are planted with a mixture of a great many sort of grapes, white, red, and black, which causes them to run over the ground several times, to make the vintage. In a great many of their vineyards, there is one row out of three missing; the interval is ploughed and sown with wheat, and between the two rows the ground is worked by hands. One of my acquaintance, living about twelve miles above Bordeaux, who had acquired his country seat only a few years before I paid him a visit, had rooted out the third row in most of his vineyards, which were

very extensive, and he told me that their fertility had been much increased by the operation, and the labor diminished. That country is very subject to late spring frosts, even as late as the sixteenth of May, which seems to be the very day that it freezes the most often; as that day is dedicated in the Calendar, to St. Ford, the common people think that it is that Saint who sends the frost, and call him, in derision, 'the last wine broker.' Below Bordeaux, about Rouan, I saw vines trained about the same way in the river bottoms, where it was subject to the overflowing of the river, and where it appeared to be marshy or swampy, but was cut by deep ditches, which then (in July) were half full of water. I have seen the like in Alsace, near Colmar, where the vines had grapes, from near the ground to six feet high; having been pruned in such a way as to have only a single horn or spur, on which two shoots are left—the one to reach the top of a six feet high stake, after being wound in a spiral around it, and the other cut down to the second or third eye to make a horn. The shoots coming out of the one, wound round the stake which bore the grapes, were pinched or nipped at the second or third leaf above the uppermost grape, and

grewed loose from the stake, and two shoots of what was growing from the horn, were carefully nursed, suckered, and tied to the ends of the bunched shoots, until they reached the top of the stake, looking as if a scarf had been thrown over the vines. At the next pruning, one of those long shoots was again wound round the stake, after the old one had been cut off, and the other cut down to the second or third eye as the year before. Those vineyards had a fine appearance, and must yield great vintages with some peculiar sort of grapes, but would require great attendance. If the top pinched shoots are not kept constantly suckered, the sap will all run there, and the lower shoots will remain weak. That way of pruning is the one I have adopted, because it is the most simple, with the difference of having the long shoot tied to the stake by the next plant in the row, instead of winding it up along its own stake. In Savoy, and in the Swiss Canton of Geneva, they have rows of the bush maple at about eight feet from one another, and the rows about twenty or thirty feet apart. By each maple, there are four vines, the stems of which are about two feet high. In pruning time, one or two shoots are left, with two eyes each, and

another one, long enough to reach a pin put across a post planted half way between the maple, where it is made fast, as there are four vines around each maple bush, and each one being trained the same way; there are two shoots tied to each end of the pin; the maple is yearly, at the same time, pruned down to about two feet higher than the vines; what sprouts from the long horizontal shoot, is pinched the second or third leaf above the fruit; and as the grapes begin to attain some size, their weight will bend the shoot downwards; in which case the sap receives a check, and both the wood of the vine and its leaves, are thus checked in their growth; while, in consequence, the fruit derives additional nutriment, and swells to a beautiful size. The sprouts from the short shoots or horn, will then be at liberty to climb up the maple bush, and its new shoots, to which, the sap prepared, to make wood, flows perpetually; because they stand upright, and make long and strong shoots, for repeating the same operation at the next pruning. After the one has been cut off, they call those vines *hautins*. The intervals between the rows are cultivated, and subject to the same culture and chance of crop, as any other of their fields.

CHAPTER VIII.

Lombardy Hautins on Mulberries—Wright's report on them and Baretti's on those in Spain—Quadrantal system of agriculture in Lombardy—Most all the land South of forty degrees may be fixed in the same way.—The rearing of silk—Extract from my travelling Journal through the silk countries—Advice on the nursing of silk worms—Probable proceeds of silk—New way to rear silk, proposed to industrious Ladies.

LOMBARDY, as I have said, by a great many of the husbandmen of that country, is nearly all covered with vines fixed in that way; except, in place of maple trees, they have mulberry trees; and by each tree there is two vines which have no branches, until they have passed one fork of the mulberry, where there is a pole reaching to its neighbour tree; along which, they train a vine from both sides, winding them one with the other after they meet, until both reach the other tree, and prune what grows on those vines, so that a spur, or horn, be established at every eight or ten inches, on which, only a shoot is left cut down to two or three

eyes, every year at the pruning time: when the pole is rotten, those entwined vines will make a sort of rope, strong enough to support themselves; and with the two or three young shoots with grapes on, growing from each horn, some downward, make the handsomest festoons. Wright speaks of them in his travels.—I here transcribe his own words:

“The country of Lombardy is perfectly flat, a rich soil, fine pastures and corn fields, abundance of Vines, and white Mulberry trees for the silk-worms; the vines running up the branches. This country is the finest we saw in Italy, unless you except the Champagne Felice about Naples.

“We observed few timber trees, only Elms and Poplars, which support the Vine branches as I observed before, of the Mulberry trees. The roads are very broad and even, and most pleasant travelling in the summer, but some of them deep enough in the winter: The hedges by the road side are many of them cut, and managed with a great deal of exactness. The vines run up the bodies of the trees, and intermix themselves with their branches; and hang in festoons between them along the road hedges. From those hedges,

“ there go rows of trees along the grounds, at
“ about forty or fifty yards distance from each
“ other; the vines all running up their bodies.
“ And, here, besides the festoons hanging from
“ tree to tree, the vine branches are extended
“ right and left, and fastened to a row of stakes
“ on each side, which run parallel to the trees:
“ And these stakes are so many pillars, support-
“ ing a sort of pent house, or oblique roof,
“ which is formed by the vine branches on each
“ side of the trees. Thus are the grounds dis-
“ posed and planted on both sides of the road,
“ and the trees with the vines, managed in this
“ sort of natural architecture, generally speak-
“ ing, all over Lombardy”

In Barretti's Travels, we read the following paragraph about vines on trees, in Spain,
“ I walked leisurely the best part of the way
“ from Molin de Rey to Barcelona; with a pros-
“ pect sufficiently fine, all around me, to put any
“ body in mind of the Elysian fields. It con-
“ sisted of an endless continuation of vines,
“ supported by mulberry trees, regularly plant-
“ ed; the vine branches so disposed as to form
“ rich festoons from one tree to another. I have
“ seen such festooned vineyards in some part of
“ Italy, especially in the Duchies of Mantua

“and Modena, with this only difference from
“the Catalonian fashion, that instead of mul-
“berry trees, the Modenese and Mantuan Vines
“are supported by elms. Think how rich Cat-
“alonian soil must be, that affords a nourish-
“ment not only to those vines and mulberry trees,
“but also, to the wheat that is sown under their
“shade! Nay, there are vineyards in this
“country, in which, after the corn crop, they get
“another of some other grain. What a delight-
“ful object to the eyes of the honest husband-
“man, to see so much fertility, come thus forth
“to reward his well spent labours!”

I got the following from the mouth of an intelligent farmer of Lombardy. The intervals between the rows of trees are kept under that rotary system of agriculture and of soiling the cattle, (that is now beginning to be introduced partially in some part of our country, and a little more in France, and much more among the rich in England, principally among the manors of the lords, when kept by themselves, but most generally in Swisserland, since twenty or thirty years,)—and, since time immemorial, all through Lombardy, where they commonly alternate one half in Luzerne, and the other half under the quadrenial or four years rota-

tion; clover followed by wheat, and the same year by corn; next year, all the manure of one year is put on that division, which is planted with plants that require hoeing, or working the ground in the summer, as for potatoes, cabbages, carrots, poppy for oil, &c. Hemp is also received in this division, and also turnips, as a second crop. Next year, spring grains, as barley, oats, and wheat, sown with the clover seed. The grain is reaped with high stubbles; and, in the autumn, a large cut of clover, of which the mixture of the stubbles facilitate a dessication for hay. This rotation, which gives commonly two crops a year, is continued until the Luzerne begins to grow weaker—suppose ten or twelve years, sooner or later, according to the quality of the soil, more or less suiting the Luzerne; then the Luzerne is ploughed up, and the part tilled until again sowed in Luzerne. A farm, thus managed, if properly and industriously attended to; by good dressings of both solid and liquid manure, (which the system of soiling the cattle will abundantly produce, and with the addition of plaister, ashes or lime,) the poorest ground will soon become very rich—so that, in thirty or forty years, it will be second for fertility to no other soil.—

Now, let us suppose all the countries south of the Ohio, particularly the pine-hills of Mississippi and Alabama States, thus planted with mulberry trees—not the white European mulberry but our own *red* mulberry, the leaves of which are so much larger, and make as good, and as much silk as any European; by a complete trial made at my house on the borders of Kentucky river, in the year eighteen hundred and three, with leaves taken from the forest; and now by the society of Shakers, in Mercer county, State of Kentucky, who make yearly a good deal of sowing silk, preferred by the taylors to any imported—feeding their worms with the leaves of the American red mulberry, which has as many advantages as the imported white. It is easier raised and multiplied—is a harder tree, growing much faster, and the quality of the wood equal to the black locust—has its leaves five or six times larger, and of course offers a saving of labor nearly proportionate to their difference; and an immense stock of trees is already possessed by the country: if only each farmer will earnestly take the care of those growing freely about his farm, and the inhabitants may go immediately to work at the making of silk, without waiting to

get white mulberry trees, which cannot be procured without much trouble and time—for centuries will elapse before the country shall have such a stock of them, equal to the one we have already of our own; even if it should be true, that silk cannot be made with them, and the people at large would undertake earnestly to get the other, I have said, with our own red mulberry tree and cape grapes, the intervals tended the same way, if Luzerne would not grow. Well, have only clover, and the whole kept under the quadranial rotation, with the soiling of cattle, to have plenty of manure; for the more of that precious thing for poor ground, the greater will be the crops. The folding of sheep would in those countries enrich wild pasture before the population had replenished the country and be of immense advantage, the sheep would bring in, in the night, what they would have gathered in the day, to fertilize the farm. Ground being thus established, would produce, on the whole, silk, wine, and wool; and, on one of the four divisions, wheat and corn; on the second, plenty of sweet and Irish potatoes; cotton, or tobacco, &c. on the third, spring grain and clover; and on the fourth three or four cuts of clover.—Then I

could venture to foretel that in less than forty years, such a farm would produce equally with the best of Kentucky land. Almost all the United States, south of forty degrees, could be planted in that way, except marshes and swamps.

The cultivation of mulberry trees for silk, and of vines for wine, is so much entwined together, in a great many countries, similar to ours, that I beg leave to finish this Chapter, by the narration of what I have myself experienced, and what I have seen and learned by inquiries about silk-making, in my travels thro' silk countries. Although labour may be, as yet, too dear among us; to undertake generally the rearing of that precious material, or to have the whole of States planted like Lombardy. It is well to give the hint; why should we not draw from our land, the most we can? If, perhaps, the scarcity of hands, will prevent for the present a general attempt, the time is not very far off, when we may see much of it accomplished. If some few of the rich planters of the middle and Southern States, may, by this, be induced to have a part of their fields planted as in Lombardy—particularly, those who have undertaken to follow the system of soiling,

and of rotary crops—I shall think myself well rewarded; nothing short of advantage, can result to the country from such a trial, and it is in favour of the ladies—under whose jurisdiction what I have to say falls, and who would surely like to learn how to have some auxiliaries to spin for them, the best, the prettiest, and the fairest of all the threads,—that I should here treat more largely on this.

The rearing of silk worms and making of silk, is not a difficult matter. The principal skill required in its prosecution is, the reeling of silk. But a great majority of our ladies, wants only to see it once done, to know how to do it themselves. A little sketch of my own trial in Kentucky, spoken of above, and an extract of my journal drawn up on my travels, through Dauphine and Languedoc, in France, when the inhabitants were chiefly engaged in the reeling of silk, may offer sufficient information on this head. And I am more impelled to submit the following statement to my readers, since all the books, I have read on the subject, speak of the American red Mulberry trees as unfit for silk, because their leaves somewhat resemble the European *black* Mulberry. Finding, however, the contrary to be the fact, I was

induced to test it by experiment. The 1st May, 1803, I put a few eggs of the silk worm in a flat snuff box, under the pit of my arm. Early in the morning of the 3d they were all hatched. I put on them young leaves of mulberry, and they soon stuck to them. I could then take those little worms, not bigger than the point of a sharp needle, out of the box, and put them on a sheet of wrapping paper, where they were fed regularly and plentifully with mulberry leaves of their own age, or not much older; but not in such a way as to make them waste any. They must have enough, but they must eat all; they grow then very fast, and will continue to thrive, if kept clean; in the course of their life—which contains but four weeks in which they eat—they change their skin three or four times according to the kind; at which time they sleep about two days each time. To clean them, it must be done by removing them from their stand; which is easily effected, by removing the leaves a few minutes after they have been put on them; for they stick to the leaves. The best establishment that I have seen for raising silk worms, had large and light baskets, with a rim about two inches high, all of an equal size; the bottom of which was

of a loose texture, admitting the worms to crawl through. The leaves are well spread on the bottom of a basket, which is set over the worms, the rim of the basket they are in, preventing the upper one from crushing them. In a few minutes, the lower basket may be removed, and its impurities shook off, to serve again, to feed other worms. By this time, the worms will have climbed into the upper basket. If any lazy or sick worms remain below, they ought to be gathered in a separate basket; they will not, then, be in the way of the healthy, nor infect them if any contagious disease should appear among them. The 5th of June, all the worms hatched the 3d May, had done spinning, and their cocoons might then be reeled. The kind I had, I think, shifted their skin but three times, sleeping two days each time, and having ceased to take food for two or three days. When they begin to spin, they had been eating but twenty five or twenty six days—Note, the better they are fed and tended the sooner they will begin to spin. They can bear to fast for a long time, without injury; except to prolong their time of working; during which time, they must be made to fast, when there are no dry leaves to give them. In the middle of June, all those which were not

killed, or reeled off, broke open their cocoons, and came out butterflies; the females of which laid their eggs and died.* The thread or filament spun by a worm measured, commonly, a thousand feet, and is so fine, that the finest silk prepared for manufacture is never reeled with less than three strands, but oftener with five. It was at this last number they were generally reeling in Dauphine and Lanquedoc, when I passed there. About six feet of sewing thread, made with our silk, bore a weight of four ounces more, before breaking, than the same length of imported white sewing silk. I had, by curiosity, some few of the worms hatched the 3d or 4th July. They spun but small cocoons by the 6th of August; and, of their seed, I had some hatched the beginning of September, which spun but very indifferent cocoons, by the first week of October. The mulberry leaves on which they were fed, were taken from the indigenous trees of the forest—and I entertain no doubt, that leaves growing in an open exposure would prove infinitely better. The following was taken out of my travelling Journal:

Tuesday, 2d July, 1816: We continued to descend the Rhone, with great rapidity. We

are passing Coteroties, where a very renowned wine is made. The vineyards are in terraces, with dry stone walls half tumbling; farther down, the hills become naked and rocky; and there are no more stakes to their vines; on both sides of the river are a great many Mulberry trees. Their aspect is melancholy, being all stripped of their leaves. The rearing of the silk worms being at an end but a few weeks before, the season having been this year extraordinarily late; the grapes being only now in bloom about Lyons. We stopped at a village on the Dauphine side, to take in more loading, the boat being bound to Baucaire, for the great fair. While they were loading, I went to see the reeling of silk, which was going on in almost every house. We stopped at a great many villages, on both banks of the river, and found the inhabitants every where busily employed, in reeling their silk, under a shed, or penthouse, where there was a kettle of ten or twelve inches diameter on a furnace, well fixed, to prevent any smoke from coming in contact with the work. A woman was sitting by the side of the furnace, having her left elbow resting on it, and holding in her left hand the ends of the cocoons which were floating on the water

of the kettle: to the right, there was a very broad reel, on which two skeins were winded up at once. Near the kettle, and eight or ten inches above the water, there were two eyes, or buckles of wire, about one eighth of an inch of aperture; through each, the threads of four or five cocoons, were passing to make a silk thread; and, after crossing one another, they were again brought through two other eyes fixed on a piece of wood before the reel, to which a motion of going and coming, of about five inches, was given by the motion of the reel. The object of this motion was, to have the silk threads not glued upon one another, because they are wet and not twisted when they come on the reel: and the object of crossing the silk threads with one another between the four eyes mentioned, is to clean them from knots or impurities that may follow from the water, by rubbing thus, one another, and to bring their component parts close together. The woman was keeping with her right hand, the cocoons, she was then reeling, parted from those in her left hand, to prevent their co-mingling: and when one cocoon was out, or the thread of one broken, she took with her right hand, the end of another from her left, and threw it against the

bundle below the lowest eye, and, striking to it, went up and kept the silk thread of an equal size. When all the cocoons in the kettle were exhausted, others were thrown into it; and when they had been sufficiently soaked, the ends were obtained by beating them with a little broom, made for the purpose, to the sprigs of which, they stuck fast: The water being kept nearly boiling hot, and only once a week changed, even then not altogether; one tenth of the old, is always left in the kettle; at the size of five cocoons to a thread, she can, with the help of a small girl to turn the reel by a treadle, reel one and a half pounds per day. They kept themselves very busy, because the price of the silk was about thirty francs per pound, and it rose soon after to forty; as the common price fluctuated in other years, between twenty and twenty four francs, or £1 Sterling per pound, of raw silk just from the reel, or 30 to 32 sous per pound of unreeled cocoons; they were very industrious: and, as soon as they had completed the two skeins on their reel, they went directly to the merchants, for fear the price would sink, though not before having plunged the skeins and reel into cold and clear water, and let it dry. The crop had been very rich,

To my queries they all agreed by saying, "that 10 pounds of cocoons, commonly, give one pound of merchantable silk, and some ounces of tow; a sort of silk that requires to be carded, and then spun on the common wheel. One ounce of eggs, or seed, will produce one hundred pounds of cocoons in a middling good season, and only fifty in a bad one. Ten pounds of cocoons will produce about twenty four hundred worms, & they will consume about one hundred and twenty pounds of green mulberry leaves, or the product of a middle sized tree." The worms from an ounce of seed is about what each poor family in Dauphine will nurse annually; although they have to buy the leaves to feed them; their common dwelling-house or room, being sufficient to lodge them, by turning out a few articles of the furniture for the last fortnight, and establishing temporary shelves. The housewife is able, during the first week, to attend them alone, and they occupy but a few feet square, on a shelf. The second week she requires the help of a child; the third, of two; and they must be three grown people the fourth week, or the balance of the time, because they have to pack on the shelves some bushes, commonly Irish broom, to give the worms the

chance to lodge their cacœons among the sprigs; the Shakers in Mercer County, in Kentucky, make use with advantage of *Peach* boughs, with leaves on. The seed or eggs, are kept from the last of June to the next May, in a cold dry place, commonly in a Chest among linen; and great care is to be taken not to feed the worms with wet leaves; rather let them fast for even two or three days: that will not hurt them as much as feeding on wet leaves; give them as much air as possible, and defend them from cats, birds, wasps, and ants. Some that I put on a tree, to let them range at liberty, were never seen eating but when the dew was dried up. In time of rain, as also in a frosty morning, they sheltered under the leaves; which, saved them from being injured, at last the whole were destroyed by wasps. To give a hint to our ladies, who use, and like to spin and weave their own family clothing, &c., I submit the following calculations.

Each worm has commonly spun in Kentucky a thread three hundred and thirty three yards long, or ten folds in a thread 33 yards; ~~the~~ worms will thus make a thread of the same length, having twenty strands, and four thousand eight hundred worms, a chain of two thousand four

hundred threads of the same length and force. Thus, the produce of one ounce of seed or eggs, would make in a middling good year, five such chains, each weighing only two pounds French weight, although about one yard or one yard and six inches broad, which shows how fine and light silk is.

The threads of such chain should not be twisted, but should be sized with a natural glue and be very strong, and which may be easily washed off; but this must not be done, until the thread is twisted, or woven; otherwise, the component parts will get asunder, and be entangled. But, if wove untwisted and unwashed, and filled with cotton, or the same sort of silk, and washed and bleached afterwards, it will make a close and compact stuff, as white as snow, and taking any sort of dye very easily. Such a chain might be made ready for the loom, by drawing the silk from the cacoons directly on a warping wheel. As two threads, at least, are to be drawn at once, the chain may be established at the first drawing. If that mode of reeling, might not be as expeditious as with the reel, it would however, supercede the reeling and spooling; and, would procure a chain of very strong thread, with the

best of sizing; and, being filled with fine cotton, as spun in our spinneries, would make the most lasting home-spun cloth. I state these ideas only as probabilities; not knowing if such a method of reeling silk has ever been practised. But, as we live in an epoch of new discoveries, it is worth while to make the trial;—and I see no reason why it should not succeed.

CHAPTER IX.

Of the quality of soil for Vines—Vines growing on any sort of soil—Best soil and exposition in North Countries—Thawing of the frost is what hurt—North exposure preferred, in some part of France—Character of the soil for vines—Less frost on Knobs—Many good seats in the United States—Advantage of the fog—Vines not as easy hurt by frost as Peach trees—Calcareous soil supposed better than Silicious.

I HAVE seen vines cultivated and growing in every sort of ground—from the stiffest clay, to the merest gravel or sand; and in every exposition, from the steepest hill side, to the dead level. However, the intermediary between the two extremes, both as to soil and exposure, may be said to answer the best. The soil most favorable to vines, is a mixture of gravel and sand with one third of rich loam; and its best sites in northern countries, is the south side of a gently sloping hill. But, in warm countries, particularly if subject to late spring frosts, I fancy that the south west is the

best; the west and north west of north, are preferable to the north east, and perhaps to the east. It is known that it is the thawing by the sun, which is hurtful; the later the rays of the sun come on a frozen vine bud, the better chance it has to thaw before they strike on it; and the earliest ripe grapes I ever found, were always before a wall facing the west or south west; I always found as much as eight or ten days difference, where the walls fronted east or south east, and even due south. The evaporation of dew cannot be performed without the absorption of a great quantity of caloric: which cools any thing on which the dew has been deposited; in a due east exposure, the sun's rays strike with their greatest force, while the dew is evaporating, and cooling the soil and plants, as fast as the sun warms them, and when the sun begins to act with some advantage, it turns, and shines obliquely; whereas, on the west side, the sun acts without any deduction of its force, the dew being long gone, and the soil having recovered the temperature of the air, when it comes to strike perpendicularly. Therefore, if that theory be true, the worst exposure, would be the due east, and north east. In several places, the north exposure has been

preferred. Along the river Seine in France, where it runs from east to west, the hill side facing the south, has scarcely any vineyards upon it; while the one facing north, is completely covered with vines from end to end. Upon inquiring the cause, I was answered, that the wine produced from grapes on the south exposure, will not keep; it turning very soon into vinegar. The mountain of Rheims, from whence comes the famous Champagne, has a north exposure: That must be attributed to the species of grapes that are reared there; as those vineyards are chiefly planted with a very early, black, and delicate grape. In the south aspect, it ripens too much; yet, in my humble opinion, they might raise with advantage, on that side of the mountain, a later, or coarser species of grapes.—As we have now but one sort of grape, we cannot suit the soil or the scite, by a selection of the proper species of grapes; although, I hope the time will come when that will be done; for the present, I shall point out the sort of soil which I think the most suitable to Cape grapes. Any soil, having the three following characters, will answer:

1. Dryness, or the faculty of letting the rain

water percolate or sink through it, with facility, to a depth below the reach of the roots of grape vines.

2d. Warm soil. The natural growth on it, commonly points out that character. The wild grapes, wild cherry, plumb, mulberry, white ash, white oak, hazel, &c. and the absence of horse tail, rushes, water-thistle, and other plants usually found in cold wet land.

3d. A poor light soil, made rich by manure, would be the best. But, as the country is not, as yet, sufficiently provided with animal manure, I would advise to choose a moderate rich, loose loam, sandy or gravelly, and deep.

As to the aspect, almost any one will answer: but, the best is that which is the most sheltered from heavy and troublesome winds, and spring frosts, and which, at the same time, has the advantage of a large opening before it, like the brow of a hill, or the last slope on the top, facing a large tract of low land, large rivers, lakes or seas. Such a position is very frequent in the United States. The Alleghany mountain, where it faces extensive valleys—the hills upon large rivers, particularly where it approaches near them, and the isolated knobs, near or in the prairies of the west.

It was on such a hill that a vineyard was established by a Swiss, for a citizen of that State, near Glasgow, in Kentucky. I tasted the wine made there, and found it very good, rather superior to our own. The vinedresser brought to Vevay, a sample of the soil of that vineyard: it was dry, gravelly, sandy, and rich; and the vines grew luxuriantly upon it. I said, *the side of the top of the Alleghany*; because, I think it is there where the late spring frost, would do the least injury to the vines. In 1798, I had occasion to cross those mountains, on the Pennsylvania road, some time in June; when, but a few days before, a frost had killed every thing, even young shoots of oak and pine, in the valley about Strasburgh, and about one third up the side of the hill. Nothing above, bore any sign of the frost. Fog along rivers, is very beneficial to the blossoms of all sorts of fruit, and tender buds of vines, by sheltering them from late spring frosts; or rather, from a sudden thawing by the sun, when covered with white frost. It also preserves in like manner, autumnal unripe fruit, from the baneful influence of early frost. We often see potatoe vines green and flourishing, in the river bottoms of the Ohio, one full month later, than at

a distance from the river, out of the influence of the fog. Where Peach blossoms are often killed by frost, the grape vines which have began to open their buds, will also share their fate, but not in so great a degree. It is about twenty years since we began to make wine on the borders of the Ohio, and we have never missed a year, without having a crop more or less abundant; while the Peaches during the same period, have several times failed. The Peach, may be taken as a standard to judge if the climate will suit the grape. The Cape grapes will also do best. As to the quality of the soil, whether it be calcareous, silicious or flinty, it matters but little; for the vines delight in both soils, provided they possess the other requisite qualities. I think, however, that a mixture of both soils, must be the desideratum. Commonly, the calcareous earth is the most fertile for the greater part of plants, and a total absence of silex or flint, would, I think, also be a blemish; but the wise Author of the Universe has provided but few spots, if any, where the soil is purely of one sort of elementary earth.

CHAPTER I.

On manure—Its quality—Accused by authors to injure the wine—My answer—May hurt delicate grapes, and improves late and coarse—Stable dunghill, a store of nutritive provision for plants—Stable dung—How prepared—Its volatility—Gypsum hurtful to vines—Good effect of garden soils—New Vineyards in Switzerland, not good—The cure of their defect by manure—Opinion on them, and trials made to cure them useless.

THE man who was thought to be the best vinedresser in Switzerland, when I lived there, because his vineyards were more productive than any other, used to say: "It is the manure which is the best vinedresser. It is, in every respect, the most powerful auxiliary to husbandry in general, but more so to vinedressing; as well for the preparation of ground to receive vines, as to support the fertility of an old vineyard—even, in some cases, to improve the wine, although it has been accused by authors and theorists of the contrary effect. All which may be true, with respect to delicate and early

grapes, like those raised in Burgundy and Champagne, where they are obliged to plant them in northern exposures, for fear they would ripen too much; while, at the same time, it increases the value of wine made from later, and coarser grapes, which are brought sooner to maturity, by the effect of manure, especially, in a wet and cold summer. In the course of my life, I never have seen or perceived, that the white wine used to make in Switzerland, had ever been injured by the effect of manure, except in some few peculiarly early years. to the white grapes, of which, the wine is made, being somewhat of the delicate sort, too great a degree of maturity is hurtful; but that does not apply to a majority of the grapes; for the red wine made there, was always improved by it, and no vine-dressers, had on that subject, the smallest doubt. As the Cape grapes we have to cultivate here, to make wine, are of the late and coarse kind, I am strongly impressed with the idea,—if not fully convinced—that these grapes will be improved by a judicious application of good manure; and I am sure of a considerable increase of the crop: I have seen by experiments, no difference as to the effect between the different sorts

of manure, in the improvement, or the deterioration of the wine; any thing which increases the fertility of a vineyard, had the same effect, at all events, I could not distinguish any difference in the effect of the soil of an old garden, and stable dung, or the scrapings of road dirt, which applied to an old vineyard, produced an early luxuriant vegetation, and great abundance of grapes: It also caused the leaves to remain green longer in autumn, and gave them a higher green hue. One of the strongest evidences of its efficacy, is, the great price it always bears in vineyard countries. My observations on the vegetation, led me to conclude, that any thing which lives, whether in the animal or vegetable kingdom, is supported by the remains of things that once had life. Of course, any thing which contains a portion of those remains, or the decay of animals or plants, is the proper food, or pabulum for plants, after it is reduced in such a state that it may be dissolved by water and air, and introduced by their organ into the plants. Putrefaction appears to be the process of nature, for subjecting every thing to its action in that state. A dunghill is then nothing but a store of food for plants; and the application of it, the feeding of them. Therefore,

before saying any thing about the preparation of the ground to receive vines, it will be proper to observe something concerning the different sorts of manure, and how prepared and applied to vines; particularly in the preparation of the ground for a new vineyard.

The best of all manures, is stable dung from cattle for light grounds, and from horses, for clay grounds; but if mixed, not the worse—especially if both horses and cattle are highly fed with rich food, such as grain, potatoes, Jerusalem artichokes, carrots, scarcity roots, clover, and the second cut of hay, called *racuvig*, taken out of meadow sown with meadow oats, *Avena Elatior* and *Avena minor*, orchard grass, and other kinds of esculent and early grasses mixed with a little red clover. The best establishment for procuring good manure is a well paved or floored stable that holds the urine or conducts it into a reservoir near or under the dung hill, so that that which runs from the hill would drain into it as well as the whole contents of the house privy if possible. Straw, or any other substance like spoiled hay, &c. must be profusely made use of to make litter to the cattle in the stable. Every day the stable must be cleansed, and the dung and straw piled neat-

ly in a shady place, and watered three times a week with the contents of the aforesaid reservoir. On the dung hill, as it increases, all sorts of animal or vegetable matter and scrapings of roads, may be thrown on and incorporated with it. The pile must be made five or six feet high, and left so until the first great fermentation has ceased; and when hauled for use, it should be done as wanted, and not before, so as not to leave it exposed to evaporation, its best principles being volatile, and if hauled before hand, it ought to be covered with earth until used. Happy is the husbandman who has industry enough to get such a dunghill that the whole of his farm may be covered with it every fourth or fifth year; and no matter how poor his ground may be, he will soon want large barns, graneries, and cellars. Among the great many substances besides stable dung, which may be considered as manure to vineyards, the following has been found by my own experiments to increase the fertility of the vines to which they are judiciously applied. The scrapings of highly frequented roads; the sods of old meadows, pastures, and forests, the shavings of horn, river mud, what is thrown out of tanyards, the tan excepted, of currier's shops, of shoemakers, of a slaughter

house, (this is very rich,) the liquor of a reservoir or a cistern, the drainings of dishwater, and other discharge of the kitchen of a big tavern, and of the place fixed for the accommodation of people to make water, the draining of a dung hill; any species of weeds and leaves, except perhaps those which have an extraordinary degree of astringency, like the leaves of oak or such like. Caloric, applied by the agency of quick lime, and I expect if applied by boiling water or any other way would fertilize the ground. The great fertility of fire applied to ground for potatoes by the process of *escobuage* (or burning the ground) comes in support of my opinion. I never tried the caloric applied by warm water in a vineyard, but have done it with lime with great effect on an old and worn out vineyard, and with the *escobuage* for potatoes. Gypsum and slacked lime had no effect, except that I thought it was a little hurtful, but as the effect of gypsum on meadow is limited to particular spots, it may act so in vineyards, and as I made but one trial, I may have hit one of its negative spots. There are several other substances that are capable of manuring the ground, but I have spoken only of those I made use of myself. The effects of stable dung

applied new or fresh will not be sensible so quick as if more rotten, but will last longer.— One of the most powerful effects of manuring on an old vineyard I ever witnessed, was by spreading early in the spring about one bushel to every three square yards of the vineyard, of the top earth taken about two feet deep in a garden kept as such for centuries. As much earth of the vineyard was carried to the garden in return; both garden and vineyard were considerably improved by that exchange, and the good effect was sensible several years afterwards.

The demands for wine having very greatly increased in Swisserland since the beginning of the French revolution, every spot along the north shore of the lake of Geneva, which was supposed fit to produce wine, was planted in vines; but these new vineyards proved mostly to be bad, particularly where the ground happened to be calcarious; the vines grew extraordinarily luxuriant, but with little fruit, and the few produced, could not ripen well, being sickened by the same disease which hurt the European grapes planted in the United States, until fifteen or sixteen years had elapsed, and the first vines had been rooted out by a complete trenching.

over again of the ground two or three feet deep, and replanted anew, then they became as fruitful as any where, and moderated their overshooting.

On my return to Switzerland from the United States, I found that the vine dressers had discovered that the application of good stable dung prepared as aforesaid, was an effectual cure of the sickness, and would have prevented it if applied in the first preparation of the ground to receive vines for the first time, which then grew to be fruitful and moderate in their shooting, and producing nearly as good wine as any other. Such discovery could not be the result of reasoning on theoretical principles; nobody would have guessed it; it looked foolish to add strength to soil, which was already too strong, for it was the general opinion that these vineyards were unfruitful on account of having too great a quantity of nourishment; that suspicion caused many trials which were all more or less useless. I tried for my part to dig to the bottom of the roots of the vines, as gardeners will sometimes do to overshooting trees, and cut off the surplus roots of which these vines had a much greater number than those of the same age planted on an old vineyard spot. I tried

also to introduce into these new vineyards, the same sort of weeds which were found growing always in old ones, (for the weeds growing on those new vineyards were for several years quite different,) on the supposition that these weeds were absorbing the obnoxious gasses, or whatever it was that sickened the vines.

Others who were preparing old meadows to receive vines, carried off the sod to old vineyards, which was supposed with some propriety to contain the greatest part of the principles that caused the overshooting of the vines. If they obtained no difference, in their new vineyards, they manured very highly the old ones, and were well paid for their trouble by the increase of the crops.

CHAPTER I.

Preparation improved by planting Potatoes—Answers to those who think that it gives too much trouble—How it may be done here—Deep trenches—Advantage of it—Comparative estimate of the expenses—The plough might be made to help—Drains in spongy ground—Such work to be done in good weather—How we prepared the ground at first.

SINCE the new discovery of the remedy to cure the sickness on new vineyards by manure, I have generally prepared the ground to plant new vineyards by planting it with Irish potatoes highly manured with stable dung for two years in succession, then by trenching and well oversetting the ground two or three feet deep, according to the depth of the soil, and then I have again planted with potatoes well manured, and the fourth spring, by a deep spading, the ground is made fit to nourish healthy and fruitful vines. After my return there from America, I prepared in that way about three fourths of an acre out of the gravel of a creek, which proved to be a very good vineyard, bearing often at the

rate of two thousand gallons of good wine in a crop. It will be found by some of the readers, that ground prepared in that way, will cost too much time and money, but where a half bushel of potatoes, sells for about the same price as a gallon of wine, as it happens often there, the ground occupied by them will yield almost as much profit as in grape-vines, especially when the ground has been trenched deep and highly manured, and no other culture will leave the ground in a better situation to receive vines.—The same preparation for Luzerne was also found the best, it commonly yielded grass enough to feed five or six cows from the middle of April to the middle of October, out of one single acre. I have no doubt but land prepared that way here, would make a good vineyard, but as it is not fashionable to have as much patience, two years of planting potatoes may be dispensed with; once planting with good stable dung would however be a good preparation, before the trenching of the ground to receive vines, then the trenching should be two or three feet deep, and the earth well overset, the top below and the lowermost on top; and if there are stones, the good ones for building if wanted, or to make fences or terraces if the ground is

steep, are to be put a side and all the others are to be thrown back into the bottom of the trench and well leveled, the largest below and the smallest on top of the others, and two inches of gravel if possible on top of all; then the ground which is to come on, in digging the next trench, will not be washed down among them, for the more hollow and vacant places remaining open among the stones in the bottom of the trenches the better. They procure to the roots of the vines the advantage of the air deeper, and serve to drain the surplus of rain water, particularly if the trenches have been made up and down the hill, or near enough one another, that there be no interval of unworked ground left between them; if there are two or three inches of gravel on the bed of stone in the bottom of the trenches as aforesaid, and a bed of earth on the gravel, at least two feet deep, or deep enough that the stones be below the common boring of worms, these empty holes among or below the stones, will remain for ages without filling; and the higher the bed of those dry stones under a vineyard the better; the roots of the vines will always penetrate to the bottom, and I have seen roots of potatoes and beans, at the bottom of a bed of stones six feet

deep, having large hollows between them, on which there was a bed of two feet of gravelly soil, prepared to receive vines, on which the potatoes and beans had been planted.

A great part of the vineyard of the *Pays de Vaud* in Switzerland are established that way; and even for some of them the soil has been brought from other places, some times across the lake, and carried by men up high terraces. It is true that such preparation of ground to make a vineyard is very costly, and centuries will have rolled away, before they will have to resort to such work in this country, but there, where the average price of labor per day is less than the price of one gallon of wine, they will besides the above described work, make a wall six or ten feet high with mortar of lime, and sand, to support terraces some times not more than twenty or twenty five feet wide; and if the purchasing and preparing one acre of ground, so that it shall be a good vineyard, will not cost more than the value of from twelve to fourteen thousand gallons of wine they think their money is at a very good interest. But here we cannot calculate on the same data, as the net produce of an acre of vineyard cannot be estimated more than from sixty to one hundred gal-

lons of wine being the half of an average crop, the other half coming to the vine-dresser for attendance: thus thirty gallons per year being the average net rent; of which the capital at the rate of six per cent would be fifteen hundred gallons, surely worth five hundred dollars, say one thousand gallons on account of casualties, and the three or four first years in which there is no crop. Thus three hundred and thirty three dollars could be laid out with safety on an acre of vineyard in the United States, for the wine is surely worth thirty three cents per gallon; but we have millions of acres that may be well prepared for vineyards, for less than the tenth of that sum, with a little ingenuity and industry; part of the trenching, if not the whole, may be performed with the plough. I see no impossibility of having her to run two feet deep where there is neither stones nor roots. The advantage of having the ground trenched very deep is obvious: a higher bed of earth becomes fit to nourish the vines, to retain moisture in time of drought, and let the rain water sink easily, and it will not wash as easy by rain on a steep hill side. The roots of the vines will strike from the end of the scion, and grow downwards, and not be disturbed by the plough; the frost will not

penetrate as deep; the surface of a hard tramped road will freeze as deep again, as a well ploughed field, the air being the worst conductor of caloric existing, provided it is confined; loose earth contains more of it than compact soil, and that which will prevent heat from passing, will also prevent cold. The earth which for ages has been exposed to the sun and the air, and which contains a vast quantity of vegetable and animal remains, of course, full of food for vegetables, if buried two or three feet deep, will be secured from washing by rain, and evaporating by the sun, and remain there safe from the reach of small weeds until absorbed by the roots of the vines, sowed on the surface above. The English author above referred to, advises to prepare the ground for vines to grow in a green house four feet deep, always with a bed of stone and a drain at the bottom. In countries where the ground is scarce, and the demand for wine great, they will sometimes be obliged to make use of wet and spongy ground, drains are then absolutely necessary; they are so constructed that every particle of water from the bottom of the trenched ground is carried off. I saw a good vineyard made thus, on a complete swamp: but in the United States there is ground

enough where drains are useless, and I would have said nothing about them, if I did not suppose that many of my readers wish to be informed how every inch of ground is made valuable, in countries where the population require it; and it may happen that in the middle of a very favorable place there might be a little spot made swampy, by a spring, then a drain may answer the double purpose of improving the ground and preparing a lasting spring of good water; these drains are to be paved at the bottom, well covered with flat stones, and walled in the sides, so that crawfish cannot work in and choke them. The declivity must be such that the water can run easily out. The preparation of the ground for vineyards, is commonly made in good weather in the winter; but the summer time is the best, scions of vines strike with difficulty in ground worked in cold and wet weather.

The Swissers, on the borders of the Ohio, having the ground to clear from a heavy forest of extraordinary big poplar and beech trees, and depending only on their own labor, did not prepare their ground according to the aforesaid rules, but satisfied themselves, by digging a hole for each vine the same as for any other tree,

about twelve or fifteen inches in diameter, with the same depth, and it being filled with the top earth, they stuck the scion in the middle of it. One of them, who had money to spend, did a little better; he dug a trench about a foot wide and a little deeper, and filled it with top soil where each row of the vines were to be, and planted the scions on the top of it; and after my return to this country from Europe, I did a little better yet, but not according to good rules, for want of means and help. My vines were planted in holes like any other trees, and when they had made shoots long enough, which happened the third or fourth year, I dug trenches eighteen inches broad and two feet deep, one foot of the bottom of the trenches was filled with top earth; stakes were planted in the middle of the trenches in regular rows, as true as could be, two feet nine inches apart, the rows being six feet three inches, then the vines being dug to the bottom without damaging any of the roots, were carefully laid down on the top of the earth which had been put in the trenches to fill up the half of their depth, and a shoot raised by the side of each stake, where it was made fast by a willow, and two inches of top earth thrown on the trench to cover the vines running horizon-

tally, the trenches were left open the remainder of the year, to give a chance to those layers or *pruvins* to strike roots at the depth of nine or twelve inches, and none above; those trenches remaining open one full year, preventing the plough to run, made it very troublesome to keep the ground clean. I shall do so no more although my vineyard so planted, seems to be very healthy and prosperous. In future I shall endeavor to follow the good rule, and try a strong plough, drawn by two pair of oxen, to help the trenching of the ground to the proper depth. As the soil on the borders of the Ohio is more or less sandy, and generally set on a bed of pure gravel fifty or sixty feet deep, which permits the rain water to sink freely, their vines succeeded very well, and will succeed, no matter how planted, on such ground; but the ploughing of them will be troublesome and often hurtful; for vines thus planted will establish their roots on the top of the ground, and the plough will often catch them and tear the vines to their great injury.

I shall speak more at length about the roots of vines in the next chapter, where I shall treat of the planting of vines.

CHAPTER XI.

Of planting grape vines—How done in old times—When done so it is for centuries—How planted now—Vines strike freely in warm sandy soil—Good success anticipated when the wood has had a full maturity—Re-planting the second and third years with new scions to fill up vacancies—Layers made when vines are strong—Vines soon arrive to perfection in light soil, they are longer coming in stif clay, but live longer—Vines must come up equally and together to do well—Franklin's rod tried in vineyards—Republican character of vines—Advice given for very stif clay—Shade formed by stakes—Season to plant—Scions must be soaked in water.

FORMERLY it was the practice, in establishing a vineyard, to open trenches about two feet and a half or three feet wide, and about two feet deep, and to fill one foot of the bottom with top soil, and sufficiently distant from each other to admit the excavated earth to lodge in the intervals. On both sides of those ditches they planted common scions, without roots,

or with roots, and long enough to reach from the middle of the trench to the edge, where a curve was made to bring them upright; those trenches were left open, the vines having been covered with a few inches of loose soil, until the vines had shoots long enough to admit of being laid down in the bottom of the old trenches, or of new holes made purposely in the intervals, and six inches along a stake to fill up all the field, at about two and a half feet distant from one another: As it was impossible that the vines thus planted should be in regular rows; the attendance of them was very tedious, but the vineyard was established forever, for when a vine perished one of its neighbors was laid down in a hole made for the purpose, and shoots brought up to replace both the dead and itself. These commonly bear fruit the first year, and are denominated by the appellation of *provin* a word that I shall make use of hereafter. There are in Swisserland vineyards which were established in that way, perhaps two or three centuries ago, and I remember to have seen when young, vines newly planted in a similar manner; but as they do not produce half as much as when planted on well trenched ground, that mode of planting has been laid aside altogether,

And now the ground having been well prepared and levelled as pointed out in a former chapter, lines are marked out on the ground with an iron tool along a stretched line or rope, at the distance the rows are to be; when the ground is thus marked one way, which is commonly up and down the hill, the rope is stretched across the marked lines, at right angles, or at sixty degrees, if the vines are intended to be in quincunx, or at the corners of an equilateral triangle. At the point where the rope intersect the marked line, a hole is made by an iron pin or bar, or hard wood thick enough to admit the scion to be inserted in the hole nine inches deep; rich, dry and crumbled earth must be run with the hand to fill up the vacancy in the hole, and a small stake planted to the south side of it, the scions must be left the length of two buds or eyes above ground; when one of the rows is finished, the rope is moved parallel at the distance the other row is to be, and so on until done. In warm sandy soil the scions strike very freely, and only a small part without shooting, if the ground has been well prepared in good weather, and the scions well taken care of, from the time they are cut from the vines until planted; but in cold clay and stiff ground, it is with diffi-

culty they are made to grow. The more or less success, in the striking of young vines, planted without roots, depends in some measure on the maturity of the wood of the shoots out of which the scions are made. After a long and warm summer we may expect a good success; the next spring some new scions are to be re-planted where they are missing; but where there are vacancies in the third springs, they are to be filled up by provins or layers from the neighboring vines, and if there is none strong enough, the vacant places may be left so until the vine is strong enough; except there should be too many vacancies remaining to be filled the third spring, then new scions may be planted again. I shall hereafter speak more of the provins or layers, either to fill up vacancies in a young vineyard, or when they begin to get old, and some of the vines die. I never cultivated very stiff clay ground; there I know it is very difficult to have a vineyard quickly established. The third or fourth year my vines were commonly in full force. In stiff clay, it requires six or eight years; but once established, they live eighty or one hundred years, while I had to renew some of mine for the third time in the course of my life. Once on account of having trenched a piece of

old vineyard in the winter in cold and wet weather, the scions planted there in the spring succeeded so badly that the third year there was not the half growing. As soon as the good and warm weather came on, I rooted out all these vines, and trenched over again the ground, and replanted immediately new scions, which struck better than any, and made one of the best vineyards I ever had. A vineyard in which the vines do not come up mostly together, will never do well, for young vines planted after the ground is run all through with roots of older vines, can never get fairly established, and being robbed in the ground by the roots of older neighbors; there is something robbed also by their leaves, from the air, which has been supposed by an ingenious vinedresser of the north part of Switzerland, to be electric fluid. As he was trying to fill up vacancies made by decayed vines in his vineyard with young rooted vines, he found a great advantage in fixing a long stake with an iron wire raising some feet above the level of the top of old vines, and communicating below with the young vines which prospered a good deal better, but not enough to supersede the custom of rooting out and trenching over worn out vineyards, and raise up young vines

altogether. Vines are of a republican character, equality suits them best. One of my acquaintances near Geneva, who possessed a tract of very stiff clay ground, but otherwise laying well for a vineyard, took extraordinary pains to make his young vines strike. He wished to know my opinion. I advised him to procure an instrument so constructed that he might bore a hole about six inches diameter into his prepared ground, without having the side of the hole made tight, as the iron pin commonly used must do in such soil, by cramming the ground towards the side, but by taking the chips out as by an auger, to have that hole so deep that he may put six inches under the scion, of that species of soil which is known to cause the young vines to strike the best, which is rotten sod or swarth of a meadow or pasture on sandy and warm soil, and to have the scions or young vines surrounded with such soil for three inches high, so that the ends of the young vines may be completely surrounded with it; when the roots are once started, they find nourishment enough among the clay ground. As I departed to come here the same year, I have heard nothing of the result; but I have no doubt of its complete success.

if in other respects he followed the best rules herein established.

But a vineyard established on a complete, or partially trenched ground, the rows are to be made as true as possible that the plough may run close and leave but a narrow strip, for that effect the scions are to be planted while the rope is stretched, and to have short and broad stakes set before the young vines to afford them a full shade while the sun is hottest, and you are to permit no weeds to grow near them and to keep the ground loose by frequent ploughing and hoeing.

As to the time when vines are to be planted, I have done it from the 25th of October until the first of July, with more or less success, but I found that the best time to plant scions, or rooted young vines, is, when the old vines have begun fairly to shoot, or when the young shoots on vines are about two inches long. Before planting, the scions are to be kept three or four days plunged into good and clear water, about four inches of the but end, and if the day is very warm and dry it would not be amiss to carry them to the field in a bucket with a few inches of water. Rain water after the planting will be of great benefit. The holes are to be

made with any convenient tools of iron or wood, as the ground being supposed to be very loose, it is easy to punch a hole nine inches deep with almost any sort of instrument,

CHAPTER XII.

Old wood, if left to cutting, prevents the pith from rotting—How to preserve cuttings until planted—Pulling off the leaves, if any, when planting—Evaporation of leaves—Best place to preserve scions in ice houses—The way to multiply vines, by seed, scions, and marcottes—Speech - ly's method when scions are scarce—How done and tried by the Author—Packing of scions and trees to be carried a great distance.

THE scions or cuttings are prepared when the vineyard is pruned in March; two or three may be made out of one shoot, but when there is a plenty, to have a choice, I would advise to take only the butt end of the shoots, which are short jointed and of a medium size, of well ripened wood, and if a little of the old wood could be got with them they would be better, but if not enough of those can be obtained, those having none of the old wood may do, nearly as well, provided the lower end has been cut with a keen knife, which should be done close under the last shoot or eye, the pith having an interruption of continuity at

each eye, they are not so apt to rot as when the end of the scion is open; and the roots shooting chiefly about the knot, will have more chance to strike at the lower end, for the sole object of some old wood at the butt, is that there is no opening to the pith, and that roots shoot always at the old wood. If you are not ready to plant at the stated time, but are obliged to keep your scions some time after vegetation has begun; you will find great benefit in cutting your scions six or eight inches longer than necessary, and in keeping them in good spring water in big bundles, in the coolest place that can be found, or buried upright half their length deep in a cellar, and kept often watered with the coolest water. If kept in this way, the upper eyes will strike almost as freely as if they had not been cut from the vines, as they are to be reduced to their proper length to be planted, which is nine inches to go in the ground and two eyes out of it, making about one foot; most all the sprouted eyes will be cut off, the remaining buds being finely swelled, will shoot directly after being planted, if the weather is a little favorable, but should it happen that the very eye by which it has to strike, should have sprouted, that shoot must

not be pulled or rubbed off, but must be carefully pruned leaving a little stump of the new shoot of about the fourth of an inch; by pulling it off, the embryo of another shoot, which had remained dormant, and with which every eye is provided, would be destroyed. It is however necessary to take off all the leaves from a scion when planted, because they would suck in a little while all the provision of sap contained in the scion, which is the only support to its life until new leaves and roots are made, and would wither it to death. The philosophers tell us that the surface of leaves evaporate equally with the surface of water, which I have found to be from three eighths to one half inch per day. One leaf three inches diameter, which contains above four square inches of surface on one side only, would thus evaporate two cubic inches of water in one day, more than the whole contents of the scion; therefore, it is well never to plant a scion without having been soaked a few days immediately before.

It is my opinion that the best place to keep scions or cuttings of every sort, either of vines or other fruit trees, late in the Spring or Summer, either to plant or graft, would be to bury

them among ice, in an ice house, if put there before any sap is in circulation in them: Vines thus kept and planted just before the rainy weather in June, would surely all strike. I never had the chance to make the experiment, but I have great faith in its success. There are several ways of multiplying grape vines, besides by scions or cuttings. By the seeds we obtain a variety of fruit, (see Chapter 2.) by young rooted vines taken out of a nursery planted on purpose with scions; and by marcottes, or layers, (a marcotte is a young rooted vine made by binding down in the Spring a shoot of the last year, and laying it a little into the earth, and having two or three eyes turned up above ground; or in the last of June a shoot of the same year with the difference, that this last shoot must not be pinched but left to grow by the end. Both these kind of marcottes will strike roots more or less, proportioned to the leaves they will have shot after the operation. the next Spring they may be raised and planted where they are wanted. If there should be some shoots striking in the Spring to two or three years old vines from the ground, they are commonly to be rubbed off as they appear; being the same as in tree water-

sprouts; but if a great many marcottes are wanted, one of those shoots may be left to grow to each vine, and when it has got eight or ten leaves, the end must be nipped, that the lateral shoots may grow with more force; in the same time it must be laid down on the ground and fixed there by a little stake or fork, then the lateral shoots, or the shoots that are sprouting from the interstices of the leaves, will grow upright; then, as soon as they have grown six or eight inches, the main shoot is to be covered with a few inches of light soil, and the upright sprouts fastened to stakes planted purposely by them, and wellnursed that they may grow the more, for if they grow much after the last operation, they will be found to have shot many roots at the very knot from whence the lateral shoots part from the main vine, and will procure as many good marcottes, by cutting them between two shoots, they will have the figure of an inverted J.

Another method to make marcottes, by which a vineyard may be planted and bear fruit the first year, is the following: Coarse and cheap baskets about the size of the crown of a hat, are procured; a shoot from a strong vine is brought through the centre of it, and

laid in a little hole in the ground, and fixed so that the mouth of the basket be upwards and the shoot raised in the middle; the basket is then to be filled with rich light soil, the shoot cut two or three eyes above ground, and a stake planted by it, all this must be done before vegetation has begun: Out of the eyes left, branches with fruit will shoot freely, they are to be nursed as any other part of the vine, and the next Spring, the old shoot is to be cut just under the basket as well as all the roots which have grown out of it, the top vine to be pruned to a proper length, leaving but one shoot, then plant basket and all, without deranging the roots in the basket, where a vine stock is to be, about one foot deep, in well prepared ground, and leave two or three eyes above ground and a stake. If the whole of a vineyard be thus planted, it is ready to bear fruit. When I was young, I saw about one half of an acre planted in that way. I never have done it myself on a large scale, but only with a few scattered vines, and know no person that is doing or who has tried it; the trouble and expenses attending this way of planting vines, can not be the cause that it is not generally practised, for no expense is spared to procure a good vineyard; it

must be, that it will not give as prosperous vines as those from scions or cuttings without roots. Then and now some vinedressers think, that rooted young vines are better than without roots. For my part I am for scions without roots, after many experiments. All the advantage the one with the roots has over the other, is, that they are more sure to live; but they will not in general, make as thrifty plants. By pruning the roots to one or two inches before they are planted, they are assimilated to naked scions, and I think made better; for if a vine which has been planted with long and old roots is dug up, two or three years after, it will often be found that the old roots have died, and new ones have sprouted from the body of the plant. Those who wish to have young rooted vines to plant, may have some of the best sort by doing as Mr. Speechely, already before mentioned, has advised to do, and which I have tried myself with advantage, and which proves to be very useful when scions can not be abundantly got. Cut the shoots that are pruned off from vines in pruning time, in short pieces having only two eyes each, the lower one being near the end: plant those pieces in a well prepared ground, in rows fifteen inches distant

and three inches in the row, and sunk in the ground so that the upper eye be just covered with soil, when heaped a little; keep the ground very clean and loose the whole Summer, as well as moist by watering, should the rain be scarce; plant a little stake to the side of those which shoot with vigour, and tie the young shoot to it when it begins to bend by its weight, and sucker it; all those which shoot weakly may be left to grow at liberty. The next Spring there will be a great many fit to be taken up and replanted in the vineyard; all those which have a shoot of ripened wood eighteen inches long will be in that case. They ought to be taken from the nursery with great care, so as not to hurt the roots of either those which are left, or those which are taken: they are to be planted of the same depth as other cuttings: after having pruned the roots at three or four inches from the stock, and taking care that the roots should not be packed together in the ground, but be spread and surrounded with earth in their new position as nearly as possible as they were before being dug up. The vines remaining in the nursery must be pruned down to the ground, leaving only half an inch of the last shoot; keep the

ground clean and loose, and suffer but one shoot to grow on each vine, which is to be tied to a stake and carefully suckered as it grows; the soil may be hilled up against the young shoots in June, to encourage roots to strike out of the new wood; then after they are rooted out the old wood below the upper knot may be cut away before replanted.

I have a little piece of a vineyard, planted that way in Swisserland, that proved to be good vines, and had as good an appearance as any when I left the country; but it is yet to be known if they will keep pace always with their neighbours, which have been planted with naked scions; they had a little more fruit the third year. The English gardener, before mentioned, raised his young vines that way in pots, sunk in a tan bed in a green house; he then planted those young vines out the first year, in June, where they were to stand, because he could then do it without deranging the roots, by receiving carefully on his hand the ball of earth contained in the pot, and setting it into the ground at the proper depth. Young vines thus raised and planted, would often strike fruit the second year; but it cannot be done by vinedressers at large. I only mentioned it

here, to show what industry may do. Enough I suppose has been said as to the propagation of grape vines, to acquaint any attentive reader with all that can be done in that line; I shall finish this chapter by showing how to pack scions and trees when they are to be carried a great distance, which is easily done by packing them in boxes, made loose to admit air at the joints, with moss round the part which is to come in the ground: the box must in one way, have just room for the length of the scions or trees, and the top end should always be near the side or top of the box, where the augur holes are to be made for the admission of the air, and now and then some water to keep the moss moist: under the butt end of the scions there should be a couple of inches of moss. The packing of moss among the cuttings half way up them only, causes the other half not to be so compact together, and the air has admittance among them, otherwise there would be danger that the eyes, whence they have to shoot branches would rot. If they are to remain in the box after the the time when they are growing, they have room to do it, and that will not be much injurious to them, provided those tender shoots should not be rubbed off, but pru-

ned within one fourth of an inch from the sci-
ons, as aforesaid. When they are taken out
of the box, they ought to be put immediately
into good running water, and let them soak
half their length, two or three days. Trees
with roots may be dispensed with putting them
into water, and if they have shot forth new
roots among the moss, better plant moss and
all. Vines and trees packed that way in the
beginning of January on the border of lake Ge-
neva in Switzerland, and carried to Jessamine
county in Kentucky, where they arrived the
first of July; have generally grown well; none
but stone fruit trees have died; grapevines of
different sorts, pears trees, apple trees, walnuts
and a black mulberry tree, have chiefly all
grown.

CHAPTER XIII.

Distance to give to grapevines in a vineyard—Diversity of opinion on that subject—Opinion of Chaptal causing mine to change—Light necessary to leaves—Chaptal's opinion, explaining the apparent awkwardness of the way of training vines in the north of France—Shaded gardens in large cities nourish well imported vines—Vines introduced in part, in a hot-house—Curious phenomenon explained—Theory of vegetation—Provision of sap in plants—Consequence of small and large distanced vines—The more of leaves, in proportion, the better the grapes—Cape vines require short pruning—Consequence of rain on ripe grapes—What happens to potatoes when not properly distanced—Distance adopted by the author in Europe—Ditto, by Maupin, a French author—Ditto adopted here—Number of vines per acre—First vines planted in Indiana—Pruning the top roots in young vines—How and when roots of vines are growing—Deep ploughing injurious to vines used to be worked shallow, but good when used to be so—

Roots considered as mouths, and how they receive nourishment.

UPON the distance from each other, vines are to be planted in a vineyard, there is as great a diversity of opinion, as in other things not precisely determined. Prejudice, I suppose, has been greatly the cause of it. I was myself in the opinion once, that the more the sun could strike on the bare earth, between the vines, the more the grapes would ripen; therefore, it was necessary to have them at a great distance. I found by reading the treatise on vines by the celebrated Chaptal, that he was of the contrary opinion, that the nearer the vines are planted, the better the grape ripened; that no part of the vines requires the rays of the sun, but the leaves which want light will turn themselves in a little time, to face the light, until old and decayed if turned. He says, look at a wheat field, the part thickly set will ripen sooner than where it is thin. This opinion of Chaptal being so much at variance with the generality of vinedressers, and particularly with mine, that I resolved to have the matter fully investigated to satisfy my own mind. I am now convinced, that Chaptal was right, and that cir-

cumstance explains to me why, in the north part of France, where they have their vines so trained, that the earth and the grapes are entirely in the shade of the leaves, and their grapes come to perfection, and in some parts make very good wine. This is a method of training vines I had thought, at first, very absurd in a country about the forty-eighth or fiftieth degree of north latitude. I should have planted my vines so that the sun might shine with full force some time in each day on the earth. But it seems they have followed a plan that neither earth nor grapes should ever have a single ray of the sun on them. Another proof, is that the European vines that I have seen succeeding the best in the United States, were those planted in shady gardens and door-yards back of the houses of New-York and Philadelphia. Some of them had their roots where the sun could never shine, but being trained up on lettuce work where they could get the benefit of the rays of the sun.

The following fact may also be an illustration of the system, that the leaves alone want heat and sun to perform the task marked out to them. A vine forced in a green house to vegetate in the middle of the winter, may have its

roots out of the hot house in ground exposed to the weather, and I was told by an eminent gardener, that the main part of the plant may be out, and only a branch introduced into the house. This will vegetate without causing much, if any, alteration to the part remaining to the weather; provided the stem of the vine which is exposed to the external air, and through which the sap is to communicate from the roots, to the branch in the house, is wrapped with moss, from the ground to the hole where it goes into the house, to prevent a too sudden check in the running sap, in time of severe frost. How to explain this wonderful phenomenon of nature, it may be attempted by the following argument; based on the theory of vegetation, as I understand it.

In the course of the summer sap is put in reserve into the body of the tree, for the next spring to make the first leaves; which may be considered as the stomach of the plant, and whose office is to digest the sap coming to them from the roots by the pores of the external coat of the wood of the tree, called the sap wood, and some from the air, being, as an English chemist says, the carbon and other gasses, which are some of the component parts of the

plants, and may be considered as the gastric fluid in the stomach of animals; and after it has received its proper digestion, returns by the same between bark and wood, where it is wanted, to make new roots, wood, fruit and more leaves. A proof of the existence of that provision of sap, or whatever you may call it, which is stored up into the body of trees, is the vegetation on trees, after they have been severed from the roots. I have seen fagots made in the winter of the limbs of cherry trees and piled up under a shade, blooming in the spring like all other standing cherry trees. This theory is according to my humble opinion the rule followed by the vegetable world: then for the vines vegetating in the heart of the winter in a green house, while their roots are in or under a frozen ground; the sap received into the branch introduced into the house, is put in motion by the heat of the house, and makes the first leaves, which prepare what they receive from the air, and perhaps more of that reserved sap, make the materials to be sent to the roots to make new ones, and in going there it draws the passage until it arrives in the earth below the power of frost, where the new roots receive nourishment to be sent up to the leaves, &c. That exchange of

juice, the one coming from the house where the heat is kept about sixty five degrees of the thermometer of Fahrenheit, and the other from deep in the ground, where the temperature is always about fifty five degrees, is sufficient to keep a free passage, even through a bed of frozen ground. I further observed, that vines planted at such a distance that the roots may expand without meeting any concurrent roots, and the vines being kept pruned as those which are more closely planted, will produce overgrown shoots, and a great quantity of grapes, but will be more watery, the leaves being fewer in proportion to the roots and fruit, they will not elaborate the sap as much, but will send it in the grapes with more water in it; while vines which are planted closely, will soon fill up the whole ground with roots, which will have to divide their nourishment with their neighbor, and of course have less of it, and will have less fruit; many more leaves in proportion to digest the sap better, which will flow with less force from below, and of course admit more of the atmospheric principle. However, it is what I thought happened to the white grapes of which I used to raise the most, and the ones we have in this country seems to follow the same rule; they re-

quire to be pruned short, and never to be pinched, that they may have a great many leaves in proportion to the fruit, and then the grapes will come to a complete maturity; otherwise, if they are overloaded in the pruning, they will make many shoots all with grapes, which will remain shorter and have less leaves, and the grapes never ripen well, especially if some cause or other should make the leaves, or a part of them, drop in the summer.

In the year of the big comet, 1811, the vines in Switzerland, where I was, were loaded with a large crop of good grapes early ripened, but had a thick skin, and were a little withered on account of the drought of the latter end of the summer and the autumn. A parish in the neighborhood would not make their vintage, until it had rained, that the skin of their grapes might be thinner. All the rest of the country made their vintage before the rain, and their wine proved extraordinarily good and strong. The rain came at last and started a strong flow of sap into the vines, which had all their leaves, being yet early in the season. The grapes in the parish alluded to, became replenished, their skin grew thin, and made more wine, but not as good; the new arrived sap into the grapes,

was too watery, and procured to the vine a great tendency to turn into vinegar, like wine which is mixed with water,

• If a field of potatoes is planted at such a distance, as to occupy all the ground with their roots, by the time they blossom, (sooner or later, according to the fertility of the ground) no more new potatoes will form, so after the roots fairly meet; but those formed at the period, will grow and be found almost all of the same size, and all ripened, because there was but a short period from the moment they began to form potatoes, to the time they quit forming any more, if the distance among them had been well calculated. But if potatoes are planted at a great distance, they will be forming a series of young potatoes, until their roots meet, and replenish the ground; the first formed will attain their size before the last are formed, and in the fall potatoes of all sizes, and at all the different stages of maturity will be found. As to the quantity, perhaps the potatoes having the greatest distance, will yield the most, provided they be not so far as to leave much ground between them untouched by their roots; for their crop is always in proportion to the quantity of their leaves, fairly exposed to light. This little di-

gression on potatoes, is what I have experienced many times, and it has been brought here to show that most plants are subject to the same law, and in my opinion, vines follow the same rule. A vineyard too near, will give less, but better wine; and will be of shorter duration, but will come to perfection rather sooner. The one planted too far, will remain a longer time to come to its full force; that time will be when their roots will have filled up all the ground, will bear more fruit to each vine, but less good: the best is to hit the proper distance.

In Europe, where the vineyards are worked by hands, my distance was two feet eight inches or three feet both ways.

A French writer about the time I was beginning to work, named, I think, Maupin, turned the head of most all the vinedressers of Switzerland; they planted according to his direction, at four feet and four feet six inches, their hopes were frustrated; then they run back to the extreme, and planted at two feet. I took the medium, and when I left the country, the vinedressers were most all come to my measure, which was about the one made use of before the French writer had published his work.

In the United States, I have proposed to set vines in rows across the side of the hill, and if the hill is rounding, to follow the 'curve, that the row may be on a perfect level; this will greatly prevent the washing of the soil in steep hill side, and if on a level, to range the rows parallel with the equator, that the ground may all be in the shade, when the sun is the strongest. The rows are to be no less than six feet apart, nor more than eight, that is sufficient to have a plough to run between. The vines in the rows at two and a half or three feet distant. If the rows of vines are very true, and a good stake of black locust, mulberry or oak, set in the side of the vines, one to each, not before nor behind, a well 'conducted plough, ground not much wider than the thickness of the stakes, which are sufficiently strong, if they are two inches thick, and not one vine will be hurt if carefully tied to the side of the stake. At six feet and a half, there is 2904 vines per acre, and at six by three, 2420. I will not give this distance to be the neplus ultra. We have but a limited experience. I have concluded to that distance from several considerations; to agree as much as possible with the principles and theory before established. That the plough could

be admitted with ease; that the stakes should be numerous enough to resist strong winds, and that the ground may be as much shaded as possible, to prevent a too great evaporation of the moisture of the earth, and weeds, if possible, from growing too freely; and I have seen nothing yet, to bring me to a change of opinion, although we have vineyards planted at six feet, at eight feet, and at sixteen. The first vineyard planted on the borders of the Ohio, was distanced six feet by two and a half feet, it has been worn out in sixteen years; on the spot, there is now young vines growing, since three years, and I am confident, that the second vines will live a good deal longer, because the ground was trenched about eighteen inches deep, and nearly all the vines, have been laid to make layers or provins, because the scions planted there, had a bad success, and most all those, which did strike were laid to fill up vacancies, which operation proves to be very advantageous, so much so, that one of our vinedressers has undertaken to renew his old vineyard by it. I wonder not for their short duration, I wonder more, that they bore twelve or thirteen good crops in sixteen years, for they were planted no better than current bushes, a little hole about

one foot deep, was dug and filled up with top soil, where the scions were planted, the roots established themselves along the surface of the ground, often the plough catching the soil root to a vine, rooted it out, or if there was more than one root, the one caught by the plough made a big wound to the vine by splitting it off. I repeat again, trench the whole of the ground intended to be a vineyard, rather too deep than not enough, rather four feet than only two, the roots will then strike at the lower end of the scions and grow downward, and if you are careful to prune or cut yearly for five or six years, all the roots which will strike near the surface of the ground, and as deep as the reach of the plough, the roots that remain quiet below, will take such force that the vines will quit to produce other roots higher up; and then the plough will never touch any of them. It may be said if the roots are established so deep, all the nourishment of the upper strata is lost to the vines; to that I answer that in the course of the summer, a great many fibers or small roots will shoot up from the large and deep roots below, and come to the very surface of the ground to get the benefit of the air, and more so, of the light and of the residue of vegetable matter,

which has been brought to a final decomposition, by the plough or any other instrument to kill weeds, or procured to the top of the soil by manuring, &c. If, in the beginning of May, you plough the ground of a vineyard, you will not perceive any young roots, but you will, after the middle of June. If you lay in the middle of the interval of the vines, in the beginning of summer, a large flat stone, you will find in September, the surface of the ground under the stone covered with young roots of vines. To ascertain in what time of the year the vines were growing the most, and when they begin to shoot, to cuttings or layers; I made a great many layers in the spring, with the preceding year's shoots, and when the vegetation had began, I raised daily, some of those layers for inspection. I never could see any shooting of roots to them, until the grapes began to bloom, which is always from forty-four to fifty-four days after they have began to shoot; some layers had jetted branches three feet long before roots appeared; then they broke all out at once, and grew very fast; they commonly strike the most abundantly round that protuberance that grape vines have by the eye, and where the leaves hold to the vines; but they will also shoot a great many

roots in the intervals of those knots. . It looks as if the sap from the inside had bursted the bark, and a row of roots close to one another sprouted out of the crevices. This being known, will teach how to conduct the working of the ground in a vineyard. Before that period, the ground may be worked as deep as you please; however, not deeper than it has been done before, for vines previously worked shallow, if worked deep, will suffer for a time, more or less, according to their age. A vineyard only six or eight years old, will appear to suffer one or two years, and after will recover, and bear deep working afterwards, especially if a good manuring is put on it the first year that it is worked deeper; but an old vineyard will be ruined, if worked deep after having grown old with shallow working. After the grapes have blossomed, I would advise to work very shallow merely to keep the ground clear of weeds. Once a year breaking the ground deep will answer the double purpose, of cleaning well the ground of weeds, prevent the washing of the ground in sides of hills by the rain, and pruning the roots as cutting the branches prunes the vines, they will always shoot plenty of young roots to gather up the nourishment. I suppose they find the most

abundantly in that very strata which is subject to be worked. I am besides of the opinion, that the vine roots which may be considered as mouths to the plants, cannot receive any nourishment except by the very end, when, in a growing and in a herbaceous state, when they are of the size of a big knitting needle, very blunt and tender, and become not thicker than sewing thread when they turn woody. I think it will remain forever a mystery, how such tender substance may find its way through solid and stiff clay.

CHAPTER XIV.

Of pruning, training and dressing of vines—Divers ways of pruning—The one adopted—It suits frosty countries, ploughing and beltign—Adlum's method most the same—Pruning and nursing the first year—Ditto, the second accordingly—The fourth pruning—Judgment of the operator always to be consulted—The fifth and every subsequent pruning—Long pruning procures more fruit, but exhausts the vines—Mercenary vinedressers paid by the share, ought to be overseen—Signs how to know if not overloaded—Pruning of the third or fourth year, vines intended to furnish bowers, espalier or hedgrows and Hautins or festoons—Time of pruning—Frost of the latter end of winter the worst—Best time to prune here—early pruning advance and late pruning retard vegetation—In countries subject to late frost, pruning is done late—Slope for the tears to run do no damage to vines nor maple trees by the flow of sap—When the embryo of fruit is formed, and now to ascertain it in vines

THERE is almost as many ways of pruning and training vines, as provinces or counties in

the part of the world where grape vines are cultivated, a partial discription of which I have given in chapter third.

The mode I have adopted for this country, after mature deliberation, is unlike that of any other place whatever with which I am acquainted; but is founded on what I understood to be the theory of vegetation in grape vines, particularly in the Cape grape, the species we have here, and it is calculated to be easily learned and understood by every body, and is upon so simple a plan that the vines may be trained with ease, be out of the way of the plough so necessary to our weed-generating soil and frosty springs. It is a fact that the frost after the buds have begun to move is more intense or does more mischief near the ground than higher up. In Europe the nearer the grapes are to the ground the better they ripen, but here I have observed very little difference if any, at two or three feet from it. I do not pretend to say that no better way can be found. I would be the first to admit any way which would offer ever so little advantage over our method, which has been in practice here for twenty-two years, yet none of our vinedressers have tried to make any change in it: and it hap-

pened to suit wonderfully this new invented way to increase the crop by cutting the vines before the blossom of the grapes. Adlum, near Washington, has adopted almost the same way, if he ties his two bearing branches to the side stakes in an horizontal position; but if he leaves them above forty-five degrees of inclination upwards, the top branches must overshoot at the expense of the lower one.

After the vines have been planted according to the foregoing direction and have shot forth roots and branches, in March or April, the next spring, all the shoots must be cut away, leaving only a little stump, of the fourth of an inch of the lowermost, shoot above the ground, (see figure 1.) Stakes may be planted to the side of those which have made two or three feet shoots the first year; for the second they will shoot eight or ten feet.

This completes the first pruning and training. Then three or four of the young shoots must be encouraged and carefully nursed, and tied to the stakes as they grow; all the surplus shoots must be pulled off as soon as possible, while they are tender. The second spring all must be cut off but one, the straightest and handsomest shoot, which is to be pruned twelve or

fifteen inches long, and tied to the stake with a willow or some bark. Thus for the second pruning, and four or five of the uppermost new shoots must be left and nursed, by suckering and tying them to the stakes as they grow. Some of them will have fruit, which will come to perfection, if taken care of and left till full ripe.

The foregoing directions are for all young vines, planted either to make a vineyard, a bower, an espalier, hedgerow, or hautin; and the figures 1 and 2 will show the strokes of the knife.

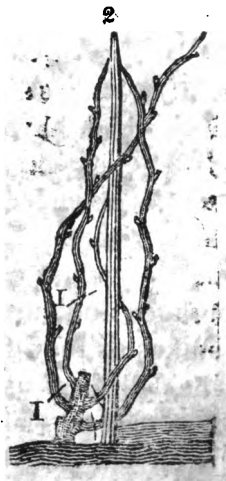


Figure 1 represents vines as they commonly are the next spring after planted.

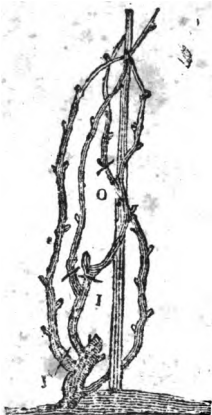
Letter 1 shows the strokes of the knife, at the first pruning.

Figure 2 represents the common appearance of vines before the second pruning, and the strokes of the knife at letter 1, for the second pruning, having a stake planted by the side.

The third pruning in vineyards ought to be done nearly like the year before, except the shoot left, which must be one of the lowest, if handsome and straight; may be pruned as high as the knee, and a horn of two or three eyes any where, may be left to strong vines, to encourage fruit. As soon as fruit may be seen, all buds, shooting without any, must be rubbed off, and the others nursed, as above.

The fourth pruning like the third to all vines which remain weak; but, to strong vines a shoot must be left long enough to be laid horizontally and fastened to the next stake, called the horizontal branch, and another one to make a horn of two or three eyes, all the rest must be cut off.

3



4

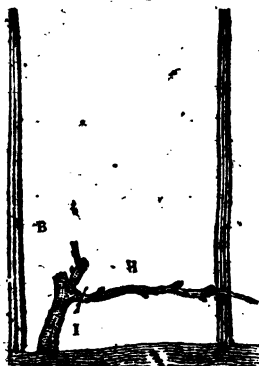


Figure 3 represents a vine before the third pruning, with the strokes of the knife in doing it at letter 1, and at O the strokes to make an horizontal branch.

Figure 4 shows a vine trained after the third pruning—B the horn—H the horizontal branch.

The judgment must conduct the knife of the operator, as to the choice of the horn and horizontal branch; the most sound and full ripe shoots are to be preferred, if neither overgrown nor undersized. As to the horn, it must be established where it suits best to get a handsome and well grown vine-stock. This horn is to produce wood for the next prun-

ing; the operator must also keep always in view, not to increase too much the height of the stock, nor to have it made too low; but to keep it straight and handsome about 15 inches high.

The next year, and at every other subsequent pruning, the horizontal branch must be cut off, and another made out of one of the shoots which have grown from the horn, and out of the other make a new horn. A very strong vine may have two such horns, and if by accident, no good shoot should have sprung out of the horn to make a horizontal branch, any of the others must serve, provided the vine appears to be vigorous. If it appears weak, the horizontal branch must be omitted until the vine has recovered its strength. Here the judgment of the vinedresser must be conducted by experiment. Too long pruning will give more fruit, but will overload and exhaust the plant, and the fruit will not be as good. Owners of vineyards, who have mercenary vinedressers, paid by a share of the crop, have to oversee their pruning; for they will overload and ruin a vineyard in a few years. Vines which shoot such branches as to reach over a stake six feet high, in the beginning of July, are not overloaded, and will bring their fruit to per-

section, and be fit for another year's crop. (See figure 4 to understand what is the meaning of horn, and horizontal branch.)

In countries where the climate is more congenial to grapes than here, the pruning begins at the fall of the leaves, and ends a little before the motion of the buds. Here the vines are hurt if pruned too soon. The hard frost of the last end of the winter does, in America, more mischief to vegetation than five or six times colder weather in the first part of it. Often in the middle of the winter the temperature is warm enough to start the sap, and afterwards a very hard frost comes. It is by such accidents that the peaches are the oftner destroyed, and that the almond tree will not bear fruit, and the English walnut and apricot, have their limbs so often killed by frost in this country. The want of snow is also militating against vines and other delicate fruit trees, as well as the excessive repetition of freezing and thawing, which occur so often in some winters in this country, and which makes the best weather for the making maple sugar.

Three or four weeks before the first opening of the buds, is the best time here, to prune; but it is very hurtful when done after that time.

• Early pruning procures early shooting, and late pruning retards the motion of vegetation in grape vines. The tears or sap of vines, by wounds, do not flow in this country, with such abundance as in Europe, where I used to prune vines in January and February, to prevent that running; but I never observed any damage done by late pruning; for where places are subject to late spring frost, they always prune as late as possible, to retard the shooting until those late frosts may be over, if possible, to give more chance to the shooting buds to escape. Sap or tears quit running always at the first opening of leaves, where I expect it flows to furnish their great evaporation. Careful vinedressers pay attention, when pruning, to have the slope made by the knife in cutting a shoot of a vine turned so that the sap running from that wound should not run immediately on an eye or bud for fear it may be killed by a frost if soaked with water. I observed, also, that no damage is done by the flowing of the sugar-water from maple, no matter how copious, provided the tapping be done prudently, and the wound not made too big with an axe, but with an auger of a small size. It seems that the water running from a sugar-tree, is not the true sap, for which

the sap begins to raise and get mixed with the sugar water, no more sugar can be made, so it may be, also, that those flowing tears in vines, are not the sap. The time of pruning has no effect on the formation of the grapes; for it is in the middle of the summer that they are formed into the buds; not only grapes, but most sorts of fruit. In trees that make their flowering buds differing from the leaf buds, like cherries, peaches, apples, pears, &c. are easily distinguished in August; but in vines no difference appears in the eyes or buds, to show the fruit, until they open in the spring, when they show their fruit very soon, although it grows in the new shoot only, opposite to the fourth or fifth leaf, higher or lower according to the species. To ascertain if vines were forming their fruit, in the same time with other fruit trees, I forced vines to shoot by their new made buds, by pruning in the summer some vines like as in the spring, beginning as soon as I was sure the new buds were formed, in the month of June, and continued twice a week until the vegetation had ceased, or until I was sure that the fruit was well formed by its appearance in the forced new shoot, which was always from the tenth of July, to the middle of August, sooner or later

according to the heat and rain. A severe drouth in the latter end of June, would cause some fruit to appear in that month; and a drouthy and warm summer is always followed by a great appearance of fruit in the following spring, and a great vintage in the fall. Caloric being a good manure, no matter how applied to the ground. In a dry summer it is supposed that the soil gets warm deeper. The evaporation of the rain water must exhaust a quantity of caloric from the earth in a rainy season. At first the fruit appears not fully formed, but shoots every week better, until it shows in the last of July, as well as in the next spring. Some of the vines, subjected to the operation have perished, which corroborated my opinion above spoken of, that the leaves are the stomach of the plant, and that they are preparing and storing up into the tree, a provision of sap or matter for the next spring's restoration of the foliage.

CHAPTER IV.

Bowers, Hedgerows or Espaliers, and Hautins—
Lombardy hautins on Mulberry—Marcottes
preferred to naked scions—Pruning and train-
ing along a pole until reaching the other tree—
Horns kept from growing too long—Festoons
so much admired by travellers, in Italy and
Spain—Care given to mulberries—Their
shade will do no damage if Silk be made—The
covering of a wall by an Espalier—One plant
ought to have limbs but on one horizontal line—
Best plant first the vines at a distance from
the wall—Regular mode of training vines for
an Espalier—Any exposure answering—Such
an Espalier is now existing in Swisserland for
thirty-five years, thirty feet high—Vines left
to climb trees or fences at liberty.

Now as to bowers, espaliers, or hedgerows, and hautins. When the vines have shot the third year, vigorously four or five branches, you may begin to fill up your bowers or espaliers, and let them climb the mulberry tree for the hautins. This last way of training vines, ought

to be the most resorted to in the United States on account of the silk; and it is of it that I shall next speak. In chapter third it was said how Lombardy is all planted; now it remains to see how those superb festoons are to be obtained. As I never raised vines that way on a large scale, what I shall say here, is concerning the rules I think the best, and that I shall follow myself; to establish such a plantation, which I have already begun on the shores of Ohio. From fifty to sixty feet distance, rows of mulberry trees are to be made, the trees in the row are to be from eighteen to twenty-five feet apart. The same spring in which the trees are planted, vines are also to be planted six feet from the trees at each side in the row, two vines to a tree. Here I shall prefer marcottes to naked scions, and it would not be amiss, if two feet wide, where the rows have to come should have been trenched two feet deep before the planting of the trees and vines. Secure both trees and vines from the plough, by good stakes; prune down your vines as aforesaid, two or three years, or until the vines have acquired force enough to shoot branches eight or ten feet long in one year. Then in March dig a trench from the bottom roots of the vines

to the tree about one foot deep if the ground has been trenched, but two feet if not, being careful to save unhurt the lowest roots of the vines, that you may lay the whole plant from its lowest end in the trench one foot or nine inches deep, and bending along the stem of the tree the strongest shoot, and prune it down to six inches from the ground, and cut all the others off; cover the vines in the trenches with only a few inches of top soil, to hold them down, for the first year; that will encourage the striking of a great many roots all along the vines in the bottom of the trench; when the roots are started, or the next year, the trench may be filled up. Nurse and tie to the trees, as they grow, two or three shoots only, per vine, of what will grow that summer. Next spring prune one of the shoots up to the fork of the tree, and cut off the others, and rub off all the buds shooting along the vine, except three or four of the uppermost, that they may be nursed and trained, some along a pole that had been previously put on the fork of the tree, reaching from one tree to another, and the other shoot to be left to climb up the branches of the tree at liberty. If carefully suckered as the suckers appear, they will grow a good

deal longer. The next spring, tie along the pole the strongest and longest shoot, and if it meet with the shoot coming from the other tree, entwine them together in the form of a rope, and leave them as long as they will reach; cut off every other branch, and rub off along the pole every second bud, and all other buds anywhere else on the vine, to encourage the sap to follow the horizontal vine along the pole. All the buds left along that long vine tied to the pole will strike fruit, the plant would be overloaded. I think it will be necessary to sacrifice the fruit, by pulling it off before it blossoms, to have the quickest vines reaching from one tree to the other; but if you will save the fruit, the vine tied along the pole must not be left longer than from fifteen to twenty eyes or buds, that eight or ten may grow and bring fruit, one being left at every ten or twelve inches, after every other bud has been rubbed off, then the shoot at the end of the vine on the pole carefully nursed, and all the others pinched off at the third leaf above the fruit.

The next year the shoot at the end of the vine on the pole may be extended ten eyes longer, that five may grow, after every other one has been rubbed off, and horns of one or two

eyes, made with the shoots growing along the pole; and so on every year until the vines have reached to the next tree, always making one short horn where there was one the year before, but never two. To make a new horn on an old one, the shoot nearest the main vine is to be preferred if equally good, and in spite of all care the horns will acquire some length in the course of several years, but now and then a sucker or water sprout will shoot from the end of the horn, near the main vine. That sucker, if not cut too close, will make a good shoot, on which the horn may be renewed, and the old one sawed off. When the festoon is finished, which is, when both vines from tree to tree have not only met, but each reached the next tree, there will be no other care to be taken of them but the pruning in the spring, and gathering the fruit: for against the time the pole is rotten, the double vines reaching from tree to tree, will be sufficiently strong to support themselves, and will make those garlands and festoons so much admired by the travellers in Lombardy and Spain.

6



Figure 6 represents two mulberry trees and vines trained from tree to tree—letter *h* the main horizontal branches—*l* the lath—*m* the trees—*b* the horns to be renewed every year, and what will grow from them will often hang as shown by the branch with leaves and fruit on.

16

If they should die or brake off, a new post and the nursing of young shoots from the main vine near the tree, will soon fill up the vacancies. It is here supposed the mulberry had been pruned in such a way as to have branches forking from the main tree at seven or eight feet high, on which the pole is to come. When the vines are very strong, some of their branches may be suffered, though sparingly, to run up some outside branches of the tree, and hang from some convenient place; taking care only not to impede the gathering of the mulberry leaves. There is no apprehension that the shade in a field thus planted in rows, even at forty-five feet distant, would injure any sort of crop raised in the intervals; the mulberries being stripped of their leaves until the beginning of June, suppose silk was made, and they would recover their foliage only in time to afford refreshing shade to the reapers at harvest.

5

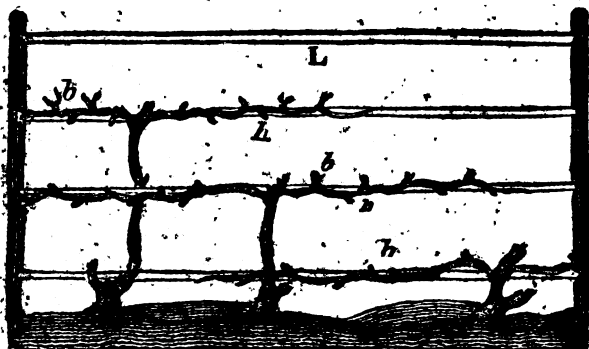


Figure 5 shows a piece of an espalier or hedgerows. Letter L the laths; b the horns to be renewed yearly; h the horizontal branches. At the lower lath as it appears immediately after the training of it. Along the next lath above, shows the horns made the subsequent prunings.

Now for bowers and espaliers or hedgerows: Any way a vine is trained on the lattice work as to furnish regularly the wall for an espalier, and top of a bower, answers the purpose. But as the sap of plants, and of grapevines particularly, always tends to run upwards, it will happen that a vine which is to give branches at different heights, the uppermost of all will shoot overgrown branches at the expense of the lowest

part, which will be always weak; therefore, if a high wall or a large bower in a garden is to be covered with an espalier of vines, the wall or bower must be divided in sections, that one vine may furnish wood enough to fill one story in that section; say from fifteen to thirty feet long, according to the force of the ground. The height of one story being about three feet, a wall of eighteen feet high and fifty feet long, would offer two sections, and five stories, also it would require ten vines to furnish it; one per story in each section; then five vines, or as many as there are stories must be planted before each section, not close to the wall or bower, but four or five feet from it; and when the vines are strong enough to be laid as directed for vines planted by mulberry trees, they are to be laid down in the same way, nine or twelve inches deep, and raised against the wall or bower, and pruned to three eyes: Vines planted immediately where they are to grow, would perhaps do as well; but I have done myself and seen it done the other way. It is supposed that a vine which is to nourish more branches and more fruit than one in a vineyard, will be stronger if it runs some space into the ground, it will surely shoot more roots from the stock; but I think any plant will

get roots in proportion to the branches it has to nourish: also, I do not think that it is absolutely necessary to plant them first at a distance from a wall or a bower, but it is surely better to do it against a tree, on account of the roots of the tree, which keeps the ground very dry within their reach; it is best, however, to do it always when it can be done most conveniently. After the vines have acquired the proper strength, they are to be trained along the laths, so that one vine should furnish one story only, or that all its branches should shoot on a horizontal line, and no where else. (See figure 5.) The vine in the left edge of the section being brought up twelve or fifteen inches perpendicular to the lowest lath, there it must be bent square to the right, and tied to the lath as far as the other edge of the section. If that do not give too great a load to the vine, every foot along the lath, a bud must be left to grow, and the vine is full loaded with twelve or fifteen growing buds, so that a lath twenty five feet long will require two or three years to fill it, without overloading the plant. The next vine being brought up perpendicular, three feet higher to the second lath, and there bent and tied along the lath about as the first one; there may be also twelve or fifteen

buds to grow, one being left at each foot; all the buds in that part of the vines which are perpendicular, must be rubbed off except one or two just under the elbow where the lath in that section has to be filled up with a next year's shoot, when the vine of one story has reached the boundary of the section, there it must be stopped. The next vine, or the third, must go up first to the third lath, and so on until the middle of the section, where, after having brought the vine up to its lath, it must be then bent to the left, having there more room. To have a perfect espalier or bower, it requires much nursing until the wall or bower is completely filled, then you will have a horn every foot along each lath except the top one, which must be left naked, that you may tie to it the sprouts of the story under it. This horn must be made anew every year, by the pruning, as directed for the festoon between the mulberry trees, and what grows from them, must be suckered and tied to the lath above, and may be pinched a couple of feet higher up. What grows on the top or roof of a bower, may be left to grow at liberty after it has been pruned. An espalier of vines thus trained cover a wall or a bower most beautifully, and bears abundance of grapes, which

come to fine perfection, and make a noble appearance; every exposure I expect would answer in this country; the southwest is the exposure that I saw grapes come first to maturity. There is in Swisserland such an espalier in full perfection, thirty feet high on the side of a large barn, planted there by myself thirty five years since.

The capegrapes that are left to grow up a tree at liberty, or on a scaffold will bear much fruit if no pruning is done to them at all, but will be subject to die above the ground very often, and will shoot again from the roots with great force. If one or two shoots are nursed and carefully trained, they will fill up their former place in a short time; but if pruned yearly, and nine-tenths of the last years growth cut off, they would stand longer, and their fruit be better.—

Vines may thus be left to climb on fences, and produce a good deal of fruit; and handsome curtains, may also be obtained by training a vine up a post of a porch, and along the plate under the eave of the roof, to which horns of two eyes are yearly made out of the last growth; at every nine or twelve inches, like the festoons on mulberry trees, from which the young shoots which have grapes must be left to hang down.

CHAPTER XVI.

Budding, suckering and tying vines to stakes—This work mostly done by women—Apt to be neglected if left to men—May be omitted in some extra favored countries—Method lately admitted, to leave a stated number of bunches—Foresight for next years pruning—Number of bunches supposed that ought to be left here to a vine—Pinching the shoots on the horizontal branches—Suckering not absolutely necessary except in peculiar cases—Damage done by pinching shoots intended to make horns or horizontal branches—Leaves not to be pulled off—Large forests of oak trees killed by being stripped of their leaves—Withering of the grapes after maturity may be good—Sweet Muscat wine made by such process—Industry recommended to save leaves on vines—Few insects hurting vines—Crickets belting the stems of branches—The knife not to be used to do the above work—Urgency of fastening vines to stakes—Vines left to run on trees at liberty, require no pruning—New invention of belting vines—Too new yet to pronounce on its advantage—It increases the

crop—Complete success of the first trial on a branch of a pear tree—An instrument to perform that operation on vines sent to our colony from France—Similar instrument proposed for cotton plants.

ALTHOUGH I have said a good deal heretofore about budding, suckering and tying, or fastening vines to stakes; I have to make it the object of this chapter, having a good deal yet to say about it, to enable any of my readers to do it themselves without seeing it done. The work directed here to be done to the vines, is chiefly performed by women in Switzerland, and in a great part of France if not all over, and some of it on the Ohio; and I have always observed the vineyard to be prosperous, and the females healthy and blooming, who take earnestly upon themselves the care of that part of the work in vineyards. Men have, at that time of the year, a plenty of other work to do, they are, therefore, apt to neglect this, because it seems at first not to be of much use, and too tedious to be done by men. In the countries where wine is very cheap, and vines naturally flourish, as the south of France, about Nismes, Montpellier and Lunel, they omit it altogether, as I have seen it myself.

But here I must repeat, our soil is such a producer of weeds, that it requires the plough and harrow almost always running; the new branches are then to be put out of the way as they grow, and by it the leaves are made to be less crowded and better exposed to light. The budding consists of rubbing off as soon as the embryo of the fruit appears, all the *young shoots* that are *useless*, either because they have no fruit, or will not be wanted at the next year's pruning, to make a horn or horizontal branch; they are living at the expense of the others, and have no business to remain. Here the intelligence of the operator must, as in pruning, be always consulted, to leave the shoot which shall best fit the pruning of next season. The cape grape vines, when the plant is healthy, shoots commonly grapes from every growing bud; there is always a plenty of shoots to prune on the next year. It is the case also with the grapes lately introduced in Switzerland, which being pruned like the sort less prolific, were soon worn out. Some of our best vine-dressers took the fashion to rub off in budding time, not only buds showing no fruit, but also all others above two per horn, which operation leaves only eight shoots per vine, which

have each two bunches, and these often yielded a half gallon of wine per stock, planted at two feet eight inches apart each way. If we would work here upon the same principle, we may leave from twelve to fifteen shoots to a full grown vine, and they often bring forth three bunches to a shoot, say two bunches; a vine would have to nourish from twenty-four to thirty two, that is a plenty for vines planted at six feet by two and a half; for if those thirty-two bunches would weigh only three pounds, that would make one quart of wine, and better than seven hundred gallons per acre, more than the double we ever made on the shores of the Ohio. There is no impossibility that vineyards planted according to the good rules, and well tended and manured would not yield that much. In performing the operation of budding, if there should be some shoots on the horisontal branch that are long enough to admit of being pinched, on the third leaf above the uppermost bunch of grapes, it may be done with propriety; it will cause the blossom to retain more fruit, but one of the suckers must be left to grow afterwards, to fasten that shoot to the stake, if it should become necessary, and to produce leaves enough to nourish the grapes.

The suckering is as in the cultivation of tobacco, the pinching of the lateral shoots growing from the interstices of the leaves, and the tendrils or wires, which grow opposite the leaves. The younger the sucker or the wire is pulled off, the less is the wound made by it. This operation is not absolutely necessary, but it does good to the shoots which are to be left at the next pruning, for horns, or horizontal branches, or which are to make layers, or, to grow very long, to fill up bowers and walls, or to make festoons from tree to tree. They will grow more smooth and longer; great care is to be taken, not to pinch the top of them: it would cause the opening of the buds, that were to remain dormant until the next spring, and out of which the succeeding crop is to come, which would be greatly injured, and the operation of pruning much deranged, by such untimely opening of the buds. No leaves are to be taken off, for the purpose of giving more sun to the fruit; it does great injury, both to the fruit and plant. If all the leaves were taken off at once, it would stop short the growing and ripening of the fruit very near in the same way, as if the plant should be cut off; the leaves are a material organ of the plant. It has been seen that

large forests of oak have died, from having been stripped of their leaves in the summer, by the caterpillars. They answer the same purpose as the stomach in animals; when they become useless they drop off themselves. When the grapes are completely ripe, they may then with some propriety be made to wither, so that a part of their watery principles may evaporate, to increase the richness of their juice. In Hungary, to make the Tokay wine, grapes are cut from the vines and spread on straw in garrets or open rooms, and left there until half their juice has evaporated. In the south of France, to make the sweet Muscat wine, they twist the stem of the grapes, when full ripe, to stop the flowing of the sap, and leave them to hang to the vines until a great part of their vegetable water has been evaporated, then pulling off the leaves which shade the grapes may be a good operation.

Wherever wine is to be made out of grapes as soon as they are full ripe, the more leaves there are on the vines, when the fruit is ripening, and the more green and healthy they are, the better will be the wine. It is, however, my humble opinion, and what I have observed, since I have paid attention to grape vines, al-

though I may differ in this, with some other vine dressers, that, instead of pulling off leaves from vines, it would be better to use all industry and exertion to prevent the untimely fall of them, by keeping the ground well ploughed, manured, and clean, and all the other work done neatly and in season, and by destroying all the insects that may do any injury to them. Happily there are not many caterpillars, that do injury upon their leaves. There is, however, a very small one which lodges itself in the bunches in time of the blossom, and sometimes in Europe do much mischief; but I have seen none yet in America, except a worm that is found sometimes in berries before they are ripe, and causes the grapes to rot. Perhaps it may be a second generation of the one in the bloom, for it looks very much like it. There is in some places a species of cricket, that comes in the night, and preys on the bark of the stem of the bunches, among the berries, when about full grown and begin to ripen. As soon as they have belted the stem of a bunch it perishes, and dries. They have done great damage on the borders of the Ohio, before it was found out what was the cause; but by going after night, with a lantern, they were found busy at

work, and were easily taken and killed. The light of the lamp dazzling them, a child ten or twelve years old would kill a couple of hundred in an evening; and by industry they were at last, in a manner, destroyed, and now do little or no damage.

It seems to be a general opinion among the vinedressers, even in the time of Virgil, that the knife is not to be used to take off any thing from vines, when the leaves are growing, or the shoots are young and tender; it cannot be from any injury done to vines by the iron blade of the knife, which rusts immediately at the first contact of the sap, which, in growing vines, is much impregnated with tartaric acid, and has a great action on iron; that is, I suppose, what gave the start to such opinion; for I think it would do no harm to vines. But if the operation of pulling off the superabundant young shoots from vines, is done in its proper time, the fingers and nails are sufficient, and will perform the work quicker. If you wait to pull a sucker off, until it is necessary to make use of a knife to get it off, better leave it; its leaves are then in full operation to digest the sap, absorb light, and the carbon of the air. Taking them away would derange that operation. Any

green thing which is to be pulled off from vines, ought to be done when young and tender, before the leaves are performing any of their functions. It seems that all sorts of fruit, and particularly the grape, have the same operation to perform as the leaves, before they are ripe; for the grapes are greatly injured by being stripped of any of their berries before they have come to perfection. The remainder of a bunch of grapes, from which a part of the berries have been pulled off as they were changing, as it often happens where children have admittance, will quit prospering: they are even hurt by simply handling. I think it rubs off the gloss or down with which they are provided, to prevent their being wet by the rain and dew.

Tying and fastening vines to the stakes are of urgent necessity, and cannot be dispensed with, except in a few privileged countries, although it is one of the most costly operations to be done in a vineyard, on account of the stakes. It must be begun in pruning time: all the shoots left to bear, when the stock is young, are to be fastened carefully to the stakes, by an osier or willow; and a ligature done *appropos*, will straighten a crooked plant; and the young shoots must be tied once as soon as they

are long enough, which is commonly when grapes are preparing to blossom, and one or more times as they grow. Rye straw is here sufficient, but the inside of elm, lin, or pawpaw bark is better. The uppermost ligature must be made near the top of the stake, and if there are some shoots too short to reach the stake, they may be tied to some strong shoots. No leaves are to be packed into the ligature, for they become a nest for insects; nor of course, bunches of grapes, as they would not thrive there; but the operation must be neatly done.

The above three operations, viz: budding, suckering, and tying, may be dispensed with on vines left to run at random on a scaffold, or tree: Also, on a vine which is trained to make a festoon, or a curtain round a porch or piazza; for the young shoots after their weight has brought them to hang downwards, do not add much more to their wood and leaves, but the grapes will generally grow to a beautiful size. Of late years it has been found, that cutting and peeling a narrow belt of the eighth or sixth part of an inch, of the bark of a tree, in the beginning of the running of the sap, more fruit will be generated. An instrument has

been invented, in France, to do that operation on vines, with expedition; and one of them was sent to our settlement soon after its invention, with a printed direction. Some of our vinedressers caused a few of these instruments to be made at Cincinnati, and have found that the operation of belting, increases the crop, as much as a fourth; but the time of doing it according to the direction, being too short, only between the first opening of the blossom and their fecundation, a period of not more than two or three days, it is not resorted to generally, and the operation is always made on branches that are to be cut off at the next pruning; for fear that the plant may be hurt, if made on the main stem. By the want of a continued experiment of some years, it is not known if that increase of the crop, is not by anticipation on the future; or if this operation may not exhaust the plant, as some of our vinedressers think. In a few years more, that point will be ascertained; until then, it should be done very sparingly. It is easy for a skilful vinedresser to increase the crop by the pruning, but there has never yet been discovered a mode (except this belting may be one) to get an increase of crop, without injuring the plants, oth-

erwise than by good nursing and manuring. As this belting is deranging the course of nature, our hesitation in not adopting it fully, and generally, is not without some good reasons. By what I have done and seen myself on different sorts of trees, I have no reason for omitting it; still I dare not do it on the main stem of my young vines, but think there is no danger in belting, every year, the horizontal branch which is to be cut off at the next pruning. I observed also that the period of doing it is a good deal longer; for it may be done as soon as the sap runs so as to admit the bark to peel easy, and the sooner the better, as the sap having run up, by the wood to the leaves, to be there digested, and to receive what the air is to furnish, and returning back between the bark and wood, is prevented by the belting, from running into the roots, but is stored up in the branches, and its great abundance there, forces the tree to make blossoms bud, if there should be none before, and causes the fecundation of the blossom to be better performed, and the fruit better nourished. The first trial I made of belting, was about seven or eight years ago, on a branch of a very thrifty pear tree, about fifteen years old, which had never blossomed, as it had no blos-

som buds made. It blossomed the next spring and bore fruit, on the belted branch only; and the operation having been performed on the main body of the tree, it has borne abundantly ever since. The same operation was repeated in the spring of 1825, which caused blossom buds to be formed the following summer, and an abundance of pears in 1826, in the belted limb only; the balance of the tree not having made a single blossom, and apparently, is not preparing to make any yet. The advice had been given to the public in a Cincinnati Almanac, some years ago, and, if I am not mistaken, the same fall we received in our colony the pamphlet and instrument above mentioned.

If the operation is awkwardly made on stone fruit trees, or on vines, it is apt to kill them; but on apple and pear trees, there is no danger. The good effect of one belting is felt on several sorts of trees, more than one year, but on vines it is not yet well known, the operated branch having generally been cut off, at the next pruning; but I have no doubt, that the effect may be good as long on vines as on trees, being under the same circumstances. I have seen in the American Farmer, of Baltimore, that a patent right has been asked for that discovery on cot-

ton, and the figure of the patented instrument to make the operation, was like the one sent to us from France, to operate on vines. Belting cannot procure more bunches on vines by doing it in the spring, for that year, for they are all formed; but it causes a better fecundation in the bloom, which makes the berries more numerous, and they remain and prosper better in each bunch; they also grow bigger, and ripen a few days sooner,

CHAPTER XVII

Number of diseases—Mildew or Carbon—Unripeness of the wood—Short jointed exhaustion—Mildew the severest sickness—Symptoms—Whole vineyards thus sick, in 1808, in Switzerland—Small exception—Bad wine made there then—Afflicting vineyards made on new ground, with more intensity—Same sickness which attacks all imported vines here—Flinty ground clear of it in Switzerland, but not here—The moisture of the air cannot be the cause—Mildew on wheat attributed to several causes; also, on vines—The cause must be sought for in the air—Unripeness of the wood a disease—The great heat of the summers, the cause—Imported vines from a warmer country having a better chance—Sap of vines easily frozen—Thawing hurtful to frozen plants—Advice to cover with straw in place of earth—Short jointed, not seen here yet—Good attendance and manure will not cure it as they do exhaustion—An insect of the Beetle family causing some damage in the summer of 1825, in a vineyard near Cincinnati.

IN this chapter I shall have to repeat something, of which I have already spoken; viz: The sickness of vines being the cause that we can raise no good grapes in the United States, with few exceptions; which will, I trust, secure the indulgence of the reader, on account of the importance of the subject, and in the hope that some of them, if put on the track, may be more fortunate than I have been, and discover the cause of it, and find out an effectual prevention or cure.

The different diseases that I have seen afflicting vines, are not numerous. They may be denominated, 1st. the Mildew, called Charbon or Tache, by the French, whose meaning is, by *Charbon*, burnt to a coal, or like a coal; and by *Tache*, a black speck: 2d. Unripeness of the young wood, which causes it to be frostbitten: 3rd. Short jointed, called *Sorbatzi*, by the Swissers: 4th. Exhaustion, by overbearing.

The Mildew, or *Charbon*, is the most severe disease that sickeneth grapevines. One of the first symptoms is a mouldy and black dust that appears some time on the under surface of the leaves in the months of July and August, and grows gradually more intense. Black specks then appear on the young parts of the

shoots, and on the fruit, as if made with a hot bit of iron: the leaves then crisp and fall, the fruit becomes black, and dries, and what fruit seems to escape the sickness, will not ripen well, and remain uncommonly sour; the young shoots will be extremely brittle, and the pith black.

In the year 1806, the whole of the vineyards in the Parish of Swisserland, where I was then, were sickened, more or less, with that disease; and it was about the walls, (which make terraces) on the top and at the foot, that the sickness was the most intense. There was, however, a narrow strip across a large vineyard, that appeared not sick, by the different hue of the leaves, for the distance of more than one mile. A number of men, among whom I was, on account of the singularity of the case, went immediately to visit the spot, and found the vines and grapes healthy and good, and by trying to find out the cause of it, we found that a vein of a different kind of rock was there on the bottom of the ground. It was a species of blue aluminous slate, but more solid, and not combustible as the aluminous slate of this country; both sides of that vein being calcarious. There was no difference to be

discovered on the top of the soil, except some fragments of the rock where they had lately dug trenches in the ground very deep, and where a brook had dug a valley.

The very large crop of wine made that year, was the worst ever made in that country, and a great part of the grapes growing on the vines planted on new ground, were left without being gathered. The sickness on such vines, had been extraordinarily intense, so that many of them died of it. The grapes in a vineyard of mine, where the earliest and sweetest used to grow, that year remained sour, though there was not a sign of the disease appearing, except on the very point of the seeds in the berries, which was black, or as if rotten; and it is my opinion that that sickness begins there.

That sickness, as I have already said, is the very one that attacks generally, where I have been in the United States except in large cities, every species of grapes, imported from the other side of the Atlantic, after the third or fourth year from the time of planting, except the Cape grape, or, as some call it, the Constantia, which has not often got sick; and if there is any other exception it must be some new species of grape lately imported. In the flinty, or silicious part

of Switzerland, these new made vineyards were not subject to it; but in the United States, I saw that sickness, where I thought the soil was altogether silicious. No body has yet satisfactorily shown the cause. It cannot be the moisture of the atmosphere, as it has been supposed, for there can be no place in the world more moist, than the air of the Islands which lie west of Africa and Europe; particularly Oleron, in the bottom of a large gulph, having an immense sea to its west, in a latitude where the west wind must predominate. There the vines flourish so well, that most of the whole of the Island is planted in vineyards. And as highly manuring with stable dung, which is known to procure a great deal of moisture to the ground, being a cure in Europe, as I have already said, stands as a proof, that the disease under consideration, is not caused by moisture, either in the air or in the ground; for in Madeira, where the air must be very humid, they are watering their vineyards, by running brooks; and the before mentioned English gardener, Mr. Speechely, recommends to procure a great moisture to the air of the green house, where vines are in bloom, that the fecundation of the fruit may become perfect. Is it not rather, that our

atmosphere is too dry? It is said that in the Eastern States of the Union, some of the people are of the opinion that Barberry bushes are the cause of the mildew in the wheat, in some other part of the world, they believe that mildew is a plant of the parasite kind, and large volumes have been written, to tell how to kill the seed of that plant; but in Europe a noted farmer has lately proved by repeated experiments, that it cannot be sown or given to the wheat; for if the wheat is sown early, and in good weather, even by sowing the most mildewed grain, will not mildew; while the most sound ~~if~~ sown late and in bad and cold weather, often becomes mildewed in spite of all the remedies. All what this proves to me is, that the cause of this disease, in vines or grain is yet unknown. In the ninth chapter I noticed some of the many different opinions entertained by myself, and other vinedressers, on the cause of the mildew, or Charbon, on vines; but I shall here speak something more of it. I thought once, with a great many others, that round drops of water made by rain or dew, and being suddenly struck by the sun, will act as a burning glass, by gathering the rays of the sun to the focus, which for a round glass or a drop of

water, must be immediately close to it, and thus mechanically burning the spot on which it lays. I took that notion before I had observed the black dust on the under part of the leaves, and the rotten point of the seed in the berry, which appears some time before any black specks are seen. That opinion being thus put aside, I thought then that, perhaps, for the new made vineyards which are all established on well trenched ground, the top or rich soil having been buried two or three feet deep, the roots of the vine finding a plentiful supply of food in the bottom, omitted to send any roots to the top of the ground where they must find the heat, and the combination of light, or of the gasses, with some of the principles of their food, things that I supposed could not be procured two or three feet below; and the good effect that manuring had on those vineyards, and their complete cure by trenching them over fifteen or twenty years after, was, I thought, a sufficient evidence of the certainty of that opinion; for the dung, by attracting the roots towards the surface, where they found the principles above alluded to, which caused them to make more fruit, which is known to spend a great deal more sap than both wood and leaves,

prevented the overshooting; and the trenching over again, mixed the whole bed of soil, and made it similar to the one in old vineyards; then the roots, although established at first deep, had no predilection to remain there altogether. I thought I had hit the very thing, until I saw that disease in America, on vines planted on ground which had not been trenched, and that the roots were all running near the surface. Now, according to my humble opinion, the cause must be sought for in the atmospheric air, which is a compound matter, and which may have in its composition more of one of its elements at one time than another, and more in one place than in another; for example: if a blast of wind would bring on vines under certain circumstances, an air more loaded with carbonic acid, or oxygen, than in ordinary times, which being corrosive, may thus cause that sickness; by too great a quantity of oxygen at once, or by a sudden repercussion of the oxygen, when in a full operation of being extracted from the leaves and tender part of the vines by the action of the light, and being yet unmixed with the air, and in contact with the plant, may have that corrosive effect, and vines growing for the first time in new ground, may give more

oxygen gas by the effect of light. I leave the question to chemists who may try to immerse growing vines in different compositions of air. The one who will learn the public how to get grape vines of every kind to grow here, clear of that sickness, will make an immense gift to the country.

Unripeness of the wood of a plant is what disqualifies it to bear the winter frost, and may be considered as a disease if it is not the consequence of the mildew; but I think it is not, for the Cape vines are sometimes mildewed, and still bear the winter frost, and some of the sweet water will perish by frost when no mildew is seen on them: Therefore, I am induced to treat of it as a sickness, although peculiar to the United States, for I never saw it in Europe. Before I had discovered that unripeness of the wood, was the cause of that apparent consequence of the frost in the winter, I was of the opinion of a great many, that grape vines ought to be imported from colder countries, supposing that they would bear the American winters better than those imported from warmer countries; but the following fact has appeared evident to me, after attentive examination of the way of growing of the dif-

erent sorts of vines, that have come under my immediate inspection: The vines coming from the north of Europe, when they feel the July sun of America, quit growing, their sap gets stopped, either by the effect of the mildew, or only (as I think) by the great heat: a great many of their leaves drop, and when the refreshing nights of August and September arrive, they start a new sap, open a great many of the buds, which were to remain dormant until spring, and when the frost suddenly comes, often between two warm days in September, and surely in October, it catches those vines while full of sap, which, in vines, is a fluid more easily frozen than in other trees (for I have inoculated some young apple trees in full running sap, more than three weeks after the leaves of vines had been all killed.) While the Cape and Madeira, the only vines I had coming from warmer countries, grow best the warmest days, and the refreshing nights of August and September, stopping gradually the flowing of the sap, the wood gets ripe, and when the frost comes there is no juice to freeze. There is now at St. Genevieve, in the state of Missouri, at Mr. Valle's and Lamoureux's garden, vines bearing, as they say, a species of Black Muscat, appearing as

healthy and prosperous, as the Cape grapes, which are growing near by, being in bloom when seen by the author; they were found to be of the hermaphrodite sort, and were introduced into that village by a French gentleman from New-Orleans.

I have observed that on some of the first vines I planted in America, a white frost of September, caused the bark of a big shoot on a young vine yet green or unripe, and in full vegetation, to crack. Out of this crevice, some sap had run, and an icicle of about two inches long had been formed, while I could perceive ice no where else on the place; and by close inspection, I found that a ring of ice surrounded that shoot, under the bark as far as it had cracked. After one or two hours of sunshine, that vine was killed above that crack, as well as several others through the vineyard, that I supposed had suffered the same way; then I concluded that it was the summer heat, that caused the delicate vines to perish in the winter, by having their wood unripened. To try to save those which had not perished by that frost, from the influence of another frost, I buried a great many, and covered them with a hill of earth, but some very warm weather came in

the middle of the winter and my young vines thus covered with loose soil in a south exposure; and steep hill side, started some vegetation under the ground, and were more hurt than those which remained uncovered; nevertheless, I advise to cover delicate vines, not with earth, but with a thick bed of straw, under which they will remain dormant and unhurt, provided they have been covered before the first frost, which is often the one that does all the mischief; methinks that it is the untimely fall of a great part of their leaves, or the accident of being frost bitten early in the autumn, that prevents the wood to come to maturity; it is, also, the heat and drought of the summer that causes cherry trees to blossom sometimes in August and September, which hurt them much, and the English walnut to be frost bitten in the winter, their summer shoots remaining also unripened.

There is another disease on vines, which causes them to grow short jointed, that is thought to be contagious. I know no remedy, except to root them out, and trench the ground over, and replant young vines in their places. I tried with little success to replace them with layers or provins.

I have seen very few vines, here if any, afflicted with that disease which is called *Sorbatzi*, in the common Swiss language. It was mostly the general opinion, that overbearing was the cause; but the plant once sick cannot be restored to vigor, by short pruning and manure, as it is done for another sickness, caused by exhaustion, and called here by that name, whereby the leaves grow yellowish and remain so the whole summer. I have not seen many insects, besides those spoken of in a former chapter, doing damage to vines; but two Swissers, who planted a small vineyard each, on the border of Licking, about two miles from Cincinnati, were complaining that their vines were last season sickened by a quantity of red bugs, of the beetle family, which seems to fling on the vines. They drop on the ground at the least motion given to the plant, but soon climb or fly up again. It is the same bug which sometimes destroys Cucumber, Muskmellon, and pumpkin vines. This, however, is only a local affair that I have never observed myself.

CHAPTER XVII.

Layers or Provins, and Grafts—What is a Layer—Operation much resorted to by vinedressers—Difference between Layers and Marcottes—How Layers are made, and their use—Preparatory nursing on vines intended to be laid—Operation to encourage roots to strike deep—Natural propensity of vines to strike roots at the surface of the ground—Mode of making layers without laying down the old stock—Trial to renew a whole vineyard by such layers—Grafting not much practised—Trial to save vines from the mildew by Grafting—Many modes of grafting—season to do it, and to save scions—Whip grafting for small vines, on large—My new invented mode—Grafting by approach the surest—Done before vegetation begins—Advice to keep grafting good grapes on wild—If a public botanic garden should be established, a corner of it, ought to be appropriated for trials on vines.

PROVINS or Layers, or vines laid in the bottom of a trench, to fill up vacancies, or for

nish a wall, &c. have been often spoken of in the course of this treatise. They are very often resorted to by vinedressers, and in the old time a vineyard was not admitted to be finished until all the vines had been laid. There is one sort of layers, made in the spring to get roots to a young vine, which is to be dug up and replanted. I have called them marcottes to distinguish them from those which are to remain where made, and which make the subject of this chapter. (See chapter 12, where it is said how to make marcottes.) It now remains to acquaint the reader how the provins are made. The third or fourth spring after a vineyard has been planted, instead of replanting scions where they have missed, if there is a vine near the vacant place, which has two or three shoots long enough of ripe wood; in March or April a trench is dug from the bottom of the vine to the vacant place, with care not to hurt the roots of the vine, and then laying it down level in the trench from the very bottom of the vine, and one of the shoots being raised where the vine was that has been laid down, and another where the vacant place is to be filled. A stake is to be planted by the side, the vine tied to it and pruned down to eight or nine inches; that is

called a provin, and it may be also made use of to fill vacancies in old vineyards; it requires, however, more trouble and attention to save the roots of an old vine, in digging the trenches, and to lay it down without breaking. A strong vine may fill up three vacant places besides his own, and thus make four provins; but two or three is sufficient. The summer previous to that operation, the vines intended to be laid down are to be nursed with great care, that the shoots may grow long without fork, and have their wood well ripened, which is always obtained by keeping the suckers and tendrils rubbed off as soon as they appear, and the shoots tied to the stakes as they grow; and when they have overtopped the stakes, and begin to bend down, tie them to the top of the next stake, to prevent them from breaking, and always take great care that the end shall not be pinched; but if by accident it happens, the upper sucker may be left and nursed, and it will answer to continue the main shoot. As the roots incline to strike towards the surface of the ground, and those roots running too near it, are in danger of being hurt by the plough. The provins which are to be laid at ten or twelve inches deep, in the bottom of a

trench, must not be covered more than two or three inches with soil the first summer, then they will strike a great many roots along in the bottom of the trench, and if the trench had been made deeper, and the surplus depth filled with light and rich soil, the roots will run downwards, and once started, they will continue to grow after the trench is completely filled up the next year; otherwise, if the layer is at first covered to the full depth, the most roots will strike near the surface, and very few below. There is another way of making layers, that I made much use of in Europe, and now and then here. Instead of laying the old vine in the ground, take only a shoot where it joins the old wood, cut out half the vine sloping two inches, by which means the vine can be doubled downshort in the trench, and raised up along the stake, to which it must be tied and pruned down to eight or nine inches. Near Bordeaux, in France, I have seen layers made that way, except in lieu of the wound, they twisted it like a withe. They are making in Swisserland a great many without either wounding or twisting, they are called arch or bow; but by comparative experiments, I found that those made with a wound struck more than twice as many

roots as those made without the wound, and I thought that the mother vine had less to nourish, or was less sucked by the layers which had been wounded. I have in that way renewed the whole of a small vineyard, but found out that trenching over and replanting anew, was still better. the next pruning time I commonly severed completely the layers from the mother vine, and dug the end which goes downwards, and cut it at a foot from the mother stock. At that new wound, they used to strike a good many roots, after which the layer may be considered as an independent plant, and did prosper so well in young vineyards, that in three or four years after, they could not be distinguished from the others. Where I undertook to renew the whole vineyard, I took the notion to tie the layer in the ground where it was to be cut next year with a sort of lead wire, made by cutting a sheet of lead in narrow bands, expecting that a great many roots would strike to the side of the lead next the provin. Knowing that the sap prepared in the leaves to make wood, is running between bark and wood downwards, and when opposed by the lead, would there strike many roots and make a big swelling, with a thin neck under the lead, where it would break easily if

pulled from the end near the mother vine, which happened and made very vigorous vines, and would have made a good vineyard if the specie of grape had been of the best sort.

Grafting of vines is not much practised by vinedressers, although it may answer to some good purpose in several cases, and we ought to try that way in this country to obtain new varieties, for I was told that vines differ from other trees, that the stock communicates some of its character to the grapes grafted on it; I give this only as an hear say, although I have made a great many vine grafts, I never did it for the purpose of ascertaining that point, and I never observed any changes in the grapes from those growing on the vines from whence I took the scions; but the seeds of a grafted grape may give a variety, partaking both of the stock and the graft.

My principal object in grafting vines, was to ascertain if those which are subject to the mildew in new planted vineyards, would escape it, if grafted on species which were not subject to it. For that purpose I planted in one of these new made vineyards, a good piece with a coarse black sort of grapes, very little attended to on account of the bad wine they make, and

on which I never had observed the least sign of the mildew, on which I was to graft the most delicate sort. A great many grafts were made in every way possible, but I learned little more by my experiments, than that I had done better for my interest to plant at first my vineyard with the good sort, because the cure of the mildew was found in the manure, and quitting that country to come here, left the experiments imperfect. I used to graft when the leaves of vines were fully open, that the running of the tears should not flow too much; but some authors give the middle of March as a proper time to graft vines: thus the season is prolonged from March to May, for I had good grafts made in May.

At the pruning season make choice of cuttings for grafts or scions, from the best bearing branches of the sort of vines intended to be propagated. In general, the butt end of the last year shoot is to be preferred, but in well ripened and vigorous wood, any part of the shoot will answer, provided it be not too long jointed. The cuttings should be preserved as told, for scions to plant,

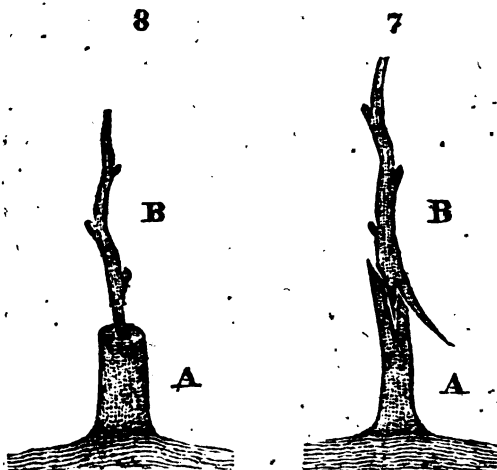


Figure 7 represents a whip graft—letter A the stock, B the scion—The graft by approach has its connection with the vines. to be grafted on the stock A by the heel of the scion B at the right

Figure 8 show at A the stock with a hole in the middle and at B, how the scion is to be prepared and inserted to make a vine-graft, the shoulder to be brought down so as to rest on the stock.

Upon small stocks of the size, or not much bigger than the scion, whip grafting or that way of grafting, that both stalk and scion are cut sloping, and both split half an inch, will be

found the most advisable; but on large stocks, my new invented way, which may be called vine-grafting, because it will answer on no other tree, is to be preferred. It consists to bore in the middle of the stock down the pith, the stock having been previously sawed two inches below the surface of the ground, true and square, and smoothed with a sharp knife; that hole is to be made about two inches deep with a gimblet of one fourth of an inch bore, take a scion of the size that after having made a shoulder of the thickness of the bark, or not much more, all around the scion, and made like a pin below to fit the hole, and the shoulder to rest on the top of the stock: then a mortar made with stiff clay, well worked with hair or horsedung, must be put all around to cover the wound, and some of the soil is to be heaped against it, and a stake planted by the side, and the scion pruned down to three or four eyes. But the grafts which are the most sure to succeed, are the grafting by approach. Indeed I have seldom known any plants miscarry, that have been grafted this way: for that purpose, it is necessary that a vine of the species to be propagated, should be growing in a pot, or near the stalk to be grafted, and that can be easily got in a vineyard, by grafting

first in the common way some scattering vines, then afterwards there is a great many vines that may be grafted by approach. The way I have done it in the before alluded vineyard in great numbers, although I had never seen it done that way, and yet am ignorant if it has ever been practised. I give it as a sure and simple way. The stock must be cut in a long slope, and must be split as you would do to make a whip graft, then you bring from the neighboring vine a shoot to which a wound is made near the mother vine as for a layer, on purpose to bend it short down into a trench, and where it comes to the split of the stock, a big wound is made to the shoot, with the same slope from the top as the stock, and then a split to be inserted into the stock as a whip graft, the spur of the shoot remaining united with the shoot by a third or fourth part of it, by which the sap from the mother vine may communicate.

See figure 7, the spur of the scion to the right on the letter A, is to remain connected with the mother vine.

That operation must be done before the opening of the buds, otherwise they could not be saved from being pulled off in doing it. When grafted below the surface of the ground, roots

will strike from the lower end of the graft; they are to be rubbed off as they appear, as well as the shoots sprouting from the stock, if the roots are left to grow at liberty, there would be a great chance for the graft not to unite with the stock, for it would depend on those roots for support; and if grafted above ground, a big lump of the clay mortar is to be put, and some moss is to be wrapped round, fastened with a cloth, and kept moist, until the union is performed. A few vines of the Cape grapes have been grafted in our colony with Madeira, which made plants having no difference with those coming from cuttings. The trial of imported delicate grapes on Cape or Madeira vines, has not been made to my knowledge, because they were considered also as imported, and were not always free from the mildew; but Cape grapes have been grafted at Cincinnati on wild, however, without the least signs of difference with the ungrafted in their fruit, and the roots growing from the graft having been left to grow freely, there is some difficulty to ascertain if they are not supported by those roots alone. Although I have been unfortunate in my attempt of grafting delicate or imported vines on indigenous stocks, and that I have not found that the

stock communicates any of its character to the graft, I shall invite all the gentlemen who can conveniently do it, to try every species of good grapes on every species of our wildings; it may happen that on a great many trials, one may bring a more hardy and prolific plant, especially if their seeds were sown.

People who have a good deal of leisure time, ought to make those experiments which take many years to know the result. If any where in the United States a public Botanic garden should be established, there would be the proper place, to have a corner of it appropriated solely for the purpose of trying the raising of new species of grapes, either by seeds or grafts; and if there was a green or hot house, several species of the best grapes, and even a male plant of the most vigorous indigenous ought to be introduced in it, and trained so that the crossing of the breed may be easily done, by bringing two different sorts of grapes together in time of blossoming, and sow the seeds. I think we may anticipate some very good results from such an arrangement.

CHAPTER XII.

Object of ploughing—Stirring the ground in summer makes water—Corn planters know it—How water is supposed to be made—Best time to plough vines, and to apply manure—Quality of manure—Its great value in Europe—How tenants agree to furnish it there—how to make here the application of manure—Curious operation practised in some parts of France—If done here would be hurtful—Hoeing and harrowing.

I HAVE not much to say on the subject of ploughing, after what has been already told before. I shall omit to mention how the operation is performed, as it is as well understood in this country, if not better than in any other place where my divers travels have given me a chance to see it. The object of ploughing is to keep the ground clean of weeds, the soil loose and mellow, and to have the weeds or plants that grow from one ploughing to another, and the dung or manure that may be thrown on the soil buried and covered with earth, that they

may the sooner rot, and to have the fertilizing principles, which are volatile, kept from evaporation. The vegetable water of the green plants that are buried in the earth, is all turned to the benefit of the plants remaining in the ploughed field under vegetation. But there is another good consequence of ploughing, that has not been much thought of, and is not generally known among farmers. It is the making of water or watering the ground, by ploughing or the stirring of it, when it is suffering by the drought. Many of our corn planters know that by steady ploughing over and over, they may raise a good crop of corn, almost without rain, provided it is kept stirred from the beginning. I had wheat sown in March, in drills, and in the beginning of May the ground was worked deep, between the rows in a very droughty time; every afternoon the blades of the wheat in the part not done, were curled or twisted by the want of water; the part which was done the day before remained green and flourished as if it had been well watered, and gave thirty-two times the seed; and a few rows left on purpose unworked, although well weeded, were very poor at harvest, and yielded about one third of what the other did, the drought

having been very long. In another place, I think the same year, I had planted Scarcity roots, or White Beets, among vines planted that year, in a very gravelly and sandy soil, which are known not to strike easy, if not well watered immediately after being transplanted. I betook myself to work the ground around them, to see if it would have the same effect on them as on the wheat. The soil was so very dry, that the working very deep could not change the color; but the next day, having worked over again a piece, to show it, as a curiosity, to a parcel of men, it appeared as the moist ground used to be, when turned over. I left also, for comparative experiments, a part unworked; and there all the scarcity roots perished, while almost all lived where it had been worked, and grew very fine, in spite of the droughty summer, by the help, it is true, of more stirring of the ground. Since that time I have paid much attention to that fact, and now I am convinced of its reality, but I am not as sure of its explanation, which, however, may be attempted by considering, that the air, which is confined in the ground by the oversetting of the soil, contains oxygen, and the putrefaction of vegetable substances always going on in any soil, which

has nourished plants before, and has some buried in it, produces hydrogen, the two component principles of water; which being in contact among warm ground, the composition of water is operated. This hypothesis is worth being inquired into by the Chymists. Of course the ground in a vineyard or cornfield, cannot be too often, nor too much stirred in the summer. One of the best ploughings in a vineyard is the one done immediately after the vintage; the weather is yet warm, and it may be made very deep if the vines have been previously prepared, as has been noticed before. It has the tendency to destroy many insects, and it is the best time to apply the manure of stable dung, which is to be ploughed in as soon as hauled, and as deep as possible.

In some parts of France they used to make a trench of about one foot deep in the middle of the intervals, in which they throw the dung and cover it immediately. In Switzerland I used to spread it regularly, putting one pitchfork load to each vine, as the breaking up of the ground was going on, and was buried in the middle of the intervals, about nine inches deep, none being put near the vine, lest it would cause new roots to strike too high up the stem, where they

are to be regularly pruned. It was at the rate of from twenty-four to thirty tons per acre, of good stable dung, that we used to manure our vineyards with, every fourth or fifth year. That quantity of manure may appear very great, but I took only the medium quantity, that I made use of myself in Europe. And let me observe here, how valuable stable dung must be considered to vineyards, to engage vinedressers to put such a quantity, when the price is commonly two dollars the ton, besides the carriage to the spot was always done, a part of the way, on men's backs, for no animals can be admitted into the vineyards. This expense may safely be estimated at fifty cents more, per ton, in the average. Thus the expenses of manuring one acre of vineyard, would amount to sixty-seven dollars and a half, which in that country is the common price of four hundred gallons of wine. Nevertheless, owners of vineyards, find a plenty of tenants, that engage, besides making all the work of a good attendance, to furnish good stable dung at that rate, and to maintain the stakes, which is another charge of about two dollars per acre, for the one half of the crop; and I have known several tenants that have grown rich, by that business. Before I went to Europe,

no manure had been applied to our vineyards here; and in my absence our vinedressers were influenced by the prejudice, that manure hurt the quality of the wine, and they were all afraid to make use of it; besides they had none, having no stables. But since my return, enough of it has been made use of, to ascertain that it is a valuable thing. To make a good application of it, I would advise to throw a deep furrow, with a big plough, even by passing twice in the middle of the intervals, in which the manure should be spread; and covered immediately: if it could be buried one full foot deep, it would be the better, that it may lay undisturbed as long as possible. Manure of any sort may be applied throughout the whole year, but stable dung would be mostly lost if applied before a drouth, in the summer; besides, it cannot be set deep enough after the blossom of the vines; for it has been observed before, that deep ploughing then is hurtful. After that time, light ploughing, merely to destroy the weeds, is the best.

I ought not to omit speaking of an operation to the vines, in Languedoc and along the Garonne, that I recorded in my journal, when I passed through those countries. In the beginning of winter or end of autumn, they dig all around

their vines, and throw the earth in the middle of the intervals, and leave the stem of the vines bare until spring, when at the first ploughing, or breaking up of the ground, by men, the earth is thrown again against the vines, and the soil restored to its former level. On enquiring about the object of that work, from the vinedressers, I was so differently answered, that I concluded that few of them knew, giving for reason, that it was the practice since time immemorial. Some others told me, that it was to retard the first opening of the buds, that the spring frost may have less chance to catch them. And in the levels about Bordeaux, where they are subject to great wind, I was told that those holes were made to retain the leaves of the vines, of which they were filled by the wind, which would otherwise carry them all away as they fall, and thus save as much manure as possible. As I have never made that operation myself, nor seen it done where I could notice the result; I can say nothing about the propriety of it. If done here, I would be afraid, that the part of the stem which is made naked by the operation, to go over the winter, would be in great danger to crack, by our cold and dry atmosphere of the winter. When that cracking is

not to be dreaded as much as late spring frost, uncovering the roots in the winter, may have the effect to retard the vegetation, and it may answer to retain leaves, in lands subject to high winds, and those leaves may perhaps shelter the roots as well as earth. In the vineyards that are level we throw dirt against the vines at the fall ploughing, that the water may drain from the vines into the furrow left in the middle of the intervals. Perhaps it would be better if the water would gather round the vines. My vineyard being on a sloping ground, I could not make the comparative experiment, but I invite those who have the chance, to do it; and they would oblige me to let me know the result.

As to the hoeing, there is not much to hoe in a well established and well ploughed vineyard, only when the plough throws from the vines, there is a narrow strip between the vines that is left by the plough to be hoed. The next time the plough throwing against the vines, covers the weeds under the vines, which are yet short. An iron tooth harrow does good business while weeds are short and young.

CHAPTER XX

On preparation for vintage—Necessity of having good cellars and casks—New invented tun—Wickets in casks and tuns—new sort of press—Necessary vessels in a cellar—Suitable wood to make vessels for wine—How to take the taste of wood from new casks—Lime neutralises tartaric acid—Musty casks—Preparation of old vessels—How to preserve empty casks in a cellar—Burning of spirits to stanch casks—brimstone matches.

AFTER the vineyard has been established, the next thing is the preparation to receive the crop and make the wine. A good cellar well furnished with vessels, is nearly as necessary to make wine, as the vineyard; you may have plenty of grapes, and yet not be able to make good wine without a cellar, except by brewing and mixing it with drugs or spirits, and that is not that genuine wine spoken of in Holy Writ, *that cheereth the heart of man*: It is a known fact, that distilled liquor produces on man quite a dif-

ferent and opposite effect; instead of dilating the heart, it contracts and crisps it, and light wines are reputed the most wholesome, but requires good cellars to keep them.

The first vessel where the grapes are to come in, from the vineyard, if white wine is not intended to be made with black grapes, is a vat holding enough grapes for one pressing: for a strong press, it may be six hundred gallons; but since it has been found out that some spirit issues out of the wine with the gasses, proceeding from the fermentation, (of which I shall speak more in the next chapter,) I have proposed to put the bruised grapes in a tun holding from five hundred to one thousand gallons, according to the strength of the press, well iron bound, and strongly made, able to bear an inside pressure of from five to ten pounds to an inch, having a small door or wicket, cut or sawed at the lower edge of one of the heads, so that the same piece will make the whole tight, by shutting from inside, being drawn through by a key, iron screw, or staple, and just big enough to admit a common man to go in. The tun must also have a big bunghole on top six or eight inches diameter, that the grapes may be easily introduced in it. Two of such vessels set

near a press, so that the liquid contents may be drawn by a cock, and the mark or husk by the wicket, will be sufficient, even for a large vineyard. As to the press, there are so many sorts, and they are so well known, that I should have omitted to speak of them, was it that I now have of a new fashion, which surpasses any I have before seen, as it answers the double purpose of pressing grapes, apples, or hay; I obtained the description from a neighbor of mine, who had made cider on one of a similar kind in Lancaster county, Pennsylvania; and I am led to believe that it is a new model, as an old press maker, who made mine, had never seen one of the kind before.

I shall here give a short description of it.—Two beams of good oak twelve feet long, two and a half broad and one and a half feet thick; at both ends of each a screw nut's hole, twelve inches diameter has been bored six feet distant, the screw threads of the one turning to the right; and of the other beam to the left; two double screws twelve feet long, having the head in the middle two feet long, bored with a five inch hole through; the threads of which, two inches apart, twisting in one end to the right hand, and in the other to the left hand, to suit

the screw nuts at the beams, completed the press. I caused the screws to be made twelve feet long, to have the chance to press hay; but for wine or cider, eight feet would be long enough; for hay a strong box is fixed on the lower beam, and for grapes or apples, a basin or platform. A lever of strong wood of fourteen or fifteen feet long, to the end of which a yoke of steers are hitched, when it requires hard pressing, if there is room for them to go round; it requires only to move the lever from one screw to the other, and the steers may go all round, and give a hard pressing if the press is well done. If the screws would be put eight or ten feet apart, and the beams strong in proportion, to get a large basin or platform, and have a big head to the screw left in the middle, well iron hooped, and have two cross holes six inches bore, and a lever fifteen or sixteen feet long, drawn by a capstan, would press very dry the husks of fifteen hundred or two thousand gallons of wine in twenty four hours. To save your presses from breaking, and from accident among the hands who tend them, it requires to charge them level and true, and work soberly about them. In the cellar, there ought to be more of such vessels as the one by the press, to ferment the

grapes in, with the difference that the bunghole be only two inches, but must have also the wicket and the same force. If the intention is to have the wine old after it is made, there must be enough of them to lay by two crops at least, besides several barrels and kegs of different sizes, all provided with wickets to save the trouble of taking the heads off when they need washing. Cleanliness is as necessary with wine as with milk. It is necessary, also, to have a tub or two, holding fifty or sixty gallons each, to put under the press, and two or three tubs made oval, much wider at top than at bottom, to suit the back of a man, holding twenty gallons, and having braces, in which a man may carry twelve gallons without spilling any of the contents: they serve to bruise the grapes in, and to carry them home, and fill up the tun. A wooden funnel holding about ten gallons, and a tin bucket made high with a bail and spout, like a watering pot, holding about two or three gallons, and a wooden pail, with a strong handle to bail with, will be necessary. All wooden vessels ought to be painted with oil color on the outside, to prevent worms from destroying them, and the iron hoops from rust; besides, they will last longer, and will prevent a two great evap-

oration of the wine or liquor they contain. They are commonly painted red with red lead; lime ground in oil makes a strong and cheap paint, most like a varnish. Oak and chesnut wood make good wine vessels; however, I have seen casks made of such oak as always gave a taste of oak to the wine, although being near one hundred years old; but I cannot tell what sort of oak it was made of. Pine is a bad wood to make wine in, it will always give a taste of tar or turpentine; so I expect the poplar or tulip tree. I had a cask of three hundred gallons the staves made of ash, and the heads of cherry tree, which made constantly elegant wine, having a light flavor of the raspberry. Beech and maple make good wine vessels, if they would be more lasting. Casks which are new, and never held wine nor liquor, must be kept several weeks filled with water, particularly if they are of oak,—and if the water has taken the least taste of the wood, some quick lime, about one gallon to every hundred they contain, must be introduced, and boiling water poured in, about eight or nine gallons to one of lime, then bung and roll it, that every part may be in contact with the lime water. Care must be taken not to burst the vessel, for the heat, and the slacking of the lime,

will give such a dilation to the air inside, that if no vent is given, there is a great danger of bursting; however, some of that inside pressure on the lime water, is of great use to force it deep into the wood; leaving the water several hours before it is thrown out. If the must which is to come into that cask, is too tartarous, it may be put into it without rinsing the lime out; it will neutralize a good part of the tartar, and make what the Chemists call, *tartrate of lime*, which is indissoluble, and will settle to the bottom. But if there would be enough lime to absorb the whole of the tartar, the wine will be hurt. It is the time, also, before vintage, to look into the vessels that have been kept empty in the cellar, to see if none are moulded or musty; if there are any, they must be well scraped of all the stone of tartar adhering to the sides, for the moulding will be worse under that stone; then pour into it lime and warm water as above mentioned. Musty taste to wine is worse than any other, and is very easily taken: I used in such case, after the lime had been washed out, and the vessel wiped dry, to sprinkle it all over with spirits of wine well deflegmated; spirits of whiskey I think would answer. A musty cask may be known by knocking against the head

before the opening of it, the sound will be dull, and not like the sound of a clean one.

The best preparation of a wood cask of any sort, to receive wine, is when it has held some good spirits, the peach brandy perhaps may be excepted, lest the peculiar taste of that liquor should be communicated to the wine, and not be found agreeable; the same thing may be said as to rum; but it is easy to ascertain the fact, by mixing a few drops of those liquors with wine. After a tun or big cask has been emptied, if it is to remain so, in cellar, the wicket is to be opened, and the whole inside well washed, and left one or two days open, that it may dry, and if any part remain wet, it must be wiped quite dry, then a pint of dephlegmated spirit of wine or whiskey, for a one hundred gallon cask is to be put in, and so in proportion; likewise a cup or bowl of common earthen ware, in which an ounce or two of brimstone dust is put and fire set to it; care must be taken not to set fire to the spirit, then shut the wicket, greasing the joint with tallow, and fasten the bung as carefully as if it should be filled up again; the more spirits there is put in, the surer the vessel will be preserved, provided it remain always tight, that no communication remain with the external air. When

such cask is needed to be filled with new wine, it is to be opened, and if found clean and sound, the bowl that contained the brimstone being taken out, and fire set to the spirit; and the wicket fastened again; but do not wait too long before you knock the bung open, for fear the vessel may burst by the great dilation of the air, like with the warm lime water, then that cask is fit to receive must; but if it is for clear old wine, it is to be opened again and undergo a good washing with clean water, wiped quite dry, filled up with brimstone smoke, and sprinkled with pure spirits, then clear old wine may be received in it. To prepare matches to sulphur casks, take strips of brown paper, cotton or linen cloth, and dip them in melted brimstone; when it is dry, let it be lighted and suspended from a wire, fixed on purpose through the bung, about the middle of the vessel intended to be sulphured. If flavor is desired, some cloves, cinamon or nutmegs, pulverised, may be strewed on the match while the brimstone is yet soft.

CHAPTER XII.

Signs of maturity of the grapes—Some grapes may ripen too much—Not the case with Cape grapes—The rotting of grapes, caused by worms and by hail—Hail fenders lately established in the vineyards of the Canton of Vaud—Bad effect of hail—How hail is supposed to be produced, anecdote in illustration of it—How the time to vintage is fixed in Europe—American vinedressers will have to guide for themselves, laws leave the grapes here unprotected—How to gather grapes—Discarding the stems—Colour in the skin and tannin in the stem—White wine—Cider mixed with the mask—Of the scum running from fermenting must—Discovery to absorb by water the obnoxious gasses filling cellars—How that discovery conducted to another, to make brandy from that water—Still-caps invented in France, to condense that spirit—One of them made at Cincinnati—Close fermentation—Partly forcing the wine to ferment in a close vessel—Safety valve—Filling up with unfermented must—being my invention to make

good wine—How strong the casks ought to be—Racking of such wine—How red wine is made by the same process—How to recognise when bruised grapes are enough fermented—Press house—Fixing to retain the gass—Excitation to staked fermentation—How to keep unfermented must—useless to make much of it—Best thing to make syrup.

OUR Cape grapes, I presume, can never be too ripe; but there is some sorts of grapes, that a too great degree of maturation will cause the wine to be less valuable. We have seen before how it happens in some parts of France; it has a greater tendency to ascidness. The sign of a complete maturation, is when the grapes quit growing, when the stems of the bunches are woody, and get no more green bark; however, this last sign is not to be depended on, for in some species of the best sweet water, their stem remain always green, the inspection must not fall altogether on some well laid bunches, but on a great many. Here we commonly wait to take in the crop, until we see that the bunches which turned first black, are withered. The tasting of the grapes will also tell to a vinedresser of judgment, if the sweet-

ness is up to its best: and the best time is not so short as not to allow the choice of good dry weather.

One of the most unequivocal signs to begin the vintage, is the rotting of the grapes by excess of maturation, but I have observed two other causes of the rot occurring oftener, which makes those superficial vinedressers grumble, who would always make their vintage too soon, if the law would not interfere. On the contrary, it ought to induce a postponement until the rotten berries would be dried, that they may be easily set aside, if the quality of the wine is as much sought for, as the quantity. One of those causes is occasioned by worms, although attributed, by some, to high mairring. The worms (a species of small caterpillar, a second generation, I think, of the one which preys upon the bunches in time of blossom. See p. 196,) will wound and scoop out many berries in a bunch before they are ripe, and should wet weather succeed, the rotting of these berries, destroys whole bunches to which they are attached, and thus impairs the flavor and good quality of the wine. And surely a very large crop of crowded grapes, will suffer more in consequence of wet weather and rot, when most ripe, than a

small crop of thinly scattered grapes, be the cause of fertility, high maturing, good attendance, a favorable season, or any other circumstances.

The hail is another cause of the rot, when it wounds the berries after they begin to change, the wounded berry rots and corrupts all its neighbors, but when the berries are not yet full grown, or as some think, when the hail is not poisonous, the wound made by the hail heals, and the grapes come to maturity without rotting, but remain sour. The rotting of grapes caused by worms or the hail, is merely accidental, and occurs but seldom, and grapes so rotten ought to be discarded at the vintage.

As to the rotting by extra maturity, I never could observe any injurious effect on the quality of the wine, except its reduction as to quantity, (See chap. 22) by trials made in Switzerland.

The hail is always a great poison to vegetation. Once I put a hailstone of the size of a green pea on the stem of a bunch of grapes growing on an espalier against a wall, which I was sure had not been touched by the hail, on account of the protection of the wall. The hailstone remained there until melted, and the bunch perished soon after.

It happens that hail is now falling more often on the vineyards along the north shore of the lake of Geneva, than it used to do in former times, and causes immense damages on those fruitful vineyards; perhaps, (according to my humble opinion,) since most of the forests have been destroyed, which covered the tops of the mountains against the side or the foot of which the vineyards are established. Some vinedressers, as I am informed, are now fixing a new species of Franklin's lightning rods in various places among the vines; those rods are nothing else than very high poles planted upright, wrapped with straw from top to bottom, which they call hail fenders, in French *paratonneres*. I give this only as having been told by a man who lately received letters from that country, for nothing of it had appeared when I was there.

Now I beg leave here, to intrude a little on my subject, by introducing the reasoning, that I suppose induced the vinedressers of that country to do so. Since it is known that water is suspended in the air, in the state of vapor, by means of the caloric or electricity contained therein; now the inference is clear, that a cloud surcharged with such water, coming near to an-

other cloud or the earth, negatively electrified or less charged with electricity, will be discharged of its electric fluid, by the stronger attraction of the larger cloud or the earth, which, in a manner, suck the caloric of the former, and make it to pass from one to the other in the form of a thunderbolt, or lightning, so suddenly, and with such an attractive force, that not enough of electric fire remains to keep the water in a state of vapor, but even liquid, must of course become ice, so soon as the subtraction of the fire, which is necessary to keep water liquid, is performed, and the hail stone will be increasing if the intenseness or degree of its coldness is such as to freeze all the particles of water, that its acquired velocity will make it overtake as it passes through the clouds.

These high poles or hail fenders, by discharging the clouds gradually of their electric fire as the iron rods do, (wet straw being, I suppose, a good conductor also,) cause the water to fall as soon as formed by the subtraction of the caloric, which abounds more in vapors, than in water, and before the subtraction is too great to freeze it; and they are doing the same operation that the tall pine trees did on the top of the mountains before they were cut down.

As an illustration of this system of the formation of the hail, I beg leave to transcribe here, what I have somewhere read. In one of the towns of Languedoc, either Avignon, Nismes or Montpellier, a druggist, in the beginning of a summer storm, descended into his cellar, to see that nothing should be damaged by the rain-water that used to run in at such times. An extraordinary shower of rain came on, which caused a sheet of water to run in down a wall, so as to cover it entirely. At that moment a tremendous peal of thunder made the house shake to its foundation, and suddenly all the water running on the wall was changed into sheets of ice. The man took a large piece of them and came out to show the curious phenomenon, to many people, who went into the cellar and had a written statement of the fact, made and certified. That fact, I suppose, is what has started the above system of the production of hail. The wall on which the water was running, became the conductor, of the electric fluid ascending from the earth to a cloud passing on and near the house, which had less electricity than the earth, and was fulminated when the peal of thunder was heard, carrying away to saturate the cloud above, all the cal-

oric contained in the wall, the subtraction of it was so sudden and so great, that not enough was left to keep the water running on the wall liquid, of course it was congealed.

In most of the vineyard countries, it is by deliberation of the public councils, that the day for vintage is appointed. The board, in one of their meetings when the grapes begin to be near ripe, agree about a day for them all, twelve in number, to make a general inspection of the whole vineyards under their jurisdiction: each member, starting early, makes the visit of the part where he has not been much before, being supposed, that where his business calls him often he knows more about. In the afternoon they meet, and each makes his report: then they vote for the day to allow the people to take in their crop: and an officer reads the resolve of the board the next Sunday, before the Church door, when the worship is over; and if there is no Sunday between, a drum is sent through all the villages to publish it. Those regulations are so old, that few men know their object, and many are murmuring, taking it as an usurpation on their rights: but it is obvious that they are founded on the same principles as the law in this country about tobacco or flour

inspection. None such regulations are needed here, until wine becomes one of the staple commodities for exportation.

Every owner of a vineyard must judge for himself; experiment will soon teach him to find out the best time for vintage. But there is one thing in which it is desirable that the public should interfere a little: The too great lenity of the law, making the robbing of fruit in general, only a trespass. If the thief possesses no property, the law itself secures him from any punishment. The grapes are not sufficiently protected: there ought to be the same difference between laws protecting vineyards or orchards, as there is between the two sorts of fruit, as to the temptation they are creating in the breast of the people; the greater the inducement, the more energetic ought to be the check. We are obliged to watch, with arms, in the night to save our vineyards from depredation; and there are several citizens in this neighborhood, whom I know to have planted small vineyards, that are so much discouraged, by having no grapes left them, long before they are fully ripe, that they have abandoned their vines; and a great many more, that would plant, but are unwilling to tend vines, when they are

sure not to enjoy the fruit themselves. Dogs cannot be made to watch vines; they are too great lovers of grapes themselves.

The Cape grapes will often have some berries remaining green, that will never come to perfection; to them no attention is to be given, except to discard them in the gathering, as well as the dry and wormy. If white wine is desired from black grapes, they are to be gathered before the sun has warmed them, and they must be handled gently; the colouring matter being in the skin, the less they are bruised the more white wine will run from the press, on which they are to be put immediately after being gathered. For red or white wine, out of white grapes, the dryer and hotter by the sun the better. We used to bruise or mash the grapes in the vineyard, in the tub in which they are to be carried home. A stake with a knot or head at the end, of about four inches diameter, is the instrument to bruise them. Rainy weather while gathering grapes adds much water to the wine, but I could not perceive that dew alone was hurtful. Small pruning knives, made on purpose, and kept very sharp, are the best tools to cut the grapes, but as little of the stem ought to be cut with the bunch, as possible. However-

er, it is easy to have the most part of the stems parted from the berries. It requires only to have on the vat, where the mashed grapes are thrown, a coarse sifter or riddle, that the berries may pass, on which the tub as it comes from the vineyard is emptied, the juice and berries' skin will go through, and the biggest part of the stems of the grapes will remain on the riddle. But I doubt if that operation is advantageous to the wine made out of the Cape grapes. One of our vinedressers has done it sometimes, but I have not found enough difference to justify the trouble. The wine of some species of grapes will not keep, if it is not fermented with the stems or husks; and I think the famous Burgundy wine is in that case. The skin holds the coloring principle, some tartar, and perhaps some of the arrum; and the stems communicate a roughness or ascerbity to the wine, which must be the tannin principle, known to be one of the most powerful preservatives against corruption. The last running of a very strong press, gets so much of that ascerb taste, that it cannot be swallowed; it dries the mouth like a green Persimone. Nevertheless, if it is put by itself, it makes good wine, when four or five years old, and is imperishable. The Hewscrab, and other apples.

which make the best cider, have also a good deal of that ascerbity or tannin principle. Now to make white wine out of black grapes, or the Cape grape we have in this country, they must be carefully gathered, as aforesaid, and put on the press, and pressed gently, and as the juice comes, it must be turned immediately into a cask, where a small match of brimstone has been burnt; the press is to go on slowly until the juice becomes too red; then the grapes are to be taken off to make place for others, and thrown in the vat among the other grapes intended to make red wine, being first well bruised; or amongst fresh expressed apple must, of the sweetest and heaviest sort, to let it ferment some days together: this makes excellent beverage, if treated the same way as wine. The cask where the grape juice has been tunned must be filled to within three or four inches. Here it is necessary I should speak of the old fashion, whereby we filled the cask up full, that the fermentation may throw out the scum which cannot be done without a great waste of wine, for the saving of which, we leave the vessel not quite full, and found that the scum is nothing else but lees, that settle to the bottom when the fermentation is over. I would have

omitted this digression, was it not, that a great many of the theoretical writers about wine making, hang to that, as if the wine would be lost if that was omitted; but it is after comparative experiments, that I can say, that there is no difference except the loss of wine. I beg leave to go on with another digression, which is not much out of my subject. Since the discovery above mentioned, that spirits are issuing out of fermenting liquid, along with that great quantity of carbonic acid gas, which is created by the process of fermentation, I have adopted a different mode of conducting it.

The reader I expect will not be displeased, by intruding a little on my subject, and give here a short history of that discovery, in which I have been one of the actors. Before I came to America the first time, having some suspicions of that escape of spirits from fermenting liquid; I established the cap of a small still on the bung hole of a tun of eight hundred gallons, to operate the condensation of all that came out from the tun which is condensable, but the arrangement being in my way to fill another cask by it, and the vintage turning out better than I expected, I could leave it but one day and one night, by that time no spirit being yet

formed in the liquid, none run out perceptible to the taste; thus my experiment remained unfinished, until my return to Switzerland, from America, when I found that a friend of mine, who had a very large and deep cellar, in which he used to gather every year, more than one hundred thousand gallons of wine, and where the carbonic acid gas used to fill up the cellar, so that no person dared to go in while the gross fermentation was going on. But having found out that by causing that gas to pass through water as it comes out of the wine, the cellar was clear of it, provided the water was changed, when saturated with the gas; for that purpose, he set a bung to each of his tuns, which had a hole of about half an inch, in which he fixed a crooked tin pipe made like a Siphon, the other end plunging in a half gallon pitcher full of water, set on the tun by the bung hole. When I saw that arrangement and seeing him throwing away the water, I begged of him to put some by, for me to complete my unfinished experiment, knowing that if any spirits would be drawn out by the gas, the water would retain it, and the distillation show it. Immediately he took the resolution not only to save some for me, but to save the whole, to put among the

refuse of the press, that he used to save, and make brandy with: Then he gave orders to a servant, to carry a barrel to the neighbour's cellar, which was arranged the same way, to save his water, on the neighbour asking what purpose that water was to be saved, the servant having heard me speak of distillation, told, that it was for to be distilled, then the water was refused and saved for himself; about a month after; happening to be coming out of my friend's house, along with him, the neighbour invited us to walk into his house and opening a buet, he showed us a shelf loaded with bottles of brandy, and cordials he had made out of that water, and now hundreds of barrels of brandy are annually made in the Canton of Vaud, out of such water; and a couple of years after an instrument, a sort of still cap, has been invented in France, and a patent right obtained, to condense that spirit and send it back into the wine, where it came from, one of those instruments has been made at Cincinnati for one of our vinedressers, who found that it had improved his wine.

If the fermentation of wine could be performed in a tight cask, the wine would always be good, and durable; the carbonic acid gas, being forced as well as the spirit, to remain in the wine,

would make it stronger, and better tasted, I never made the experiment of distilling such wine, although a good deal of it is made in Switzerland, in small casks made on purpose, very strong and lengthy, that the heads may be small. But I have seen in one of my friends cellar, such wine, measuring by the hydrometer, the double in force or specific lightness, of the one in a big Tun, which had been filled with the same must as the forcing barrel, which had been filled before any fermentation had begun. As it is impossible to force wine to ferment in a completely close and big vessel, it may be done partially, and it is the process I have invented to obtain that result, that I shall mention.

After the casks are full to within three inches of the bung, set a pack of green vine leaves on the bung hole, about three inches thick; on them place a piece of board loaded with a stone, or any other weight upon them of about twenty pounds; the leaves answer admirably as a security valve, for when the pressure is too great, they raise a little, and leave the gass to escape, with great noise: The bung hole cannot be opened until February, for if opened by raising the leaves, and let the air go

in, a big froth will immediately issue, and draw much wine out, like when a bottle of good porter is uncorked; by drawing some out at a spile at the head, the wine may be inspected, and it ought to be done twice a month if not every week, to know when the bung may be opened without danger of loosing wine, to fill up the cask with unfermented must, that has been prepared on purpose; the safety valve is then to be fixed again; the unfermented must, starts or causes a slow fermentation to continue until the beginning of April, when the bung can be opened, the cask ought to be replenished with the said must twice a month, if the vessels were made very strong to bear six or ten pounds inside pressure to the inch, or stronger, it would be for the better.

In the month of April, during clear weather, rack the wine in a clean and well sulphured cask, draw but clear wine, and as soon as it changes, turn the cock, and put the balance in a cask filled up with shavings made of beech wood—of which it shall be more spoken of. The four last crops I made in Swisserland before my last departure, the wine was made that way in common casks: and I sold it in racking time, or in April next, at twelve or fifteen per

cent more than my neighbours, who knew nothing of it. Keeping it secret on purpose to get a patent right here for the invention, had I not wrote this book.

I will now inform the reader how to make red or white wine out of white grapes, by the same process, the bruised grapes, are to be thrown into the tun before mentioned by the press, which has a large bung hole, and you are then to fill it up to within six or eight inches of the bung, then fix the safety valve; but here as the hole is too large to be covered with vine leaves, a big bung with a hole to it must be fixed.

As the spirit do not raise with the gass until some is formed by the fermentation, none comes the first days, it is not worth while to have the arrangement mentioned hereafter, fixed to save the spirits with water on the vessel which contains the grapes, except they are to be left, until the fermentation is most over, like they do in a great many parts of France, to make wine.

The wine is to be drawn and separated from the husk when the fermentation is strongly established, or about the end of the second day or the beginning of the third, according to the degree of heat, for as long as the grapes remain

under 55 deg. of Farenheit's thermometer, there will be no fermentation: At that degree it begins, and the heat soon gets increased by it. An exact criterion cannot be given; some grapes require more fermentation with the husk than others; too long, makes the wine hard and rough, and not enough the wine will not keep, nor be able to travel, and not very red. The judgment and experience of the operator, must here be the guide. When the fermentation is strong, all the husk and great many of the seed are floating on the top, and make the cap; then is the time to draw the liquid underneath, when otherwise every thing is ready, and the fermentation is in the desired point, a cock which has been previously fixed at the foot of the head is opened, and all that will run by itself, is drawn and carried into the cellar to be turned in a clean sulphured cask. When the grapes were put in a vat; to strain, the wine, we used to make a bundle about a foot thick of cuttings of vines or other bushes that have no bad taste, tied at two places by a withe, and fixed fast with a stone before the hole where the cock is to be introduced: but in my new invented tun, a different arrangement must be made; to obtain the same effect, I would advise a

species of riddle or basket, fine enough to retain even the seeds so as to suit against the foot of the head inside, behind the wicket, having hinges, that it may be folded by pushing it a little back to get it out by the wicket, and that it may be made steady, by a stone put in it before the shutting of the wicket.

The establishment of the press may be fixed, that the wine may run from that tun by the press and from the press, into the cask in the cellar, by a tin pipe or leather hose. When the liquid has all done running, the wicket must be opened, and the mark or husk drawn out and pressed immediately, all that will run from the press, may be put with the other in the same cask, until full to within three inches; the fixing to retain the gass must be arranged again, even before the tun is full, the more the wine is kept from the contact of the air, the better: If the fermentation has not been left to go too far with the mark, it will go on again in the cellar, if not, some unfermented must, is to be put in, and the filling up regularly as told before, for the white wine, is not to be omitted.

To keep must of grapes the whole winter unfermented, a cask is filled with it before any fermentation has begun, the cask is first sulphu-

red until the brimstone matches refuse to burn any more, and when half full, it is to be rolled, and shook, to have the smoke incorporated with the liquid, then another trial to burn brimstone matches, is to be made, and the cask filled up, and kept in a cool place. When right clear, which is easily known, by drawing some out of a spile, it must be raked clear into another clean cask, where the same operation of sulphuring has been done.

It is not necessary to make more of that sulphured must than what will be necessary to fill up all the vessels which contain new wine, for I think it will not do, to fill up old wine with it. For when the warm weather of the spring comes, it will ferment, and will not make the best wine. But if you like to drink sweet wine, by mixing some of that must, with any wine for present use, it will sweeten it like sugar, thus you may drink sweet wine in your family the whole winter at a small expense, and if some is left in the spring; before any fermentation has begun in it, it may easily be turned into syrup of the best sort. Put it in a brass kettle on the fire, after it has boiled a little while, and been scummed, pour it in a wooden vessel, and throw in gradually some dust of pounded lime.

stone, and wait to make a second throw, till the fermentation of the first, has subsided, keep throwing some of that dust, until no more fermentation appears, or until some of it may be boiled, mixed half and half with new milk, without curdling the milk, then it is to be left 24 hours to settle, when it will be as clear as pure water, then it must be decanted clean, and put again on the fire, to evaporate into the consistence of sirup, bottle and put it by, until used; if well made, will be equal to any sirup made out of the best loaf sugar.

Now for to have an establishment to save the spirit carried out by the gas, and retain in the same time as much of the gas as possible; a crooked pipe or siphon of tin must be provided for every cask of half or three quarters of an inch bore, one end fixed fast and tight in the hole of the bung, and the other plunging into water, but the pipe ought to be plunged in a column of water, deep enough to obtain the same pressure as with the safety valve; sixteen feet for example would give the pressure of half an atmosphere, or seven pounds to the inch, if the cask could bear it, it would not be too much: The value of the spirit obtained that way, is not much, compared to the value of the gas

retained in the wine; that consideration made me adopt the above described simple valve because I found the fixing to save both, too costly, and troublesome, and that the French invention, does not answer either, it is only a little improvement on the old process whereby the gas is all lost.

CHAPTER XIII.

Continuation on fermentation and making of wine

—Scientific description of fermentation, omitted—Specific weight of must—How to make a simple hydrometer—Sweet substances added to must—Reducing must by boiling—Better mixing sirup with must—Rich must may be forced—Tokay wine tried—Sound berries made wine difficult to keep—Rotten berries made good wine—Brandy added to wine—Trial in our Colony—Concentration of wine by frost—Florence wine, and unripe grapes, by Adlum—Specific weight of cider must, by Coxe—quantity of brandy it yields—Amount of sugar to make brandy—Wholesome wines—How to increase the sugar in must—Concentrating must of grapes or apples by frost—How to take the colour out of red wine—Too high sulphuring gives the taste of Sulphur—Common way to make wine—When to press, in France, in Swisserland—Wine gained by fermenting with the husk—Repletion of the casks—Quantity of air absorbed in the formation of

Vinegar—Signs of ascecent outside of the cask—How to preserve provision of grapes for eating—Durability of grapes—Sign of same characters in wine—Free use of grapes, a cure for the Ague—Preserved in the sirup noticed before.

I SHALL not give a scientific discription of the theoretical process of fermentation, and of the analysis of the must and the wine. Not many vinedressers, nor even wine coopers of the great wine trading towns of Europe, who know how to make good wine, know any thing about it, and a great many abler pens have done it; those who wish to be informed of such things in detail, will find it done in a masterly manner, in Chaptal and most of the modern chymists, suffice it to say, that the heaviest must, whether it be the must of grapes, apples, pears, or other fruit, will make the strongest or the more spirituous wine or cider; the quantity of that specific gravity above water, is supposed to be natural sugar, which cannot always be discovered by the taste, but is accurately ascertained by an hydrometer, that can be made, simply, as follows: Take a phial containing about a gill, having a long and even neck, put

some shot in, for ballast, until it swim in water, of common temperature to the middle of the neck, where a mark is to be made, then dissolve among water, a given quantity of sugar, say a fourth of its weight, or the 25 per cent, in which the phial is to be plunged, the dissolution, being about the same temperature, and mark on the neck, the point of immersion, then roll a bit of paper round a cork to stop the phial, on which a graduation is made; 0 being the point of immersion in pure water, and number twenty five on the other point marked on the neck for immersion in the dissolution; and the interval being divided into twenty five divisions, they will correspond to as many per cent of sugar, in liquid, in which that hydrometer is plunged, provided it is in the same temperature or thereabout, as the water when the instrument was made. If the same graduation is continued above 0, it will show the specific gravity of liquid, lighter than water, but I do not know to which degree of force of the hydrometer now in use, they will correspond, in distilled liquors, but that may be easily ascertained. If the must has not naturally enough of saccharine principles, good sweet substances, as sugar, honey, or sirup made out of

grape juice, may be added with advantage, if mixed before fermentation, it is a better way to add strength to wine than by mixture of distilled spirits, which being procured by the agency of fire, is quite different from the one produced by fermentation; however, I never did it but one time, and then I put for sake of experiment, five pounds of loaf sugar in ten gallons of extraordinary tartarous red must, to which it gave great strength, but took very little of its harshness, till two years old, when it proved very good wine.

I have seen both strong, dry and sweet wine made, by reducing the must by boiling; but I never liked the taste until very old, therefore, I never made any myself. The cider that I have tasted in this country, made that way, had also the same disagreeable taste of fire. If I had sweet wine to make, I would first make a great quantity of sirup out of clarified unfermented must, as mentioned above, even in the winter before, to have it ready for the vintage, to mix it with the best and heaviest must before the fermentation begins, and tun it in casks holding not more than a barrel, for the greater the quantity, the stronger the fermentation will be, and rack it often, to check a little the fermentation,

if sweet wine is intended. But if only strong dry wine is desired, the sirup may be mixed with the bruised grapes, in the tun by the press, and the fermentation conducted afterwards as aforesaid. When the sirup is well made, it has no taste of the fire: it seems that it is the sediment which is precipitated from the must, by the act of fining, that gets burnt on the fire, and gives the taste, and the must of which sirup is made, according to the process above mentioned is twice fined, once by the smoke of brimstone, and the other time by the effect of the combination of the limestone with the tartar. But I have to learn yet, the proportion of sirup required to make sweet and durable wine, it must be surely proportional to the deficiency of natural sugar contained in the grapes; by weighing first the specific gravity of the must by the hydrometer contained in it, in two or more different trials; the result would show at once, the quantity of sirup required. Our wine on the borders of the Ohio, bears yet a too great price to allow us to make sweet wine by reducing the must on the fire, or with sirup made out of grapes; my opinion, however, is that four or five gallons of sirup per barrel, would make sweet wine.— Three, and at most, four gallons, of our best

must, will give one gallon of sirup; thus a barrel of such wine would cost, say twenty gallons of must to make five of sirup, and twenty-seven of pure must, in all forty-seven, reduced to thirty-three, would be equal to about reducing the whole one third. I expect must as rich as that, would ferment in a strong small barrel, without bursting it, although tightly bunged, then there would be a certainty that the wine would be of the best quality,—all the gas and spirit formed would remain in it, the experiment is worth trying. If no vessel be found to hold it with a confined fermentation, the safety valve before mentioned would answer nearly the same purpose.

It has been noticed in a former chapter, how the Tokay of Hungary and the sweet Muscat of Lunel are made, as was stated to me by the most experienced vinedressers of the latter place: But here it would not be improper to relate an experiment of a friend of mine of Vevey, in Europe, who undertook to make Tokay wine, to show that rotten grapes are capable of making good wine, provided they were ripe before rotting; in 1807, the grapes there, were of the best quality. My friend had enough of them spread on straw in the garret of

his house, to make about four hundred gallons of wine; in February, when he thought the grapes would be half dried, they were found very much rotten, moulded, and a great deal reduced. The presumption that the rotten would disqualify the wine, he had them carefully picked, with the intention to throw them away; but after having pressed the sound grapes, for the sake of experiment, he had those damaged, pressed also: The juice of the sound berries, (for the stems had been discarded) turned out extra good wine, during three years, after which time, all the arts and knowledge of the wine coopers of Vevey, a great wine trading town, could not save it from turning into vinegar, perhaps because it had not fermented with the husk,—and the juice of the rotten berries had, for better than three years, an abominable taste of mustiness, which afterwards gradually subsided, and then was one of the most generous and best wines I ever made use of, and grew better every year, for I drank of that wine frequently previous to my leaving the country, in June, 1816.

Those who like strong wine, and dread the trouble attending the care of keeping light wine, may put good spirits in it; the best time to make.

the mixture, is before any fermentation has began, provided the quantity is not such as to stop it. Good spirit well dephlegmated, and run through charcoal, would, I think, answer in place of brandy; but I would never put rum or peach brandy. Three gallons of brandy made with lees of wine was put in one barrel of our wine, and left two years in the garret of a kitchen, in the warmest place near the chimney, and it made very good wine, nearly equal to imported Spanish or Madeira, except the colour.

I have tried the concentration of wine by frost, but it is too costly. After having been exposed to hard frost, until I thought it could not freeze any more; I drew the part which had remained liquid, which I found to be about one third of the whole, it was considerably better than before; but having put the ice in a still to ascertain if any spirit remained, I found it yielded better than one third of the brandy, that the wine would have done before freezing, so that the wine had gained but double the force although reduced to a third.

Mr. Adlum says in a memoir on the cultivation of vines, page 38, "that the Florence wine is perfected by the process of racking often; for this wine the must is withdrawn

"from the vat as soon as the head is raised;
"It is then transferred to a cask for sixty hours,
"only, and from this cask is again decanted
"successfully three or four times, after inter-
"vals of only a few hours, by which means the
"wine is completed in a short time."

He also says that wine may be made out of unripe grapes, by putting three pounds of sugar to a gallon, which is at the rate of six ounces to the pint, or a little more than thirty-seven per cent. I wish Mr. Adlum had told, what quantity of brandy, such wine would yield at the distillation. Mr. Coxe says, that a pint of the heaviest apple must in New Jersey, weigh twenty-four pennyweight, more than a pint of water, and that the cider made out of such, must yield fourteen quarts of brandy to the barrel, or at the rate of one gallon of brandy, for five and a half pound of sugar, if that excess of weight on water is altogether sugar, for it may be something else as tartar tannin, or any other of the elements of spirit heavier than water; although it comes very near to what a friend of mine, a good distiller said, that with one hogshead of melasses, they most generally make two of rum, thus one gallon of melasses, weighing about twelve or eleven and a half

pounds, making two gallons of rum; it is about six pounds of melasses, or five and three fourths to a gallon.

That agrees very near also with what is said in a treatise on brewing by R. Shannon. That a barrel of unfermented beer, prepared for strongale, called therein *wort*, weighed eighteen pounds and four tenths more than the beer after the fermentation was completed, and that one gallon of it having been distilled, produced at the rate of 13.1 quarts of proof spirit for the barrel; that diminution of 18.4 pounds, must be the sugar in the *wort* attenuated by the fermentation, and changed into spirit, which being divided by the 13.1 quarts, give 5.6 pounds per gallon. The same operation having been made on a barrel of *wort* prepared for porter, the difference of weight being eighteen pounds, and the produce 13.4 quarts gives 5.36 pounds of sugar, or saccharine matter per gallon of spirits. So that it may be taken as a fact well ascertained, that a gallon of proof spirits, is the production, by fermentation of about 5 1-2 pounds of saccharine matter; for the combination of the four above experiments, gives 5.55. pounds.

For want of a good scale and weights, I never could know the specific gravity of our

must, but if the above data are nearly correct, by the quantity of brandy it yields, it must weigh between thirty to forty penny weight per pint more than water. It is about twenty years since I betook myself to taste the quality of must, by its specific gravity, but was satisfied by the hydrometer above mentioned; and neglected the scale. I wish that my leisure and means would have allowed me to make the necessary labors and experiments, that I could adorn this work, with a table showing the specific weight of different juices of fruit, and the admixture of fermenting matters, with the correspondent quantity of brandy, they would yield by the distillation, after a complete fermentation. Those experiments, would naturally tend to some useful knowledge, about the theory of fermentation. I wish some more able citizen would undertake it.

The most wholesome wines are those made from the pure juice of grapes, as they are coming from the vineyard, which are fully fermented, a part of the time, with the husk, and in which, the combination of all the elements of the spirit, has been completed, and no saccharine matter remains unattenuated, to procure a sweet taste to the wine: Such wines are light,

tartarous, and when new, harsh or rough, but it is those only which have eminently, that property of cheering the heart: We should all know that, but our taste depraved, as I suppose by the use of strong liquer, causes us to dislike such wine, and to think that good wine, must be sweet, strong, and full of the inebriating principle, then we call those wines generous, because we may be intoxicated on a small quantity. As our taste has become thus depraved; to satisfy all sorts of people, I shall here give some few hints of the means I would employ, to make such wine, besides what I have already said on the subject, without inspissating the must on the fire. Any way which would decrease by evaporation, the vegetable water of the grapes, before they are bruised, or the must after the expression, will answer the purpose, the saccharine principle, not being volatile, will remain in the grapes, or must. The grapes may be left as in Languedoc, or in other places where sweet wines are made, to hang to the vines after the stems have been half cut or twisted, until shrivelled, half dried, or until the juice would have acquired the desired degree of richness.

Or grapes may be left as aforesaid, or in any

other way to dry entirely, but without fire, so that they may keep until the next vintage, to be mixed with the new in the vat, and thus to increase the saccharine principles of the whole. Good sun dried raisins would I expect answer very well. Now as to the expressed juice of grapes. The unfermented must, may be concentrated by freezing, and the ice carefully separated; to keep must without fermentation until freezing time, the smoke of brimstone, applied as directed at page 266 would answer; but as the fermentation would then go on through the summer, it would be rather troublesome to carry it safe, over that season;—I think, however, that it may be continued until the fall, by being checked with often racking.

Concentrating must, thus by the frost, would be a proper way for cider; good keeping apples may be pressed only in the winter, that the must may be immediately exposed to the frost, the sugar being not subject to be frozen, would all remain in the must; as I never have made such an experiment on cider, I will not pronounce if the frost would, or would not, alter the aromatical, or some other principles of the must; ripe grapes are not the least hurt by frost; in some part of French Compte, they gather their

white grapes only when they have been frozen, the unripe take the colour of rotten fruit, and become very sour, are easily noticed and discarded.

There is a way to take the red colour from wine and make it white, that a wine cooper of my acquaintance knows; but he keeps it secret. Chaptal tells, that it may be done with lime water, but I do not like to mix water with wine. Once I had a small pressing of black grapes, to make white wine, when the must from the press was too highly coloured, I sulphured it in a small keg, that I might shake it strongly, like the must which is to be kept without fermentation, as it is mentioned before. That operation took out the colour, and made it middling white, enough so, to allow the mixture of it, with the other white must, but it would be troublesome to operate on a large quantity; and I never tried it on made wine: I think that such an operation after the fermentation is over, would give the taste of sulphur to the wine; as it sometimes happens when sulphuring casks too much, before putting clear wine in when racking, or in burning the sulphured match too long beforehand, particularly, if the inside of the vessel is wet with water; however, that taste sub-

sides gradually before along time. And it may be taken off, by racking the wine with clean copper bucket, that the whole may come in contact once with copper, but must not remain a long time in it, nor by no means allow copper to be put into the wine, even in the smallest quantity.

At Fayal, one of the towns of the Azore Islands, all the wine I tasted, had highly, that taste, not knowing however, how it got it, I thought then, that it was the soil which gave the taste of sulphur to the wine, for I observed that the whole of those Islands had been made once, by volcanoes, particularly the one the peak is on, which is most completely covered with vineyards.

To make wine in the common way, the process is the same as mentioned above, until the wine is in the cellar, except, as the grapes come from the vineyard, are thrown in a vat, instead of a tun; where they are left (for red wine) until the fermentation is most over. In a great many parts of France, they think the time when the wine must be drawn from the vat, is confined to a few minutes, and are watching not to miss the very one which is thought to be the best, drawing often at a spile, some of it to taste, and when they think, that the sugar is all combined,

then is the moment. We were not so particular in Switzerland to make our white wine out of white grapes. The grapes bruised in the vineyard, were left in the vat, until the fermentation had fairly begun, or until the husk raised on the top, by those who have two vats, or are not in a hurry to make their vintage, for, a good deal of wine, is made by pressing the grapes in the night, which have been gathered in the day: And in some places, they carry the grapes into the vat unbruised, and at night, a man stripped of all his clothes, goes into the vat, and mashes the grapes with his body, and are pressed that night, to have the vat empty for next day. The wine which has been pressed out of unfermented grapes has a great quantity of sediment, or lees at the racking and the cheese remains very great at the pressing. The fermentation with the husk, liquify some of the pulp, the lees remain in the cheese which gets pressed easier, and it becomes a good deal smaller; of course much wine is gained by fermentation, before pressing.

When the wine is in the cellar, a little bag filled with sand is put by some, on the bung hole, and by others, a pack of green vine leaves with a small piece of board or a brick bat on it; then

as soon as the fermentation slacks a little, the cask is filled up every week, until it can be bunged, then once in two weeks, until racked, and after that every month, always drawing some out to taste. One cask must of course be tapped to furnish the wine to replenish the others, but when it begins to be diminished so much, that a too great surface, is in contact with the air, it must be racked in a smaller vessel, that it may be full, or bottled if fine, and the same must be done with any cask broached for use, for wine which does not hold one-fourth or more of brandy, cannot bear the contact of the air without running the danger to have the acetous fermentation started, which cannot go on without air, of which a great deal is absorbed by wine turning into vinegar: for as soon as that second fermentation begins in wine held in wooden vessels, a scrupulous inspection of the outside of the cask, will show a degree of dryness more than common, caused by the atmospheric air penetrating through the pores of the wood.

To terminate this chapter, I shall mention how to preserve grapes for provision.

They are to be gathered four or five days before they are thought fit to make wine, very

carefully, and two bunches tied together across a stick, so that they are not in contact, and hung near the ceiling of a good tight room; through the fall and winter, the rotten berries are to be picked, and that is all the process. Every year in Europe where a pound of grapes never brings more than four cents, and often as low as two cents, we used to put that way four or five hundred pounds, and some years we had some well preserved and good until the others were ripe, except much shrivelled, but also much richer. Some years they would keep without rotting, while some other years there are good many rotting through the winter, and I observed that their durability was a certain sign for such a quality in the wine of that year. Our Cape grapes treated the same, keep very well; there may be some other more effectual process, but none so simple; the provision of no fruit whatever, is more pleasing to a family, than grapes. I can truly say, that there are no better remedies to cure the ague and dysentery, than a free use of full ripe grapes. I have to omit telling how raisins are prepared, for want of the knowledge, but I think our grapes are not fit for it, and they are yet too dear. I pointed out above, how the

French chymists, have learned to make the best of sirup in time of scarcity of sugar, caused by the war, and any lady knows how to make with it preserves of grapes, so that should we be ignorant yet, of the process of making wine, it would be worth planting vineyards, only for the grapes.

CHAPTER XXIII

Of racking, fining, curing and bottling wine—

Forced wine need not be racked so soon—January or February the time for other—Old wine to be racked twice a year—Engine to perform racking—When the vessel is to be tapped—What is to be done with sediment—Cleanliness required—Artificial fining, three modes of doing it, with eggs, isinglass or shavings—Merchants make use of shavings with great advantage—Mixture of different wines improves them—Shavings supposed to answer well to fine cider for bottling—What Adlum says about sulphuring—On sickness of wine—Ropiness, easier to prevent than to cure sickness in wine—Oxide of lead dangerous—How to make vinegar—Of bottling recommendable operation—Never have a wooden vessel broached, except to put the contents in bottles—When the barometer is high, good time to bottle and rack wine—Cleanliness and cool cellars—What Coxe says about bottling cider.

WINE in which the carbonic acid gas is retained, as mentioned before, does not require to be racked until April or May, if lodged in a good cellar; the more gas it contains, the later it may stay without racking; but the wine made in the common way, ought to be racked in January or February, and again in May, before the blossoming of the grapes, and old wine is to be racked in September, and in March, as long as it is kept in wooden vessels. Every time a piece of sulphurated match, about two square inches, for every barrel that the cask holds, is to be burnt, just before the throwing the wine in; that sulphuring and racking of the wine, drawing only what is clear into clean and sweet vessels, is sufficient to fine any wine in time, and that natural fining is the best.

The operation of racking wine is performed in different ways. Our wine coopers do it very expeditiously in this manner; two men, with as many tubs; one helping the other to be loaded with a full tub on his shoulders, who carries it up some stairs, and throws the contents on the funnel fixed on the bung-hole of the cask; the other man fills the other tub, at the cock, and if they are up to their trade, they will keep the cock most always running. In some

large cellars, they have a small engine or pump like a fire engine, which is put under the cock, and the hose being stretched and fixed to the bung of the cask, which is to receive the wine; a man moving the lever of the pump, forces the wine to pass; that machine answers extremely well, when the wine has a tendency to get ropy, for the motion of the piston, beats the wine, and restores it to its sprightliness. If the casks are not very distant, a leather hose being fixed to the cock, and the other end to the tapping hole of the other cask, the wine will run by itself, until it has taken its level in both vessels, then if a bellows is fixed to the bung hole of the one which is to be emptied, the balance of the wine may be easily forced into the other. The cask must be tapped just above the lees, at the bottom of the clear wine, the hole is commonly made about two inches above the lower end of the wicket for a tun of six hundred gallons, and in proportion for others. When no more wine comes by the cock, with a small Jackscrew, the hind part of the cask may be raised gently a few inches; if there is not too many lees, more clear wine will run; by great care and attention the wine may be drawn very clear, to a small quantity; If it remain but a

small quantity of muddy wine in the cask, it may be left with the lees to still, but if there is some worth the while, it is put by itself, in a cask where it soon gets clear. As soon as a vessel is emptied it must be washed right clean, and wiped dry if washed with water. When wine was cheap, in large crops, I used to wash with wine, which being put by itself, soon gets clear again.

Artificial fining of wine is performed in different ways, but I shall mention only the three methods I have made use of myself, which I think are the best, and sufficient to answer all purposes. I have always considered that the white of eggs is the best ingredients to clarify wine, and the easiest procured, one egg to every six or ten gallons, according to the quantity of matter to be precipitated from the wine; the eggs are first beat until the ropiness is subdued, and then being put into a tub, wine is drawn on them by a spile hole, from the cask which is to be fined; and while the wine is running, the eggs are in the same time churned or beat very brisk, until the tub is filled, and the whole is introduced into the cask again, which ought not to be quite full, for the churning will generate an abundant froth, which I think is the very thing

that fines the wine, therefore, it ought all to be introduced into the cask, for that purpose more wine is to be drawn to rinse the tub and funnel, until the whole is in; then with a stick, introduced by the bung, a good stirring is to be given to the top of the mass of the wine, and the bung made fast. If that operation is made in a clear day, or when the mercury in the barometer is high and shows elasticity in the atmospheric air, there is a greater chance of success. I have made use also, of Isinglass; but I found it very troublesome. It must be pounded very fine, and soaked several days in wine before it is thoroughly dissolved, and then it is only equal to the white of eggs, and must be operated the same way. Some say that it refines the wine quicker; but I could not observe any material difference. It is true, I have not often made use of fish glue; I had to buy it, while I had eggs of my own: besides, I thought that the tannin principle which exists in some sorts of wine, perhaps more or less in all, and is a desirable quality, may be combined with the glue and forms lather, and thus destroys its best principles of durability. Although the eggs seem also to be a glue, I suppose they do not operate in the same way. The time is in

glass succeeded the best with me, I had left it to soak among thirty gallons of wine in a keg, a full month; then beaten in a tub with a broom for an hour before it was introduced into the cask intended to be fined, one ounce per eighty or one hundred gallons, is the dose made use of. Some recommend to add the shells, well pounded, with the eggs; and I have done it myself, but I abandoned that practice, after I had considered, that being limestone, they must neutralize some of the tartar of the wine, which is absorbed again if it is lodged in a vessel having some chrystalized tartar adhering to its staves, which is the case of all vessels in which new wine has been made, will again dissolve as much of those chrystals as the lime will have neutralized; for only a certain given quantity of that salt can be dissolved by water, and none by alcohol; therefore, the more spiritous the wine is, the less tartar it keeps in dissolution. The must holds as much as its watery part can dissolve: in the course of the fermentation, spirit is formed, and all that part of the tartar which cannot be kept in dissolution by the spirit, or combined in it, is chrystalized into hard stone against the sides of the vessel.

One of the best methods to fine wine is by

shavings of tasteless wood, like beech, maple, young elm, and perhaps sycamore. Were it not for the following inconveniences, this method would be the best, but they prevent many people from using it; which are, that only a part of the wine thus fined can be withdrawn clear from among the shavings, at one time, and the shavings cannot be left to remain above the surface of the wine any length of time, for fear they should get mouldy or sour: The vessel must always be kept full, and the shavings made somewhat coarse, that they may have elasticity to remain up without settling, even after being soaked a long time, and much loaded with chrystalized tartar. When the wine is drawn, the shavings which remain above the surface of the wine, as it descends, being loaded with sediment, which is washed down by the dropping from one to the other, disturbs the wine, and makes it muddy; if clear wine only, is thrown on them, a greater proportion can be got fine at one drawing. When in large crops, I used to wash my casks at racking time with wine. I had always an hundred gallon cask filled with shavings, on which the wine that had served to wash, was thrown; after a day left to settle the grossest lees, and in five or six days it was

clear again, and I could draw about a third of the contents of the vessel before it turned muddy.

When the shavings are much loaded with sediment, like when new wine has been made on them, to have it early done, and fine, they are to be drawn out of the vessel by the wicket and washed clean, then dried by the sun, and put in again; they are then better than before. Merchants who deal much in wine, and have great and regular sales, make use of that method of fining their wines, with great advantage. They have several large tuns of two or three thousand gallons, full with shavings; they draw from them to furnish their customers, and fill them up immediately with wine all but fine, without omitting the sulphurated match; by the attention of using only most clear wine, they can draw for years; every fifth or seventh day one thousand gallons out each tun perfectly fine, and they say that continued mixing of wine improves it.

I presume that those who have large quantities of cider, and wish to have it bottled in March to have it frothy, could with great benefit have it fined that way; a tun of two thousand gallons, full of shavings, would clarify a

large quantity of cider, in a winter, if lodged in a good cellar, and not put on the shavings before it had been racked two or three times. Before quitting the article of fining, I shall copy what Mr. Adlum says about sulphuring, page 60 of his memoir.

"It is evident that the same process, (sulphuring) applied to highly saccharine wines, will tend to preserve their sweetness, and, thus indeed, most of the sweet wines are prepared. The rules are in fact so universal, that it would be a waste of time to enter into more details respecting their application. But before I quit this subject, it will not be uninteresting, to point out some methods of attaining the same end, which are little known, and perhaps more convenient than the process above described. One of these, is the introduction of the black oxide of magnesia, whose properties in precipitating the leaven, are similar to those of sulphuric acid.

"But a more ready and perhaps most convenient than the process of all, is the use of sulphate of potash, a salt easily prepared, or easily procured from the trading chymists. A very small quantity of this salt which possesses the advantages of durability, is suffi-

“cient to answer the purpose; a drachm for
“example will be enough for a pipe of wine;
“it communicates no taste, and can readily be
“managed, with the greatest accuracy, by pro-
“portioning the quantity to the particular cir-
“cumstances of the wine. Makers of sweet
“meats will not be displeased to know, that by
“the use of the same substance, the fermenta-
“tion of sirups and preserves may be effectually prevented.” As to the black oxide of magnesia, or the sulphate of potash, answering the same purpose of sulphurated burning match; I know nothing of it, but should it prove to be as Mr. Adlum says, it must be a valuable discovery, and worth an experiment at least: For the burning of brimstone is not without inconveniences; the excess of it will hurt the wine, it gives a disagreeable and bad taste, most like the water of sulphur springs, and it precipitates some of the colours of red wine.

I shall not say much of wine sickness. I should have to borrow from other authors, for I never had any that needed medicine, except once, and that I found one evening; the wine I was drawing by a spile, from an eight hundred gallon tun, very ropy; about sunrise that same day, I had drawn some out the same hole and it was

good, and by tapping the tun higher up, I observed that ropiness in wine begins below, and rises up gradually; to cure it, I took a man to help me, and forthwith went to work, first cleaning a vat in which we throw the wine, after we had beaten it with brooms in a tub, as it was drawn from the tun, which was when empty well washed, dried by wiping, sulphured, and filled up again, doing over the same operation of beating it, in the tub as it was drawn from the vat: in the morning when day appeared, all was done, and the wine as good as ever, if not better. In the course of that operation, I had the opportunity to observe a curious circumstance; the wine at the top of the vessel came out first, although the cock was fixed within two inches from the lower end of the head. It is easier to prevent sickness in wine than to cure it. A good cellar, extra clean liness, often visiting, and racking, and keeping always full, will most surely prevent disease. They say that a beginning of ascendent is palliated by the oxide of lead, but it is a dangerous ingredient; the best remedy in that case, is to make vinegar with it; and when wine has acquired some bad taste, by the cask or other way, the distilling of it is the best.

To make vinegar, they have where they do it as a trade, two high and narrow tubs filled with the mark or husk of the grapes, kept in certain steady degree of heat, one is filled up with wine, and left two or three days, then drawn and thrown into the other tub among the mark, when signs of fermentation appear the empty tub is filled up again from the other, and so on, racked successfully from one into the other until the whole is vinegar, then being put equally into the two tubs, which are filled up with wine, is there converted into vinegar; once those tubs being right sour, much good vinegar may be made by filling up with wine or cider, as vinegar is drawn.

The bottling is a commendable operation for delicate wine. When a cask is broached, and begins to have a large surface in contact with the air, there is great danger of getting asceticous, the bottle secures it, provided it is well made with perfectly clear wine. It would be well to have bottles enough, that all the wine for family use should be bottled one year beforehand, and keep no vessel broached, particularly tavernkeepers in a bar room in the summer time, for no good and genuine wine will keep there without spoiling, if it is not mixed with

brandy, and then it is not genuine: I would advise them to lodge the wine as they receive it, in a good cellar, and immediately proceed to fine it, if necessary; and when right clear, have it bottled, and the bottles left in a cool cellar until wanted, even filling up the casks which contain old wine, would be better to be done with bottled wine. The wine must be completely clear and fine, before it comes into the bottles; then I think it can be bottled any time through the year, except perhaps when the grapes are in bloom, and when that wind is going which sinks the mercury in the barometer, which is also a bad time to rack wine; the atmospheric air is then unelastic and much relaxed. Great care should be observed, to have the bottles thoroughly cleansed, that no incrustation of tartar, or any other kind of matter should remain, although, it would have resisted a common washing; it would dissolve by time, and soil the wine; gravel, preferable to shot, is commonly made use of to wash them, and no remnants of cork should be left in the bottles, nor old corks made use of, but good sound and new ones, which are not to be immersed in water, to have them soft, if it should be necessary to give them more pliability, wine

or brandy, would answer better than water. Bottled wine is to be kept in a cool cellar, and buried among clean and dry sand, the bottles on their sides, to prevent the cork from shrinking. They should not touch, for the concussion attending hard strokes of thunder in our climate, may crack some, if in contact.

It seems that cider requires different treatment, than wine in the bottling. For according to Mr. Coxe, "it ought to be bottled in the March, following the making of it before the blooming of the apple trees; after having been completely fined, (in the same way as wine is done), but it is to be left twenty four hours in the bottles before it is corked; it requires some time to take the bottle. When thus treated, but finally is a better liquor and less dangerous to the bottles; about an inch of vacant space should be left in the neck of the bottle, below the cork when placed on its bottom, which should be always done during the first season, the bottles may then be placed on their sides with safety, and deposited in the coolest cellar in the house, and the corks fastened with wire.

CHAPTER XXIV.

Temperature of the best cellar—How deep—Half arched—How to make it—Answer against fire—Pavement—Two beams to lodge the casks—Cistern to save the wine if a tun should burst—Of vent holes between contiguous cellars.

THE temperature of the earth, below the influence of the sun, and of the versatile temperature of the atmosphere, is most generally ten degrees of Remur, or fifty-five of Farenheit's Thermometer. The cellar which remains the whole year the nearest to that temperature, is the best, provided it is dry and airy. To obtain the end, a cellar ought to be at least eighteen feet deep, walled and arched with stones or bricks, the buttments of the vaults to be below the surface of the ground or well shaded, and the arch covered with one or two feet of clay, sand, or loam; the door to the north, and having two shutters, one at the foot and the other at the top of the stairs: and some *rent* holes opposite, and placed so as to procure a current of air, which are to be provided with shutters,

that light may be entirely excluded at pleasure; the light is apt to change the colour of red wine, even when confined in strong wooden vessels, and dark cellars seem to be cooler.

Instead of stone arch, a sort of ceiling, that may be called a half arch may be made, in the following way: Beams are to be hewed with four faces, one of them being two or three inches wider than its opposite side, to be laid the largest side below and the narrow up, six or eight inches distant; the intervals are to be filled up with stones and good lime mortar, or with bricks shaped on the purpose broader at one end, in the same proportion as the beams, the stones or bricks are to be set to pass about one inch below the beams, to give a hold to the plastering of the ceiling, and if a foot of some mortar or other is laid on such half arch, it will effectually stop the progress of fire, in case of the house burning, very near as well as a stone or brick vault. One of our cellars near Vevay, has been made that way, and is a good cellar; has not cost much, and takes less room. A cellar ought to be paved with stones or bricks, and well drained if subjected to any infiltration of water. There ought to be a couple of beams on each side of the cellar, to lay the casks on,

at a convenient height; to be handy for the service of the cellar, and to prevent the vessels lodging on the ground, where they would soon rot. The best fixed cellar that I have seen, had a cistern below the pavement, to receive the wine in case one of the tun should burst, or have a large leak sprung, and thus be saved.

If two or more cellars are contiguous to one another, nothing contributes more to their improvement, than some vent holes, from one to the other, under the butments of the arch; the holes need not be larger than about six inches, and be grated with iron to prevent the passage of rats. There is always a current of air going through these holes, sometimes one way and sometimes another, according to the side of those cellars the wind is, or the dilatation of the air outside is the greatest, for as it comes warm by the sun or other way, being lighter, it raises, then the air in the cellar runs out by the vent holes on that side to fill up the place left by the ascending air, and is replaced, by the vent holes of the opposite side, which happening to be in a cool shady place makes it a happy circumstance.

END.

NOTES.

NO. 1,

ON what has been said in page 20 about vines called red juice, by the Harmonites given to one of our colony, and thought to be the sand grapes. Having never had a chance to see their blossoms until in May, 1826, in the Harmony vineyard near Wabash, where I found one plant in full bloom, and observed it to be of the pentendria monogynia family, although similar to the sand grape is most every part except in the blossom, which in Linnaus, is the distinguishable character of plants.

This black juice grape may be the one called *de la Madelaine*, for which the sand grape was mistook by the French on the borders of the Ohio, which seem the same described in page 69, under the name of *Early black July grape*: Or with more propriety, may be supposed to be a seedling, produced from the crossing of breed between a sand grape and some European vines; for the blossom has a little of the character of the female blossom of the sand grape; the stamens, were somewhat crooked, like the little leaves which are in their place in the female blossom of wild grapes, but had small antheras on the top. It was with the magnifying glass of the watch maker of Harmony, I could look at them, a better glass would perhaps have altered my judgment.

It is a curious circumstance that the strawberries are in their original state, similar to the vines as to the sexual character; the American strawberries, being of the dioecia family like the vines, and the European are of the

hermaphrodite kind; but since the American sorts have been cultivated in Europe, and their breed crossed over and over, some species have been created, that partake of the two sorts; L'Abe Rozier has given the description of some of them.

I cannot help repeating here the request to persons who can do it conveniently and possess a green house, to have their house so fixed that they may easily perform the crossing of breed, and I shall add here, that a dexterous person may cut nicely off, the antheras in the blossoms of the best European grapes before the emission of their fecundating farina; this operation would require great patience, nicety, steady hand, and good sight. Perhaps the opening of the bloom may be anticipated by pulling off nicely the petals, a little before they fall themselves; when a bunch thus fixed being close to the blossom of a male of the most vigorous wilding, would surely be fecundated by it.

NO. 2.

Refers to page 37. The Madeira grape vine was seen by the author in May, 1820, succeeding middling well in the vineyard of New Harmony, which occupies perhaps a half of it. The snow and frost of April, had destroyed there most of the fruit brought forth by the first sprouted buds, while at Vevay no harm was done, owing to the buds not having yet opened, the pruning having perhaps been later; but if it is on account of its more southern attitude, it corroborates the apprehension I always had that vines will not flourish best to be the more south: late frosts exert their baneful influence very far south, behind

the fine, where vegetation begins, and catch more of it to act on: The frost of April was felt at Natchez, as I was informed by travellers, with enough intensity to hurt cotton plants. The Madeira grapes of Harmony, brought forward by the second shooting after the frost, more fruit than the cape grape, which nevertheless succeeds there very well, but none of the imported grapes, do well there, except the black juice, of which I found but one plant; it is too small a bearer to be worth nursing, altho each shoot brings forth three or four, and even sometimes five bunches.

NO. 3,

Refers to page 82.—About watering the vines in the Canton of Vallais. Since that part has been put to press, I had some conversations with a Swiss gentleman, who is well acquainted with that Canton of Switzerland, which lies in a deep valley, between the glaciers, where the summers are very hot and winters very severe, similar to ours; those conversations have induced me to repeat here the request to any person who can do it conveniently, and have European vines of the most delicate sort, to have them watered, by running water conveyed to them from time to time in the summer, to see if their shoots would not ripen better, and bear the winter frost, and have the result published. I begin to be impressed with the idea that it is something in the siccidity of our atmosphere or a great power in the air, to excite a large evaporation on the leaves, that sickens the European vines here.

Refers to page 101 and 106, where it is said that the thread or filament spun by a silk worm, measured commonly one thousand feet. I must have been under a gross mistake, being twenty four years since the experiment was made, and having made no record of it, except in a letter sent then to Europe. One Oliver Kieth, of Switzerland county, Indiana, who has reared this spring (1826) some silk worms of the sort that shift their skin three times, and fed them wholly with indigenous mulberry leaves taken in a thick forest, had reeled a common cocoon* on a reel seven feet and a half in circumference, which made two and a half cuts of one hundred and twenty rounds each before breaking, and there was still enough yet (he says) to make another half cut, had it not have broken. Two and a half cuts by one hundred and twenty, make three hundred rounds, which being multiplied by seven feet and half make twenty two hundred and fifty feet for the length of the filament spun by a single worm; and by weighing five hundred and fifty three cocoons he found that they weighed thirty ounces; which give about eighteen to the ounce; in Dauphine they said that one pound was the weight of about two hundred and forty cocoons, or fifteen to the ounce. This difference in the weight of the cocoons may come from the circumstance of the worms being fed altogether with leaves taken out of a shaded forest, and not from an open orchard; or the spe-

* I could find the word cocoon in no English Dictionary, and I was advised to write cacoon, but the Baltimore Patriot, writes cocoon, so will I now.

sies of the worms: If so, the computation given at page 106 and 107, falls short of the true length of one cocoon, and the five mentioned chains from twenty four thousand cocoons, which in Dauphine weigh one hundred pounds, and here, according to Oliver Kieith, eighty one pounds and five ounces of our weight, would be seventy yards long, instead of thirty three and a third, and not weigh two pounds each, except it should happen that the cocoons would yield here more than the tenth of their weight in reeled silk, as they commonly do in France, which fact ought to be ascertained, that the public may have a criterion to go by, and know the comparative value of the leaves of our trees and of those of the white mulberry. But by the inspection of Mr. Kieith's silk, I was induced to believe that twenty cocoons drawn in one thread, would yet be too fine to be woven in twelve hundred; however, any lady who understands weaving, will determine at the first part of the reeling, the number of cocoons to put in one thread to answer her purpose. As Mr. Kieith's intention was to make sewing thread with his silk, I advised him to have it drawn twenty five cocoons at once, on a common spinning wheel, to give it at the same time a good twist, and then put three cords to his thread, which I think will be fine enough and very strong; thus two of his cocoons will make a skein of the same length as those found in stores of better silk.

As this note was going to press, the Baltimore Patriot of July 13, 1826, in an article under the head of Silk worms, mentioned that in Bucks county, Pennsylvania, in 1771, oak leaves were accidentally laid in the way of diseased silk worms after the third shedding of the skin, which they devoured greedily and were restored to health and

vigour, and spun well. In page 106, it has been mentioned that the Snakers in Mercer county, Kentucky, are substituting with success, beech boughs with green leaves, to the Irish broom or other bushes to make, what is called in France, *cabanne* or little bundles of boughs, forced between the shelves, to bend and make a sort of arched bower, to give the worms the chance to lodge their work among the sprigs. I see nothing to prevent the use of oak boughs, with green leaves to give the worms the double chance of finding a remedy and room to work, oak leaves being similar to the beech leaves in toughness, in holding fast to the branch after being dried, and then not easily crumbling to pieces, an essential circumstance that the silk may be picked off clean from them.

NO. 5.

Referring to page 285 and 299, where the necessity of keeping wood vessels containing light and delicate wine always full, is mentioned.

I ought to have added, that there is another consequence attending the contact of air on light wines, not holding more spirits than they do, which urge also the regular repletion of casks or the bottling. A scum or a sort of white skin is growing on the surface of the wine exposed to air, that we called *fleur* or bloom, which soil the top, especially when the surface in contact with the air is large, and of a long standing: I always considered that scum as a true skin growing there to cover the wine to prevent that very contact of the air, which changes wine gradually into vinegar, and instead of doing damage does good, was it not, that it soils the wine, and makes it difficult to be clarified again.

NO. 6.

Refers to page 193, to give an additional reason of abstaining to mix the shells with the eggs, in fining wine, because the tartar that the shells would neutralize, may be necessary in the wine to prevent flatness, and perhaps is what helps to give durability to wine, and in the must is one of the component principles of the spirit, see page 243, the advice to rinse the lime out of casks which are to receive must, if there is a danger of a total combination of the tartar by the lime.

NO. 7,

The American Vinedressers Guide, being mostly printed when I met with the *Bibliothèque des Propriétaires Ruraux*, on the Land Holders Library, by a company of learned land owners of Paris, in 1803, the following extract is made in the form of a note, it will serve as an illustration of what is said at pages 271, 277, and 278. A hydrometer is noticed therein under the name of *aerometre* used to ascertain the relative quality of sugar in the must, similar to the one mentioned at page 271, differing in this respect only, viz. this shows the degrees or portions of sugar in 85 parts of pure water, while that shows the sugar in 100 parts of water; the French instrument being made by the immersion, first in pure water to obtain the point 0, and after, in a dissolution of 15 pounds of common salt, in 85 pounds of water, which makes 100 after the mixture to mark the point of 15°, corresponding to 15 per centum of the mixture, and then it must be graduated accordingly. But ours showing the per centum above water, is better adapted.

ted to the test of must by the scale, which shows how much a given measure of must weighs above water. The best cider must in New Jersey, weighs 24 pennyweight's per pint more than water, or if 1 1-5 ounce be added to 16 ounces of water, it gives the 7.5 per centum of pure water: at that rate a barrel of 33 gallons of must will weigh 19.8 pounds more than water, for that quantity of sugar will dissolve and go into the water, without increasing its bulk. The 15° of the French instrument corresponds to 17.64 of ours, and 16° being the degree of the best must in France, corresponds to 18.22 of ours, and the must of the worst quality, shows 5°, it would be 5.88 in ours. Now if the cider of New Jersey, showing at the hydrometer 7.5 per cent, give 14 quarts, then 18.82 per cent. gives 35.13 quarts per barrel, or the 26.61 per centum. And by the same rule, the worst must, would give 10.97 quarts per barrel, or the 8.31 per cent. All of which, statements, I am inclined to believe are nearly correct, for according to Chaptal, the most generous wines, give 1-3d in brandy, Lanquedoc wines the fourth, those of Bordeaux the fifth, and those of Burgundy the eighth. And if so, they highly corroborate the suggestion of page 278, that a gallon of spirit is produced by 5.5 pounds of sugar by the fermentation in a proper liquid containing eth other elements of spirit: That criterion being certain, it is easy to make wine of any strength. Suppose wine is desired equal to the best of France, add sugar, or better (sirup of grapes) and tartar till the hydrometer (of page 271) shows 18 82°: tartar being one of the best ingredients in wine. If saccharine matter alone added, they may absorb the whole tartar contained in the must in being changed into spirits, and leave none to the wine, which will thus be delicate, turning easily to vine-

gar. The best wines of the north of Europe, Champagne, and Old Hoc, contain very little of spirits, perhaps not an 8th per cent, nevertheless they keep half a century. I have drank wine, made on the borders of the lake of Zurich in Switzerland, forty years old, it was light, tartarous, and well tasted; the tannin, although in small quantities, and the tartar, beside a good cellar, were what gave it such durability. If wine, holding a given part of spirits is desired, suppose the 20 per cent, ascertain first, what your must shows at the hydrometer, or weigh it at the scale, and, if it should show 7.5 or weigh 19.8 pounds per barrel more than water, as the Jersey cider must, which gives 40.6 per cent of brandy, the addition of 17.56 pounds of saccharine matter per barrel, would bring your must to the proper point. To find that, you have 10.6 per cent to 19.8 pounds as 20 per cent is to the answer, which will be 37.35, from which 19.8 pounds, the natural weight of the must, being deducted, 17.56 pounds remain to be added to the must.

By the hydrometer, you must know first, that the 20 per cent. of a barrel is 26.4 quarts, and 14, the 10.6 per cent. then you have 14 quarts; 7.5 degrees:: 26.4q: x, or 14.14 degrees, you then add sugar till the instrument shows 14.14 degrees: and for wine holding 25 per cent. of spirits or 33 quarts per barrel, you have 14q: 7.5d:: 33q: x or 26.4 quarts 14.14 degrees:: 33 quarts: x or any other proportion of known degrees, and the correspondent product of spirits, you will have for the x, 17.67 degrees, and then any must showing 17.67 degrees, at the hydrometer, will make wine holding a fourth in brandy, provided the must is otherwise well constituted and the fermentation well conducted; or to know the weight per barrel of the

must for wine of any strength you have, as 14 quarts is to 19.8 pounds, so is 40 quarts or the number of quarts wishing the wine should hold, to the answer, which will be the number of pounds a barrel of must should weigh more than the water, taking always the cider must quoted by Mr. Coxe, as a correct criterion. I ought not to omit mentioning, that fresh new milk is recommended to be mixed with the wine of eggs to make white wine, for the milk will take some of the colour of the red wine: perhaps it is by the agency of milk that they change red wine into white.

The French authors give us also to understand that one of the ingredients of the juice of grapes is malic acid, or the acid of apples, and that unripe grapes have more of that acid than full ripe, and it is the cause of the bad quality in many wines, and that tartar is quite a different acid, and is that which qualifies good wines, and gives them durability.

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ERRATA.

Page Line

9 12 1160 *read* 160.
 12 13 share—slave
 20 14 of the Island, to be
 erased
 22 12 Penendria Monogena
 read, Potendria Mo-
 nogynia
 23 22 nursery—nurse
 24 11 Kewslar—Hewslar
 26 2 countries. Among the
 apples, *read* coun-
 tries among the ap-
 ples. It
 28 8 branches—bunches
 33 17 grape—grain
 34 22 by—they ought to
 make
 35 3 Know—now
 53 1 V—IV. and the five
 following Chapters
 thus misnumbered.
 61 4 branches *read*, bun-
 ches
 73 21 iniquitive—inquisitive
 79 9 Seine—Maine
 “ 18 Stalks—Stakes
 80 8 them—the must
 82 24 Valey—Vallais
 83 12 States—Stakes
 88 4 bunched—pinched
 89 10 pinched—pinched on
 “ 21 perpetually—prefera-
 bly
 “ 23 pruning. After the—
 pruning after the old
 “ 27 chance *read* change
 90 10 rear—reel
 “ 12 have—heard
 96 17 enrich—rich in
 98 8 fairest—finest
 100 24 of—before

Page Line

105 9 will—are the produce
 of
 106 3 Peach—beech
 “ 24 the worms—two worms
 107 8 & 9 should—would
 110 1 west and north west of
 read, west, north
 west and north
 111 1 Seine—Yonne
 116 13 to—for
 118 13 racuwing—rouan
 120 2 add after cistern, be-
 ing
 “ 6 omitted after leaves,
 especially when
 green, their vegeta-
 ble water is greedily
 absorbed by the
 roots
 156 18 received *read* reserved
 159 8 so, to be erased
 161 16 omitted after plough,
 will leave a strip of
 unploughed
 “ 21 feet and *read* feet by
 two and
 163 3 soil—sole
 169 2 cutting—belting
 172 6 after the word branch,
 add, letter i shows
 the stroke of the
 knife, when the hor-
 izontal branch is to
 be renewed
 179 3 third *read* seven
 238 21 whole—hole
 239 6 was it that—was it not
 that
 276 3 spirit—spirit of whis-
 key
 279 5 taste—test