

Vineyards  
*of*  
France

Alicia du Pont  
de Nemours



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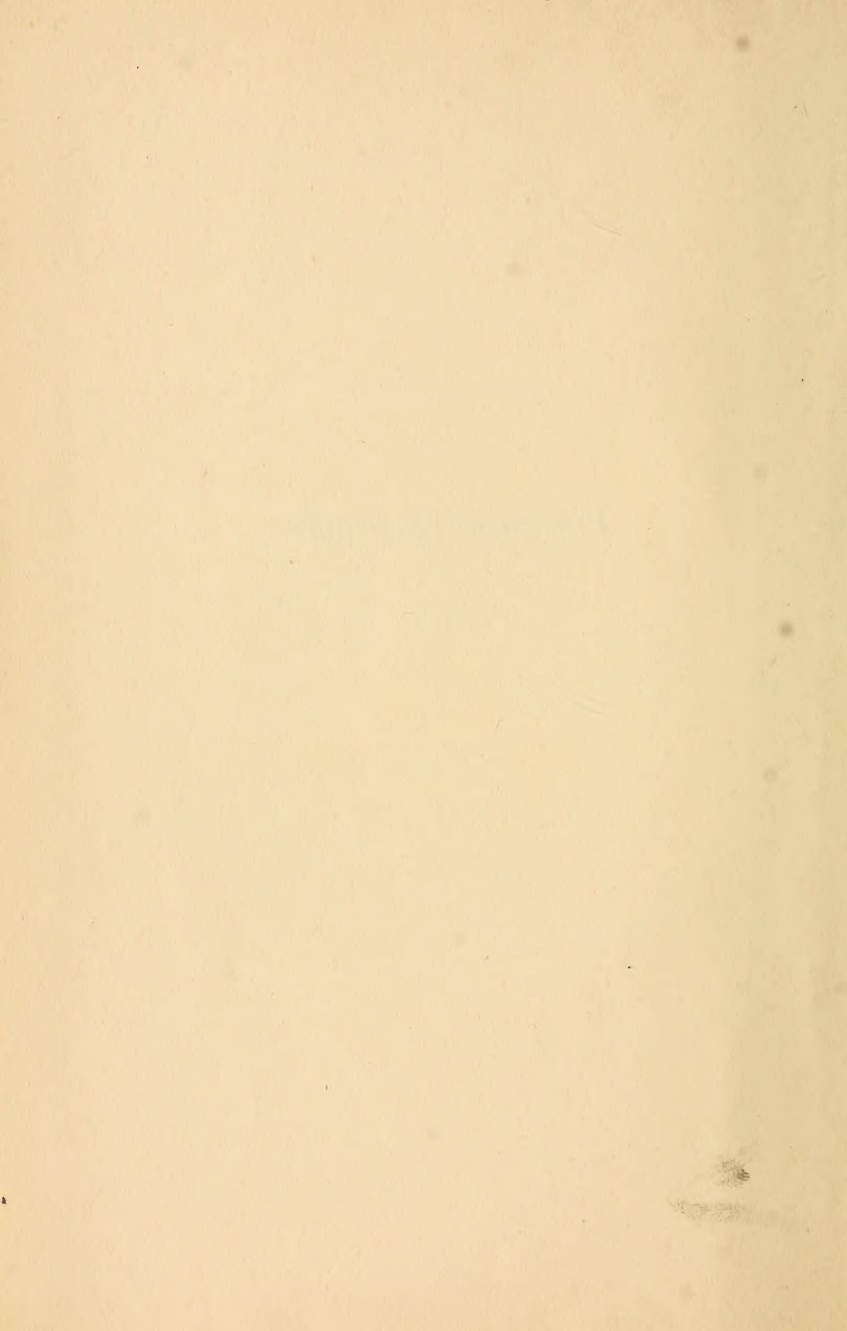
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*Vineyards of France*



*THE CULTIVATION OF  
VINE YARDS*

*in Southwestern France*

By

*Alicia du Pont de Nemours*



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*To Myron T. Herrick  
Ambassador to France*

## Part II

*Cultivation of the Vine*

I.	<i>The "Parage"</i>	75
II.	<i>The Poles or Stakes</i>	81
III.	<i>Fertilizers—Manures, New Earths, and Marls</i>	85
	§ 1. <i>Quality of Fertilizers</i>	85
	§ 2. <i>Proper Time for Manuring the Vine</i>	87
	§ 3. <i>Quantity of Manure to be used for Manuring Vine- yards</i>	90
IV.	<i>Dressing the Vine</i>	94
	§ 1. <i>When to Dress the Vine</i>	94
	§ 2. <i>Manner of Dressing the Vine</i>	98
V.	<i>The First Tilling. Preliminary Observations. Vegetation</i>	112
	§ 1. <i>The Proper Tilling Time</i>	118
	§ 2. <i>Tilling Methods</i>	129
VI.	<i>Destruction of Weeds in Vine- yards</i>	136
VII.	<i>The Fastening</i>	139
VIII.	<i>Nipping Off the Buds</i>	147

*Part III*

*Accidents Affecting the Vine. Its  
Diseases and Harmful Insects*

I.	<i>Accidents Affecting the Vine</i>	151
	§ 1. <i>The Frost-Bite</i>	151
	§ 2. <i>Winter Frosts</i>	153
	§ 3. <i>Spring Frosts</i>	155
	§ 4. <i>About Hail</i>	161
	§ 5. <i>Dropping Off and "Tacon"</i>	163
II.	<i>Diseases of the Vine</i>	167
III.	<i>Insects Injurious to the Vine</i>	171
	§ 1. <i>Vine-Grubs</i>	171
	§ 2. <i>Wine-Weevils</i>	174
	§ 3. <i>Beetles and Other Insects</i>	177

*Part IV*

*The Vintage*

I.	<i>Preparations for the Vintage</i>	183
	§ 1. <i>Wine-Press</i>	183
	§ 2. <i>Liens</i>	189
	§ 3. <i>Tubs and Casks</i>	190

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II.	<i>Wine Casks</i>	194
	§ 1. <i>Proper Time for Buying the Casks</i>	194
	§ 2. <i>Quality and Making of the Casks</i>	200
III.	<i>Proper Time for Gathering the Grapes</i>	209
IV.	<i>How to Make Wine</i>	214
	§ 1. <i>Selection of Grapes</i>	215
	§ 2. <i>How to Crush Grapes</i>	220
	§ 3. <i>How Far the Tub Process should be Pushed</i>	222
	§ 4. <i>How Long Grapes Picked from the Bunch should be Permitted to Boil</i>	230
V.	<i>How to Regulate the Wine-Press</i>	235
VI.	<i>How to Treat New Wine</i>	246
VII.	<i>White Wine</i>	253
VIII.	<i>The Vine Espaliers</i>	256
IX.	<i>Rapes</i>	262
X.	<i>Temperature of the Wine Cellars</i>	266



## List of Illustrations

---

	<i>Facing Page</i>
<i>A Vineyard</i>	3
<i>Wine in Bottles</i>	84
<i>An Arm of a Modernized Cellar</i>	122
<i>A Walled Vineyard</i>	140
<i>Wine Casks</i>	200
<i>Workers in the Vineyard</i>	212
<i>A "Foudre"</i>	240
<i>Bottled Wine in Cellar</i>	270



*“The Grape that can with Logic absolute  
Life’s leaden Metal into Gold transmute”*

This study of Grape Culture was made in Orléans, Auvergne, and Périgord, where Romance breathes forever and Love never dies.

A. DU P. DE N.

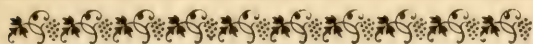








A VINEYARD



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## VINEYARDS OF FRANCE

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### Part I

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#### CHAPTER I

##### *The Soil and the Plant*

**A**CCORDING to the common saying, every soil does not bear every kind of fruit. It is, therefore, necessary to know the fruit suiting the soil in order to reap a bountiful crop. Experience only can serve as a guide in this connection. Only by experience has man been able to find out which is the proper crop for the different kinds of soil.

The different layers are to be distinguished in every soil; first, the earth that is at the surface; second, the underlying bottom.

For a soil to be favourable for the cultivation of the vine it is necessary, first, that the underlying layer be permeable to water, for, as is the case with clay, were this underlying layer impermeable, the vine would inevitably perish, owing to excess humidity. Second, that the underlying layer should be deep; that is, located at two or three feet at least below the surface of the soil, otherwise the vine would

not find sufficient nourishment. Third, that it should not be so compact as to prevent the vine from spreading its thickest roots through it.

The most favourable soils are the heavy soils that have a deep underlying layer, and still more the loamy soils, the underlying layer of which is composed of heavy earth. The vine finds in both all the nourishment it requires. It can live in such soils for two or three generations. These soils are the most suitable for the "Auvergne" vine. This is the vine which gives the best wine in this soil.

Fine chalk mixed with coarse sand is also satisfactory for the "Auvergne" vine. This applies also to the soil commonly called "Grouettes," which is a black earth resting on a harder bottom approximately of the same quality. However, the life of the vine in both instances is shorter.

Most of the other soils are suitable for the planting of the vine called "Fromente-black," likewise described under the name of "Eunier," owing to the fact that the under side of its leaves is covered with a white down. This is the best vine, second only to the

“Auvergne” vine, and generally it gives a good yield.

The “Fromente-black” is also planted in soils which would otherwise grow satisfactorily the “Auvergne” vine, when such soils are situated in low and damp locations, or when they adjoin woods or marshes. It withstands better than the other varieties the frost and mildew which are very prevalent in such locations.

White grape vines are generally planted in light sandy soils. They thrive better in such soils, as they do not require much nourishment.

## CHAPTER II

*Preparing the Soil*

**I**F the soil is new, it is sufficient to dig it a single time to a great depth during summer and to open the rows a few months afterwards. This is the operation called by the vine-growers "Ranger." The soil is then ready for the planting of the vine, which should take place either before the winter or in the course of the spring, according to the nature of the soil.

If the ground were wooded, it would be possible, after having pulled out all the stumps, to plant



the vine in the course of the very first year; as with regard to the vine such ground would be considered new soil. However, it is advisable not to plant the vine until the following year, in order to destroy completely by repeated diggings the roots which may have been left in the ground and which may prove injurious to the growth of the vines. If the soil has been planted previously with vines, it should be permitted to rest at least one year and sometimes several years before replanting. In this connection one should follow the custom that prevails in the

different vine-growing districts, which custom is the result of long experience with the particular kind of soil prevailing in that district.

With regard to heavy soils which are left to rest only for a year, such soils, in order not to leave them entirely uncultivated, may be planted with peas or other small grains, such as vetch or oats, but never with wheat or barley because such crops exhaust the soil. The other grains, on the contrary, enrich the soil.

Such soils as are allowed to rest for as long as three and four years

owing to their being weak are planted with grass between the clearing of the ground and the planting of the vine.

Whatever the nature of the soil before planting the vine, care should be taken that all weeds are destroyed.

When replanting, it is necessary to turn the earth of the beds in a direction opposite to the pre-existing rows. In this way a portion of the old alleys may be covered by the new beds. These old alleys may be considered as new earth, the largest roots being found in the beds.

It should be kept in mind that, first, the beds drawn from north to south are the most advantageous, since they receive more sunlight. Second, the beds should be so arranged as to facilitate the draining, as stagnant water would be liable to destroy the vines. One of these two reasons may lead the vine-grower to plant the vines in a parallel direction to the old rows.

It is possible when turning the earth to raise slightly the alley and the bed at the points where they are found to be low. For this purpose it is sufficient to

dump on them a small quantity of earth.

However deep the digging done previous to the replanting, such digging should never reach the underlying layer. Care should be taken not to dig through this layer, as it serves the useful purpose of retaining rainwater while it takes no part in the nourishing of the vine.

### CHAPTER III

#### *Width of Beds*

**B**EFORE opening the rows, the first operation is to draw them on the ground in order to

be sure that the alleys and the beds shall have a uniform direction all through the ground in case the field used is square. All the vine stocks are planted along straight lines drawn by means of a cord. The stocks are equally spaced at a distance of two feet three inches. These straight lines are commonly described as rows. All the rows are likewise equally spaced at a distance of two feet six inches.

The alternating spaces between two rows are called, respectively, bed and alley.

The alley forms a kind of walk

between two rows. The vine-grower stands and walks on this alley when cultivating the soil.

By the word "bed" there is designated the earth existing on the side of and along the alley between two other rows.

The earth intended for the planting should present a flat and equal surface after having been spaded.

One begins by drawing or tracing on this ground by means of a cord the location of each row, following the instructions given herein. A five-foot stick having a notch in the middle is used to fix

the width of the alley and the bed, whereas the cord is used for marking the direction of such alley and bed.

For spacing the stocks there is generally used a new pole or stake, which should be four and a half feet long. The length of this pole or stake comprises, therefore, two vine stocks. By this means a uniform configuration is insured for all the alleys and all the beds, provided the field is square.

After this preliminary tracing, since the vine stocks to be planted are to be bent towards the inside of the bed, there is dug up by



means of the spade the space intended to become the bed and the earth is thrown upon the space intended to become the alley.

The earth thus thrown on the alley forms by its accumulation what the vine-growers call “Chevaux” or “Chevalets,” and it is used to cover the vine plants after they have been planted in the bed.

If the field is not square, after all such ground has been uniformly traced as is possible, the rest of the ground is divided into alleys and beds, narrower at one end than at the other, so that the

narrower end has only one row of stocks instead of two.

Some vine-growers make all the beds with two rows; all the beds and all the alleys, however, being wider at one end than at the other. This arrangement is open to the same objection, the unsightliness in the one case being as glaring as in the other. The use of excessive land is to be deplored.

Furthermore, such wide ends interfere with the proper digging of the ground, whereas the narrow ends do not afford sufficient nourishment to the vine, which will eventually die out, while

at the other end it grows and thrives.

Experience has shown that vines thus planted in good soils thrive and have a long life, finding therein a sufficient nourishment, the long shoots spreading all around the bed up to the pole or stake which is notched in the middle for supporting it.

If the alley and the bed are more than five feet wide, first, the soil is not sufficiently occupied. Second, the beds being too wide, their cultivation is not so easy, and therefore they are liable to be but poorly plowed.

If, on the other side, the width of the bed and the alley is less than five feet, the roots being too closely packed are injurious to one another and the vine suffers. It bears less fruit and has a shorter life. Furthermore, the shoots being unable to spread as they should, one is compelled to prune them very short, which, of course, diminishes the yield.

In weak soil, where the vine is to be replaced every twenty-five or thirty years, it is sufficient for the alley and the bed to have a width of four and a half feet, the vine stocks being spaced at a dis-

tance of twenty inches. The period during which the vine remains in the soil being comparatively short, the roots do not make a great development and do not become sufficiently large to prove injurious to each other.

In dry and burning soils straw is resorted to, which is intended to hold the water in order to afford more nourishment to the vine stocks.

#### CHAPTER IV

##### *The Vine Plant*

**T**HIS subject should be considered as the most important in the cultivation of the vine

and as the one demanding the utmost attention. There is no doubt but that the greatest injury that a vine-grower can inflict upon the land-owner is to take advantage of him by supplying him with inferior plants. The plants may occupy the ground for five or six years before one is able to discover that one has been misled. In such a case either these inferior plants are pulled out and replaced by new plants, which means a loss of ten or twelve years, useless expense, and lost crops, or are left in the ground, which will mean that the land will be occupied by

a sterile vineyard which will bear no fruit.

§1. *Selection of the Plant*

The best plant is the one taken from a stock giving a plentiful yield of high grade grapes.

The plant is taken solely from young vines and on the wood of the year.

The best plant is the one taken from a vine which is neither too young nor too liberally manured, and which bears fine grapes. Under such circumstances one is assured that the excellency of the grapes is due exclusively to the

excellency of the vine stock. It is quite possible for a young, well-manured vine to yield fine grapes simply on account of its youth and the abundance of dressing.

An average vintage year is the most suitable for judging the comparative qualities of the different stocks. In such a year the poor stocks bear inferior and scanty grapes. A good stock, on the contrary, will always yield plenty of fine grapes.

In order to be sure of obtaining a satisfactory plant, it will be advisable to survey the vineyard from which the plant is to be taken one



or two weeks before the vintage, and to mark all the stocks carrying fine grapes.

Such a survey may also be made after the vintage. If so, attention should be given the grape stalks left on the vines. If these stalks are short, hard, and thick, this shows that the grape berries were large and well nourished, and that, consequently, the stock which has produced such grapes is good.

A further proof of the fine quality of the wood is afforded by the knots, which should be round and spaced at very short intervals, and

the cores of which should be only slightly twisted.

All the shoots of a stock are not equally good. The comparative goodness of the different shoots is ascertained by means of the features which have just been described.

The thickest wood is not always the best unless it presents the features described above. One should not let himself be deceived by thick and long shoots which bear a great resemblance to the barren branches of fruit-bearing vines. Such shoots are likely to produce more wood than fruit.

They are easily distinguished by their knots, which are flat and spaced at long intervals.

It is, therefore, clear that it is necessary that only the best stocks be selected throughout the vineyard and that the plant be obtained from the best shoots of each stock.

The vine should be taken from a stock reared in a soil inferior in point of quality to the soil in which the vine is intended to be planted. An intrinsically good plant will, of course, thrive when planted in a soil better than the one from which it originates. Of course, no

risk is run by planting it in a soil exactly similar to the one from which it originates; but it would be dangerous to plant it in an inferior soil, where it would certainly die out, owing to the lack of proper nourishment.

§ 2. *Taking the Plant*

The suitable time for taking the plant is after the pole or stake has been removed and after the leaves of the vine have fallen off and the sap has disappeared; that is, at the end of November.

No signs of frost should be noticeable when the plant is taken, as

frost is apt to injure the wound which is inflicted upon the vine. Such a wound is liable to cause serious injury unless it is afforded sufficient time to dry out before the frost sets in.

Strictly speaking, it is possible to take the plant after the frost has disappeared and before the setting in of the sap; that is, in February. It is best to take the plant at the time first mentioned.

The finest plant is the one cut at the greatest distance from the base of the shoot; it should be taken from the wood of the year.

The plant taken should not present traces of vine frost, as it is liable to make the wood too soft. This, of course, would make such wood liable to freeze or rot during the winter.

The summer vine frost is due to lack of heat, caused by the shoot having found itself cut out from the sun or thoroughly enveloped by the leaves of the vine. Vine frost is caused also by cold rains or by hail. The winter vine frost is caused by hoar frost adhering to the wood and melting under the action of the sun. It burns the wood, and means death to the shoots on

which such melting has taken place.

Each plant cut should be thoroughly cleaned.

After such cleaning the wound of each cutting should be coated with earth. The plant should not be allowed to bleed, as that will exhaust its strength.

## CHAPTER V

### *Planting the Vine*

**I**N sandy or gravelly soils, the underlying layer of which is not permeable, it is possible to plant and to interplant from the time of the fall of the leaves up

to the end of the winter without running the risk of the plant rotting.

In heavy soils, more or less impermeable to water, one should plant only in May. It is necessary to see that the planting is done in moderate weather, for if the planting is done during cold and rainy weather, the vines are sure to rot and get mouldy in the earth. If, on the other hand, the weather is too warm, the vines are liable to suffer; that is, the bark becomes scorched near the surface of the earth. In either case the plant will certainly perish.



The planting in medium soil, between impermeable heavy soils and permeable gravelly soils, is done in the course of April. Generally, this soil is neither too dry nor too damp, but offers a medium condition.

All the plants of the same grade should be planted together in the same plot. If this precaution is disregarded, it will become necessary to gather grapes on the plot several times in succession, since each kind of stock has its own ripening time, some being earlier and some later. It is certainly inadvisable to rely upon the carefulness

of the vintagers and to expect them to select and to gather only such grapes as are perfectly ripe and to leave behind the bunches which have not as yet reached the proper degree of maturity. Such a selection requires too great an amount of care on their part. They are sure to make their selection in a thoughtless way. It results therefrom that the wine loses some of its individual characteristics and acquires a more or less sour taste.

However careful a vine-grower may be in obtaining his plants from the same kind of stock, some for-

eign plant is sure to find its way among the plants collected; for instance, in "Auvernat" plants there will surely be found some white or "Fromente-black" plants. As soon as the mistake is discovered, the foreign stocks should be pulled out and replaced by trenches.

The planting most generally resorted to is open row planting, and in fact this is the only manner of planting which should be recommended.

The spade and not the hoe should be used, since the hoe does not dig a sufficiently large hole

around the plant, which is necessary in order to afford the plant a sufficient quantity of loose earth through which it may spread its roots.

The vines should be kept in a vessel full of water, and the stools should be taken out of the water only as they are needed, in order to avoid their being dried out by the heat and rendered useless.

Each stool should be bent crosswise to the bed instead of lengthwise. All the earth of the bed having been previously loosened, the stool finds in it sufficient nourishment for all its

shoots, on both sides, whereas, if it were bent lengthwise, it could obtain nourishment from only one side, since the pathway is composed of hard ground.

The part of the plant encompassing the cutting wound should be bent by bringing it down toward the underlying layer.

After the plant has been duly bent, it should be covered with good earth, loose and damp, and not with dry, lumpy earth. Afterward the ground should be stamped with the feet in order to make the earth close upon the shoots on all sides to enable them

to obtain the necessary nourishment. It should be seen that a healthy shoot is left above the ground, as it is through such shoots that the plant begins to grow.

Although each bed is made up of two rows, nevertheless, a third half row is planted in the middle of each bed. This row is intended to supply replacements for the dying plants of the two rows along the alley, and constitutes a true nursery plot.

Whenever the planted soil is exposed to frost and to blast, such a soil, even if sufficiently good for

the "Auvernat" stock, should be planted only with "Fromente-black." This latter has more resistance and is stronger, provided it is very closely pruned.

#### CHAPTER VI

##### *Attention required by the Plant*

**A**FTER planting, as soon as the shoots begin to grow, the plant should be slightly pruned. At that time one can easily distinguish the good shoots from the bad and leave at least one good shoot above the surface of the earth. If this pruning is neglected, the strain on the plant,

compelled to nourish all its shoots, will become so great as to make it perish.

Care should be taken that a good shoot is left above the ground. If the shoot which is exposed above the ground does not grow, it will be necessary to unearth carefully with the finger another shoot. If this is not done, the wood of the plant will rot in the earth.

Since the plant requires a moderately cool soil, it is necessary to water it to prevent its drying out and perishing in continuously hot weather.



Whenever the planting cannot be delayed any longer, owing to the advancing season, it will be necessary to water the earth at the time of planting, if it appears dry and scorched. If the heat persists, it will be necessary to water frequently after planting.

When watering, the earth of the bed above the plant is dug with the spade in order to make a kind of funnel into which there is poured for each stool about one pint and a half of water.

The plant which is being watered should not be exposed. The funnel is dug half-way down

between the plant and the surface of the earth.

To facilitate this operation, it is advisable to place in the middle of the nursery plot or ground an empty trough, which is filled with water from which the sprinkling water is taken.

As soon as the water has been absorbed by the earth, the funnel-shaped hole should be filled again in order to prevent the hardening of the wet earth under the action of the sun.

In damp and cool soils it is unnecessary and even dangerous to water the plant. Such watering is

likely to cause the rotting of the plant, owing to excess moisture. Watering is resorted to on dry soils planted in the course of the spring where it gives most satisfactory results.

One should not be deterred from carrying out this work by considerations of the expense involved. This watering, by saving the plant, enables the vine-grower to secure a vintage a year earlier. Furthermore, the fact should not be disregarded that the plant replanted during the second year does not grow as well as the plant of the first year.

The plant requires frequent spading, in order to keep the earth loose and raised in such a way that it may be thoroughly permeated by air.

Spading should be resorted to especially when weeds are noticed on the plot. Such weeds would certainly make the plant wither away by depriving it of the necessary nourishment.

#### CHAPTER VII

##### *Pulling out the Vine*

**W**HEN a vine is old and yields but a small quantity of low grade grapes in spite of

careful cultivation and tending, it is necessary to have it pulled out, since it is only a useless occupant of the ground.

In heavy soils very old vines still give, at times, a plentiful grape yield; the berries, however, being smaller and shorter than the berries of grapes of young vines. In such a case they may be preserved. The wine obtained from such stocks is the best. However, if a number of vacant spaces appear in the vineyard owing to the dying out of numerous old stocks, one should not hesitate to have the vineyard pulled out. By acting

otherwise the soil would be uselessly occupied.

In light soils the vine often becomes exhausted after twenty-five or thirty years, and it is often necessary to replace it. The proper time to pull out the vine is after the vintage and before the winter, when the soil is sufficiently damp to allow all the roots, at least the largest one, to be pulled out without breaking.

If the soil is heavy, large lumps of earth are raised when pulling out the vine. It becomes necessary to break the lumps in order to allow the salts of melted snow and

rainwater to permeate them thoroughly.

#### CHAPTER VIII

##### *Two Methods of Layering*

**E**VEN in the best vineyards, now and then, some stocks die out. It is necessary to replace such stocks. In nurseries the empty spaces are filled by interplanting—in young vineyards by one kind of layering and in old vineyards by another, as stated below.

No special instructions are necessary with regard to interplanting, since it does not differ from planting.

§ 1. *First Method*

In a young growing vineyard, when interplanting would be likely to prove unsuccessful, the gaps are filled by layers.

The method here is to bury the stock in such a way that the stump disappears, only the stools appearing above the ground at such places as are intended to be filled up.

One of these stools is intended to take the place of the stock itself, which has disappeared. The other stools are intended to fill the gaps on the left and on the right.

The proper method of this lay-



ering calls for the laying bare of the stump all around its base. This is done by means of a spade. Afterward the digging is carried on with a special instrument, called "croy," in order not to injure the roots. The stump is then bent so that it may be buried on the underlying layer. The longest stools are properly bent in order to lead them to the gaps furthest from the stump. Then a loop is made out of the youngest stool, which is the most flexible. The stool is carried under the stump and is buried in the bed. The stump rots in the earth and the looped stool takes

its place in the same way as the other shoots fill up the adjoining gaps.

In the permeable soils the layerings may be made before winter, provided the shoots are sufficiently flexible to permit of the making of the loop. Otherwise the proper time is from the beginning of March up to the end of April. The earth is then thoroughly cleansed; the stools are flexible and the shoots are sufficiently thick to allow the vine-grower to judge of their quality. The earlier the layering the better, as the stool is afforded a longer

time for growing the roots and gaining strength.

The layer yields a crop the very first year. If the grape yield is too plentiful, it will be necessary to cut some of the fruit in order to prevent exhaustion.

When plowing the ground the following year, it is necessary to uncover the layers in order to cut out the small roots grown by the shoots near the surface of the earth. Such roots prove detrimental to the main roots, which are the ones called upon to nourish the layer.

§2. *Second Method*

Layering used in old vineyards is merely to bend down under the ground a few stools of a stock in order to carry them to the gap intended to be filled, leaving the stock itself to live on as before.

The wood selected as a layer should be a long shoot which has already given a plentiful yield of high grade grapes.

In order to carry out properly this operation, the shoot should be carried toward the middle of the bed and then bent back to the row. The end of the shoot should be

bent downward and carried down to the underlying bottom.

The layer should never be laid along the row without bending it across the bed. The earth of the alley being hard, it could not grow roots on that side, but only on the side of the bed where the earth is loose, since it has been dug up so that it would lose one-half of its nourishment.

A layer should never be carried from one row to the other across the alley. First, because the earth of the alley being constantly hard, the layer cannot grow its roots through it. Second, because the

heat, the cold, and the rain are felt more in the alley than in the bed.

The best position for the layers is to lead them across the bed from one row to the other.

The following year the layer should be notched near the stock in order to begin its separation from it. The final separation is made during the second or third year, according to the nature of the stock. This is done in order to avoid the exhaustion of the stock from which the shoot originates.

When the shoot is separated from the stock, it is necessary to see to it that the cut end is buried

deeply in the earth. The cutting asunder of the shoots should be made during the operation called "parage" and before winter. First, in order that the wound may dry out, and the spring sap may not be lost. Second, in order that it may grow roots during the winter.

When a shoot, cut asunder before the winter, is pruned in the course of the spring, it should be left sufficient wood to prevent its exhaustion.

## CHAPTER IX

*Fastening the Vine*

**T**O tie up or fasten the vine means to raise the shoots which have grown after the disbudding and to tie them to the stake.

This tying up is done after the disbudding, and always before the second tilling, in order not to disturb the already tilled ground.

The tying up should be done in moderate weather. If the air is cold or if the heat is very intense, the grapes freshly uncovered are liable to die out.

If the tying up is done too late,



the buds run the risk of being broken by the wind or being struck by hail, the possibility of which should not be disregarded at this time of the year.

Since all the buds of the same stock do not grow evenly, a part of the buds require to be tied up earlier than the rest. This entails the necessity of performing this operation in two stages. The second tying up is called "raising up."

Young vines should be the first tied up or fastened, since they are the ones growing more rapidly, and also to prevent their buds or

shoots, which are generally numerous, becoming intertwined or twisted.

Three ties are required for fastening, one at the bottom, another at the top, and the third in the middle.

In the absence of the middle tie, upon the bud growing after the fastening has been completed, there arises a kind of cage. It follows therefrom that the hampered and unsupported bud either breaks or becomes detached at its base.

The fastening should be made by means of straw and not by

the use of rushes, which are less flexible and more apt to break than straw. Each tie should be made up of at least two straw strands, otherwise it would be too weak and liable to break upon drying.

The budding grapes should be clear of the ties, for if not, they would be stifled and would not ripen.

#### CHAPTER X

##### *The "Binage" or Second Tilling*

**T**HE "binage" or second tilling may be undertaken about the end of May in heavy soils or other soils which were

tilled early, especially when weeds begin to grow fast.

However, this second tilling should be discontinued when the vine is blossoming and when the weather is either too cold or too warm. In either case one would run the risk of killing the blossoms by digging the earth. For the performance of this work one should wait for very mild weather.

The blossoming season is the most critical time for the vine. Cold weather is likely to injure the blossoms because it stops the sap, which thereafter is no longer sufficiently strong to nourish the

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growing grapes. Intense heat likewise destroys the blossoms, especially after protracted rains, because under such circumstances the sap flows too fast and does not afford the budding grapes sufficient time to grow.

A protracted drought has the same effect, as the soil does not supply the grapes with sufficient moisture.

When the vine blossoms after protracted rains and the foot of the stock is surrounded by water, the dropping of the blossoms is greatly to be feared.

When dry weather has pre-

vailed for a long time, it is necessary to wait until it rains before performing the second tilling, and if the weather clears and appears settled, to take advantage of it. If rainy weather were to set in again, the air would become cool owing to the rain and the blossoming grapes would be destroyed.

From the foregoing it follows that the second tilling is the operation which requires the most attention in order to select the proper time to avoid the destruction of the blossoms.

Mild, dry weather, with a tinge of hot wind in it, after sufficient

rain has fallen, is the most suitable for the second tilling. The grapes and the buds derive then a greater benefit from such work and the weeds are more easily destroyed.

The "binage" should not be undertaken until after the fastening, otherwise the buds or shoots which have not yet been raised and fastened would be liable to be broken.

Before the second tilling one should see to it that the first tilling has been done throughout the vineyard. If this precaution is disregarded, one may mistake such portions of the vineyard as have

been tilled the last as being the first to have received the "binage."

The second tilling is performed by means of the forked hoe and not by the use of an ordinary hoe, as the former has a keener edge and is more suitable for cutting out weed roots.

During the second tilling the earth should be dug at a great depth both on the bed and on the alley, and there should be returned to the bed a part of the earth existing on the alley, in a lesser quantity, however, than during the "rebinage" or third



tilling, in order that the foot of the stock may be surrounded by a sufficient quantity of earth to afford it the necessary protection against the heat.

In black soils and other soils in which the underlayer is not located at a great depth, this removal of the earth from the alley to the bed is delayed until the "rebinage" or third tilling in order that the foot of the vine may be better protected against the heat.

During the second tilling the manure newly spread on the silo should be thoroughly dug up, and

it should not be left exposed to the air, which would deprive it of its moisture, nor should it be removed to the alley, where it would serve no useful purpose and where it would become dry.

CHAPTER XI

*The "Rebinage" or Third Tilling*

**T**HE "rebinage" or third tilling is done in the same way and by means of the same implement as the second; namely, by the hoe.

In tilling for the third time a greater quantity of earth is removed from the alley to the bed

than at the time of the second tilling. The vine being protected by its bud or shoot, which is now fully developed, there is less danger that the foot of the stock will be damaged by the heat.

In heavy soils or other soils which have been tilled early, the third tilling is undertaken about the middle of July and sometimes even earlier, whenever the grapes appear very well advanced for the time of year.

If the soil is too dry or if the heat is too intense, it will be necessary to delay this third tilling, as to overturn a dry and scorching

soil would be tantamount to setting fire to the foot of the stock and would be apt to parch the stock and the roots.

Furthermore, dust, dampened by dew, would form a kind of layer around the berry of the grapes, hardening its skin and diminishing its wine yield.

The most appropriate time for the third tilling is immediately after rain, when the earth is thoroughly permeated with water down to approximately two or three inches. Under such circumstances the operation should not be delayed, as at this time of

the year the soil dries out very quickly.

If the third tilling is done close to the vintage, the grapes are not afforded sufficient time to derive any profit from it. The utmost that can be expected from a "rebinage" is the destruction of weeds if they are too plentiful; but even at such a late date, it should not be neglected unless the heat is too intense.

Whenever near the vintage the weather becomes cool, it is dangerous to disturb the earth. The vine would shed its leaves and the grapes, especially in the case

of the "Auvernat," would be likely to wither rather than ripen.

For no reason whatsoever, even were grapes very scarce or almost entirely absent because of frost, hail, or withering, or any other accident, should the third tilling be neglected. These tillings keep the stocks in good condition and destroy the weeds.

## CHAPTER XII

### *The "Quartage" or Fourth Tilling*

**T**HE "quartage" or fourth tilling is an ordinary tilling operation.

It becomes necessary some-

times to carry out this fourth tilling in vineyards which have been manured after the last vintage, whenever the weeds become very plentiful on account of prevailing rainy weather; and also in such portions of vineyards as have been the first to receive the second tilling, whenever they are overridden by weeds. In such cases this work is paid for on the same basis as other work.

In the foregoing cases, this fourth tilling is useful only provided the preceding tillings have been properly carried out. For this reason the fourth tilling is very

seldom, if ever, used by vine-growers on their own vineyards.

### CHAPTER XIII

#### *Paring and Nipping Buds and Shoots*

**A**FTER the third tilling one may, or rather one should, pare the bud or shoot whenever its height exceeds that of the stake. The stock is thereby relieved and enabled to afford better nourishment to the grapes; but the lower shoots should not be raised before the middle of August, as the intense July and August heat would be likely to parch the grapes so exposed.



The vines should never be stripped of their leaves before the vintage is completed as the leaves protect the grapes until they are ripe.

The buds or shoots of the middle and lower stock should be most carefully preserved for the pruning, and should never be nipped except at the very end of the longest shoots. The nipping should be performed by moving the hand upward in order not to injure the shoot, which would make the wood more sensitive to winter frosts.





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## Part III

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### *Cultivation of the Vine*

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#### CHAPTER I

#### *The "Parage"*

THE "parage" consists in removing the earth from the alley and dumping it on the bed in order to raise the latter. The object of this is to afford a better protection to the largest roots which are found in the bed, in order that they may better withstand winter frosts.

The proper time for the parage of the vine is after the vintage. However, the earth should not be

too dry, because, if so, it will be difficult to remove the dirt from the alley in order to throw it on the bed.

In such vineyards as are intended to be manured before the winter, the first operation undertaken is the opening of the bed, the earth removed therefrom being dumped on the alley. The manure is afterward spread upon the beds thus opened, and is then covered up by means of the earth previously dumped on the alley. After this the "parage" is carried out.

A good "parage" requires that

the beds be kept high and of uniform shape. First, the vine being covered by a deeper layer of earth better withstands winter frost. Second, the quality of the digging following the "parage" is dependent upon the quality of the "parage" itself. The higher the bed is raised during the "parage," the greater the quantity of earth that can be dumped on the alley during the digging, and consequently the deeper the furrow. This exerts an influence even on the second and third tilling, as will be explained later on. In plant nurseries the "parage"

should be at an earlier date than in vineyards, because the plants, having been covered from the outset with earth, are in a better position for withstanding the early autumn frosts. Plant nurseries do not require as high a bed as vineyards unless the plant is three years old in heavy soils and two years old in loose soils. No "parage" should be made after hoar frost unless the hoar frost has melted out. The roots of the vine would be exposed to injury from the buried ice, which would crack and burn them.

In making the "parage" it is

necessary to overturn the earth taken from the alley to the bed. In this way the weed roots become exposed and die out more rapidly, and by their decomposition they form a light manure that is very useful to the vine.

Furthermore, the earth so overturned becomes exposed to and permeated with air, and when turned over a second time it carries down to the roots the air absorbed.

During "parage" the stocks should be thoroughly cleansed; that is, they should be ridden of any weeds growing near them.

Such weeds by their moisture would be likely to favour the growth of mould on the stocks.

A properly carried out "parage" requires that the alley be hollowed along its middle axis in order to afford a draining channel for the water, which, if left stagnant all around the stocks, would make them die out.

The above described operations constitute what the vine-growers call "parage." This operation has been called "parage," because after such operation all the alleys look even, as in a properly cultivated garden.



## CHAPTER II

*The Poles or Stakes*

AS soon as the work has been completed, the pole or stake should be pulled out, as it is no longer necessary, and if left in the earth will be likely to rot under the influence of frequent winter rains. After it has been pulled out, it is sharpened whenever the point is found to be decayed or blunt.

The best stakes are those taken from full-grown timber. They should be big, square, straight, and have a length of four feet and a half. The best size is the one inch square. The copsewood

stake is the poorest, as it is taken from wood too young to have reached a sufficient degree of hardness and consistency. Such stakes are easily recognized from the fact that their ends are generally small and of a triangular shape instead of being big and square. Sometimes copsewood stakes are round their entire length and full of sappy spots, which are easily noticeable because of their whiteness.

In the vineyards where the alley and the bed occupy five feet and where the vine stocks are spaded at a distance of two feet three inches from one another,

there are in an arpent\* eighty beds, each having two rows, each row comprising forty-four stocks; consequently, there are eighty-eight stocks per bed; that is, a total of seven thousand forty stocks.

An arpent of soil should be divided into two parts or cuts and crossed through by an alley two feet wide running between the two parts or cuttings.

In vineyards in which the vines are bound to each other by shoots (couragees), besides the stake which is driven at the foot

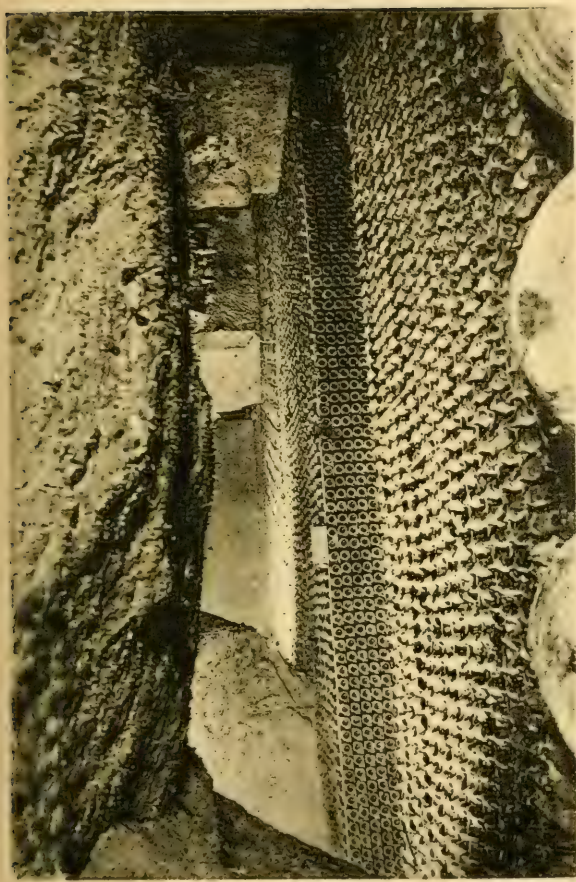
\* An arpent is equal to five-sixths of an acre.

of each stock, other stakes are required on the bed to support the long shoots, which are arranged in the form of a bower.

These old stakes may be used as bed stakes as long as they have a length of one foot and a half.

When the stake has one of its ends larger than the other, it is the large end that should be driven into the earth, as this end offers a greater resistance and is less likely to break.

Since all the stools do not begin to grow by the first year, only such stools are provided with stakes as begin growing. The in-



WINE IN BOTTLES



terplant of the second and third year does not have any stakes.

### CHAPTER III

#### *Fertilizers—Manures, New Earths, and Marls*

##### § 1. *Quality of Fertilizers*

**T**HE cow litter used for making manure should be a straw, haulm, or hay litter. Bulrush, shoots, and heather are absolutely useless. The manure should not contain either earth or cut shoots.

Cow manure is the most suitable, especially for young vines and those planted in burning

soils, in which case horse manure should be absolutely avoided. It certainly would burn or scorch the vine.

Horse manure may be found satisfactory for old vines, especially in cold and damp soils. It is warmer and leaner than cow manure.

Pigeon and fowl manure is extremely warm. It cannot be used in vineyards unless the soil is cold, and it is desired to impart new vigour to spent vines. It is scattered in small quantities almost in the same way as grain seed.



§ 2. *Proper Time for Manuring the Vine*

The best time for manuring the vine is from All Saints, First of November, to the end of winter. First, at such time the manure is more thoroughly done, as it has been kept since the spring. Second, the good nourishment secured by the cows during the summer makes a better manure. Third, during the winter it is afforded plenty of time to dissolve and permeate the soil, so that in the springtime the vine can derive the whole benefit to be secured from the manure.

It would be possible likewise

to spread the manure in the month of March before the sap sets in, but in this case it should be seen that the earth is healthy; that is, that there is no snow or frost, which, if buried with the manure, would be apt to injure the roots of the vine. Furthermore, the manure should not be applied when the vine is budding, because a recently manured or dug earth is likely to attract the frost.

Strictly speaking, it would be possible to spread the manure at any other time after the danger of frost is passed, at least in vineyards in which the vines are

tied by loops. However, in this case one would face the risk of the heat drying out the manure and rendering it useless. With regard to vineyards in which the vines are tied by shoots (courgees), after they have been tied it will be impossible either to spread or to bury the manure.

At the time of spreading the manure, the soil should be sufficiently moist to facilitate burying the manure.

The large roots are to be found on the bed, since the stool has been bent toward the bed at the time of the planting.

Manure should be buried at a great depth in order that it may come in contact with all the roots. When tilling the soil the manure is brought to the surface, but it should be at once covered up again, and should not be left exposed to the air, as otherwise it will dry out, and only serve to grow weeds. Generally, manure is not thoroughly absorbed until after two years from the time it is buried.

§ 3. *Quantity of Manure to be used in Manuring Vineyards*

Manure in itself is beneficial to the vine, but it can be much

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more so if spread in the proper quantity and at the proper time. Since manuring increases the quantity of wine, but is detrimental to its quality, it is necessary to avoid two excesses; namely, the use of a too large or a too small quantity of manure.

In good soils each arpent should be manured in its entirety every seven or eight years. Light soils should be manured more frequently, as they need this help in order to be able to nourish the vine properly.

The vine is manured in the first instance after it has been

planted, and thereafter it is manured again in the year following the one during which it has borne its fifth bud.

The manuring at the time of planting is done by hand; that is, the plant is covered with a layer of earth two or three inches deep. Afterward, a handful of manure is spread on the earth and covered with another layer of earth. From two to three hundred baskets of manure should be sufficient for planting an arpent.

New earths used for fertilizing vineyards instead of manure have a longer duration than manure

itself. Their fertilizing strength is not as great as that of manure, but a better quality of wine is produced.

New earths should be buried in the bed exactly as manure. If they were simply spread on the bed without being buried, they would only serve to grow weeds. Marl\* taken from morasses and ponds is very good for the vine, but it is extremely cold, and, therefore, first, it should be left to rest two years before using it. Second, it should be used only

\* Soil consisting of clay and carbonate of lime, a valuable fertilizer.

on warm soils. Third, it should be spread on the bed rather than buried. Its coldness may injure the roots of the vine if these precautions are neglected.

From two to three hundred baskets of earth are not too much for fertilizing an arpent.

#### CHAPTER IV

##### *Dressing the Vine*

###### §1. *When to Dress the Vine*

**I**N warm sections, such as Provence and other similar countries, the vines are dressed before the winter, and this is a very wise method, because, first,



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the roots, having less wood to nourish during the winter, give a better nourishment to the rest of the plant. Second, the wound is afforded sufficient time to dry out and does not bleed, as is the case whenever the pruning is done during the spring. The vine does not lose any sap. In a climate such as the upper Loire, this practice would be dangerous, since the frost is sometimes very heavy, and if it were to happen that the wood left after the pre-winter dressing were frozen during the winter, there would be nothing left for the current year.

On the contrary, if the vines have not yet been dressed, even if the weather is very severe, it is extremely unlikely for all the shoots to be frozen and spoiled, and one is practically sure to find at the time of pruning some shoots suitable for dressing. This is the reason why the custom prevails of not pruning vines until after the frosts.

The best time is the month of March, because in that month the frosts are not sufficiently heavy to injure the wood of the vine. However, this is impracticable, owing to the fact that vine-grow-

ers are generally too busy, since the first tilling of the soil is done during the month of March. Furthermore, the vine, being already in an advanced stage of growth, would lose too much sap.

The least of the injuries that a frost may inflict upon a vine recently dressed is to kill the shoot which is nearest to the wound, if it has not had time to heal before the winter frosts.

According to custom, dressing may be commenced on the Feast of St. Vincent, 22d of January, unless frost prevails.

Clear weather is the most suitable for dressing the vine. In rainy or inclement weather the vine-grower cannot be expected to pay sufficient attention to the work he is performing, which demands close attention rather than physical exertion. Furthermore, the wound is prevented from healing quickly.

§ 2. *Manner of Dressing the Vine*

Before undertaking the pruning of a stock, it should be ascertained whether there are vacant places near such stocks to be filled by layering. If this is the

case, it will be necessary to see to it that sufficient wood is left on the stock for this purpose.

The first vines to be dressed should be the old ones, in order to be sure that the wound has healed by the time the vines begin to grow and that no sap is lost. In the case of old vines, sap should be spared as much as possible, as it is less abundant than in young vines.

The plant should be treated in the same way as old vines and should be dressed at an early date.

The plant has a very scanty sap, since it has extremely small

and weak roots. Care should therefore be taken that no sap is lost through a fresh wound.

Before dressing the plant it should be laid bare all around its base in order to cut out the small roots appearing at the foot of the stock, which prevent the plant from growing through the bed where it finds the most nourishment. This is an important point. The dressing work should be concluded with the young vines. As their sap is abundant there is no danger of their being injured by loss of sap through fresh wounds. Such a loss of sap is rather likely

to benefit them, as the shoots will grow nearer one another and will be better shaped and rounder. Such shoots are more likely to give a plentiful crop.

On the contrary, if these young vines are dressed too soon, the force and abundance of sap is such that the shoots are not allowed sufficient time to grow properly, but spread very far apart and become flat in shape. Such shoots are generally barren. Red grape vines should be dressed earlier than those bearing white grapes.

In order to carry out the

dressing properly, it is necessary to exercise sound judgment as to the quantity and quality of wood to be left on the vine.

With regard to the quantity, one may state as a general rule that the larger the amount of wood left, the larger the quantity of wine produced, but at the same time the vine is liable to exhaust itself more quickly, since it does not possess a sufficient quantity of roots and sap to supply such an amount of wood. On the contrary, if the pruning is pushed too far, the vine produces too much wood and too many buds,



and consequently a scanty crop of grapes, since the more buds, the more sap taken up by them and diverted from the grapes. Therefore a middle course should be followed.

In order to determine the quantity of wood to be left on the vine at the time of dressing, it is necessary to take into account the age of the vine, its strength, the nature of the soil, and the manuring, as well as the quality of the stock.

To a young vine planted in a strong well-manured and well-tilled soil there should be left at

least two "viette" shoots, a few "pouce" shoots, and a few "taquet" shoots.

The "viette" is a shoot about three feet long. The "pouce" is a shoot containing two or three knots, and the "taquet" a shoot having from five to six knots. "Eye," "knot," "shoot," "button," are all words having the same meaning.

With old vines or vines planted in weak, scantily manured soil, the pruning should be pushed further.

After two or three consecutive plentiful crops less wood should

be left, since the vine, exhausted by such plentiful crops, is not in a position to nourish all its grapes, which are liable to miscarry before, during, or after blooming.

If, on the contrary, the vine has given scanty crops for several years consecutively, it will be necessary to leave a somewhat larger quantity of wood than ordinarily, but generally speaking, it is better to leave more wood than necessary rather than less.

The dressing should be performed in such a way as to leave a sufficient quantity of wood for the requirements of the current

crop as well as for the requirements of the next year, according to the proverbial saying: "In dressing the vine it is necessary to leave on it both the wine and the vine."

The dressing of the vines has among its other objects the rejuvenation of the plant by leaving at the foot of the stock sufficient wood to carry new "pouce" shoots, new "taquet" shoots, and new "viette" shoots.

In red grape vines the shoots which are located directly on the stock, however fine and long they may appear, should always be

pruned to the length of a "pouce" shoot, since they absorb a great deal of sap and very seldom yield a reasonable quantity of grapes. This does not apply to white grape vines.

Young shoots are the only ones that give a reasonable yield, and when they are directly located on old wood, or at least on comparatively old wood. These shoots are called "Mouchet" and should be preserved most carefully.

The pruning is done by means of bevel cuts, the slanting side of which runs away from the shoot to prevent the sap from falling

upon and ruining it when the vine bleeds.

Vines should not be cut so near to the eye or knot as is done by gardeners in the case of trees. It is necessary to leave one to three inches of wood from the shoot to the wound, but no more. If this wood—called “argot”—is longer, when dressing the following year the pruning-hook is liable to injure the remaining wood.

In dressing the vine the stools or shoots left over should be thoroughly cleaned. Furthermore, all the “large heads” should be cut out. By “large heads” the vine-

growers mean the dead wood existing on the stock, but it is necessary to see to it that the stock is not cracked when this is done, as otherwise the sap will be lost through the wound.

White grape stocks are generally dressed in such a way as to leave on the stocks long shoots, which are tied by loops, excepting the "Auvernat-white" of "Pais-bas," which is dressed in exactly the same manner as red grape vines.

On white grape vines, besides the long shoots which are tied by loops, there are left on the stock

small shoots of from three to four knots, called "looptails" or "brainwood." This "brainwood" gives a small yield in red grape vines, but a large yield in white grape vines.

Besides the "looptail" there is left also a small "courgee" shoot; that is, a shoot of from four to five knots grown on a "looptail," or on a small shoot that has already yielded grapes.

With regard to vine arbors, since such vines have a large surface of ground from which to derive their nourishment, they should be left a larger quantity



of wood, especially at the base, as that yields the largest crop.

Vine arbors, as well as vines in general, should be dressed early in order that the wound may have sufficient time to heal before the sap sets in.

The different methods of dressing and the different kinds of stocks planted in different soils have been taught by experience supplemented by reasoning. It would be dangerous in this case, as in any other, to deviate from the generally accepted custom. If this is done, the experiment should be performed in the first

instance only on a small number of vines and during several consecutive years before adopting it definitely.

CHAPTER V

*The First Tilling*

*Preliminary Observations. Vegetation*

**T**HE effect of tilling is to facilitate the growth of the plants; that is, the action by which they are nourished, and grow and yield fruit.

Sap is the medium of vegetation in plants. Sap, which is a thin and spirituous liquor, enters the plant by its roots and runs

up to the ends of its branches, ascending and descending in a continuous circulating flow.

Sap is composed of different salts, of water, as well as of the thinnest components of earth. The salts of fertilizers and new earths spread in vineyards mixed with the sap become an integral part of it and increase its quantity.

The other salts contained in sap owe their origin to the action of air, to the rain, snow, and fogs, which, permeating the soil, give up to it the salts they contain. These salts, mixed with the thin-

nest components of the earth, are later dissolved by rain.

During the winter the sap is coagulated within the branches, the trunk, and in the roots of the plant, as becomes apparent upon burning the wood of a recently felled tree. The heat of the fire makes the log, which did not bleed through its wounds when the tree was felled (as the felling is done as a rule in the winter-time), bleed at both ends. Such bleeding cannot but be caused by the sap which was nourishing the plant when it was standing.

In the springtime this sap,

which has been coagulated all through the winter, begins to melt in the plant through the heat of the air and sunshine, which likewise starts on their course all the salts saturating the earth and making up the sap.

On the other hand, this heat expands the roots, which have been contracted by the cold of winter. It follows therefrom that the sap surrounding the roots thus expanded enters and permeates them, impelled by the action of the air and of the earth heated by sunshine. One might also say that the sap is drawn into the roots by

the vacuum created by the heat, both in the pores of the roots and in the trunk and the stems.

This same expansion, combined with the upward thrust of the new sap furnished in large quantities by the roots, compels the sap which is melting throughout the plant to resume its circulation, thereby promoting the growth of the plant.

The above is made clear by the inactivity of sap during the winter and by its activity during the summer.

Now, experience has shown how useful the tilling of the

ground is for the promotion of the growth and fruit-yielding capacity of the plant. It is a well-known fact that untilled soil, even under the most favourable climatic conditions, is always barren and yields only brambles and thorns, even if in itself of the very best quality.

It is easy to understand how a soil, which for several months has been pelted and hardened by frosts, is loosened and raised by proper tilling in order to make it so permeable to rainwater and to sunshine as to make it possible for the roots to profit by the action

of these elements, and for the sap, which is the active factor of growth, easily to penetrate into the roots.

§ 1. *The Proper Tilling Time*

The first tilling is one of the most important agricultural operations, owing to the special time at which it is performed, as it is done at a time when the vine, just starting, is in the greatest need of help.

Its importance springs also from the fact that unless this first tilling is properly carried out, all subsequent tilling work will be unsat-



isfactory. The proof of this is very interesting and tangible, and it will be dwelt upon in the following paragraphs.

During the Autumn “parage” the earth has been taken from the alley and placed on the bed with a view to widening and raising the bed. This operation has for its object the providing of better protection to the roots against winter frosts.

When carrying out the first tilling, which is done in the spring, a portion of the earth which at the time of the “parage” was taken from the alley and dumped

upon the bed is again removed from the bed in order to afford to the roots, which now have no longer to fear the biting cold of winter, a better opportunity to be acted upon by air and sunshine as well as by rainwater, which favours and promotes the growth of the plant.

But since the roots of the vine are as much affected by excessive heat, which parches them, as by the cold of winter, which cracks and burns them, it becomes necessary at the end of spring, when the heat increases, to protect them against it, as they were protected

during winter against cold, and the same protection is resorted to in both cases: namely, covering the roots by a deep layer of earth.

For this purpose, at the “binage” or second tilling, which takes place at the end of May, the first thing done is to remove a portion of the earth from the alley and to spread it on the bed as a protection against heat.

At the “rebinage” or third tilling, which is performed about the middle of July, when the hottest weather prevails, and when, consequently, the greatest protection should be afforded the

roots of the vine, a further quantity of earth is taken from the alley and dumped upon the bed. It is clear that unless at the first tilling a sufficient quantity of earth has been taken from the bed to the alley, the earth accumulated on the bed will be insufficient to take care of the "binage" and "rebinage."

It follows therefrom that the second and third tilling cannot be satisfactorily done unless the first tilling has been properly attended to, which is exactly what we aim to prove.

It follows, furthermore, that as



AN ARM OF A MODERNIZED CELLAR



the fitness of the first tilling depends upon the fitness of the "parage," as was explained when describing such "parage," so the fitness of the two following tillings depends on the fitness of the first tilling, and that, by a natural interlinkage of cause and effect, the improper performance of either of these operations, and especially of the first, namely, the "parage," exercises unfailingly an injurious action on all consecutive operations.

The tilling of heavy soils is generally begun in the middle of March, when the winter is ap-

parently over, the vine has already been dressed, but not tied, the earth is healthy, that is, neither too dry nor too damp, and the weather is clear. It is at such a time that the soil requires this first tilling in order to make the sprouting buds grow more rapidly.

The "grouette" soils, sandy soils, and light soils should not be tilled until about the middle of May, owing to the fact that they are more liable to frosts than the heavy soils.

Experience has shown that such delay does not prove as injurious in the case of light soils as it would



in the case of heavy soils, because the latter being less easily penetrated by sunshine, owing to the greater density and hardness, the frosts would be apt to bite the roots if the tilling were delayed until such a late date. This has been the experience of several land-owners who followed this plan with a view to preserving the vine from possible frosts and found themselves confronted by a much more serious danger than the one they were trying to avoid.

Plants and young vines, even in heavy soils, are not tilled until

the middle of May, that is, when all danger of spring frost has apparently disappeared. Being more tender and in closer proximity to the soil, they are more sensitive to frost.

When shoots begin to blossom out, if there is danger of frost, the tilling and any other kind of work in vineyards should be immediately stopped. It is even dangerous to gather weeds when frost is threatening, as such gathering cannot be done without slightly disturbing the earth and thereby attracting the frost.

The soil should not be tilled

unless the weather is dry and the soil itself is dry, at least on the surface, and the water has disappeared. The reason for this is perfectly plain. The soil is tilled to loosen it and to enable rain-water and sunshine to percolate down to the roots. If the tilling is done when the earth is too damp, each stroke of the hoe will remove a lump of mud, which by and by will harden, destroying thereby all the useful results of the tilling. This is the reason the proverb says: "Only a fool will till the ground in foul weather."

Intrinsically damp soils should

be the last to be tilled for the above-mentioned reasons.

Tilling done at a wrong time is liable to cause the vine to wither away, to become burned and barren. The statements in this section and the foregoing observations will be easily acknowledged to be thoroughly supported by reason.

Vine-growers are so firmly convinced of the importance of tilling that whenever, after they have performed such tilling in their own vineyards, heavy rains occur which pelt and harden the ground, they do not hesitate—at

least those who are well enough off to afford doing so—to carry out such tilling all over again.

§ 2. *Tilling Methods*

The tilling consists in dumping on the alley the earth which was removed to the bed at the time of the “parage.”

It is generally performed by means of a wide and blunt-forked hoe rather than by an ordinary hoe, unless the soil is a stony one, in which case only a pointed instrument can be used.

This hoe is a flat iron instrument with a cutting edge, like a

spade, fifteen inches long and nine inches wide.

The difference between the hoe and the spade consists in the fact that in the latter the blade and the handle form a straight continuous line, whereas the blade of the hoe is set at an angle with the handle, which is inserted in a bent socket forming part of the blade.

The labourer using the spade works in an erect position and throws in front of him the earth he has dug. The labourer using the hoe works in a bent position and draws the earth toward him-

self in digging and overturning it.

The "croy" or forked hoe is a true hoe except that from its cutting edge up to two-thirds of its total length there extends an indentation two to three inches wide, which permits the hoe to surround the stock when digging. This allows a thorough clearing of the ground all around the base of the stock.

The two sides of this indentation may have pointed ends, in which case the instrument is called a forked hoe. Such an instrument is especially suited to gravelly or stony soils.

If the tilling has been properly done, first, the alley should be as high as the bed, the difference in the level not to exceed three inches; second, there should be no lumps. All the lumps should have been crushed with the head of the forked hoe. The earth should have a uniform appearance throughout the bed without any hard patches. Unless all these conditions are fulfilled, the earth will not be sufficiently loose to be favourable to the growth of the plant.

After the tilling has been completed, the thoroughness of the work may be tested by sounding



the depth of the furrow. It should be at least two or three inches deep.

It is at the time of the digging of the bed for manuring purposes that the thoroughness of the tilling is ascertained. Unless the tilling has been properly done, hard soil is encountered at a small depth from the surface, and thick roots are found there which, had the tilling been properly carried out, would have struck deeper.

In the course of the tilling, the earth, which, since the "parage," has been exposed to the air and

is consequently more saturated with salts, should be completely overturned in order that it may be brought into intimate contact with the roots so as to supply them with the necessary salts.

The weeds should be buried in such a way as to leave their roots exposed. The stocks should be thoroughly cleaned all around their bases.

Before removing the earth from the bed it is necessary to clean the alley with a rake in order to pull out all weed roots and prevent them from growing, as far as possible, until the "bi-

nage," to avoid their depriving the vine of its nourishment.

In tilling the soil care should be taken not to expose the manure recently spread in the vineyard. By exposure it will dry out and become useless or even positively injurious, as it attracts frost. Whenever the manure is uncovered during the course of tilling, care should be taken that it is covered again with earth.

A careful first tilling spares the vine-grower a great deal of work later on, besides proving extremely advantageous to the vine, owing to the fact that it is per-

formed when the vine is starting its wood and its fruit.

CHAPTER VI

*Destruction of Weeds in Vineyards*

**W**HENEVER feasible, no weeds should be allowed to remain on the ground in a vineyard. They dry up the soil, they use the manure, they deprive the vine of its best nourishment, and prevent it from producing as fine and as plentiful a crop of grapes as it would were such weeds removed.

The weeds should not be pulled out immediately after rain,

as this would disturb the surface of the tilled soil. Nor should they be pulled out when the soil is too dry, because it would be impossible in such a case to extract the root.

It is at the time of tilling that such weeds may be most easily destroyed by overturning them in such a way as to expose their roots, which, dried by the sun, die out and become harmless.

All kinds of weeds are injurious to the vine, but especially the thistle and the quitch.

The thistle, from the second year of its growth onward, strikes

its roots down to the bottom layer, and it cannot be pulled out unless the earth is very damp. If, instead of being pulled out, it is simply broken or cut, it grows faster than before.

Of all the weeds, the quitch is the most objectionable; it spreads faster than any other, and its roots strike deeper into the soil. Its growth is traceable to utter neglect of or carelessness in tilling.

The proper time to exterminate this weed is when the sap is ascending, and especially after heavy rains. When pulling them out it is necessary to dig the earth

to a great depth in order to expose the deepest roots and make sure that not the smallest one is left in the ground, as otherwise the obnoxious plant is sure to reappear.

#### CHAPTER VII

##### *The Fastening*

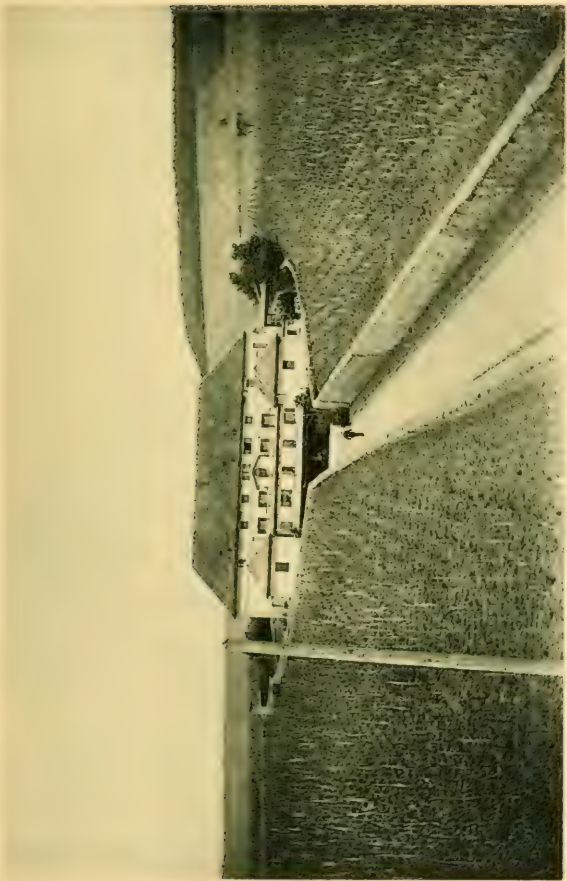
**A**S soon as the tilling is completed, the stake to which the vine is to be fastened is driven into the earth.

The fastening should be undertaken only at a time when the ascending sap makes the wood soft and flexible, so as to avoid any risk of breakage.

A vine-grower should refrain from driving more stakes than he can fasten the vines to in the course of the day. Otherwise the wind, blowing the shoots against the stakes, is likely to injure and to break them. The stakes are driven in the morning before lunch time. After this meal the fastening work is begun.

When the buds are about one inch long, it is dangerous to leave the vine unfastened, even if the stakes have not yet been driven, because in windy weather the wood and the buds are liable to suffer, owing to the shaking





A WALLED VINEYARD



by the wind of the unfastened shoots.

Red grape vines are fastened by "courgee" and white grape vines by loops, except the "Auvernat-white" of "Pais-bas," which is fastened likewise by "courgee."

The fastening by "courgee" is done by laying on the bed the long shoots left behind at the time of the dressing. For this purpose an old stake is driven in the middle of the bed, the ends of the shoots are fastened to the old stake, and the long shoots to the stake driven near the foot of the stock.

Vines fastened by "courgee" form a kind of arbor on the bed. This arbor should be sufficiently high to allow ample space for the hoe at the time of tilling. When the vine is laid in this way, the grapes are more fully exposed to the air and sunshine. They ripen better and acquire a better quality.

In order to secure these advantages, some vine-growers have tried to fasten white grape stocks by "courgee," instead of fastening them by loops, but such a practice had to be discontinued. It was found that the end shoots

of each "courgee" were the only ones to bear fruit, while those nearest the stock remained barren. This trouble was not experienced when the vines were fastened by loops.

This curious phenomenon can be explained only by the energy of the circulation of the sap, which, flowing too rapidly toward the top of the shoot fastened by "courgee," cannot exercise its full action upon the first branch shoots it meets with upon leaving the stock. If the vines are fastened by loops, the flow of the sap is retarded, and the sap is given full

opportunity to exercise its action upon all the shoots.

When the vines are fastened in this way, a single glance is sufficient to determine whether the vineyard is sufficiently provided with wood. If this is the case, the arbor does not show from one end to the other any discontinuation or any gap.

In loop fastening no "charnissons" are driven in the bed. The shoots are bent in the form of a loop, and their ends are fastened to the stake individually in order to prevent the last buds from injuring one another.

Fastened vines are more liable to frost because their buds are nearer the ground and consequently more easily affected by the vapours from the ground, which, condensed by the coolness of the air, cause frost.

For a similar reason, when the vines have not as yet been fastened, since all the buds are not placed at the same height from the ground, those farthest from the soil suffer least from frost, the more because, being shaken more vehemently by the wind, they are less liable to be frost-bitten. It will therefore be

advisable to discontinue the fastening whenever there is danger of frost.

In fastening, the shoot should be laid according to its natural direction and not counterwise, in order to avoid the possibility of splitting when twisted. If this happens, the sap flows out through the wound and the shoot dies.

The vine should be fastened with red willow and not with white willow, which is likely to break, at least when dry.



## CHAPTER VIII

*Nipping Off the Buds*

**T**O nip off buds or to disbud the vine means to remove needless buds which would be apt to prove injurious. Any bud is needless or useless which does not have any grapes, or which is not intended to be pruned in the following year.

Any useless bud is superfluous, first, because the sap nourishing it would be merely wasted; second, because on its growing it would cover the grapes, shutting them off from the beneficent action of air.

It is dangerous to disbud the vine too early, that is, when the grapes are still so small as to make it difficult to distinguish them in the heart of the bud, as one runs the risk of pulling out the future grapes together with the bud.

It is equally dangerous to disbud the vine too late, because in such a case the bud removed has already used up nourishment intended for the remaining buds. It is, therefore, necessary to carry out this operation at the proper time, and the vine-grower should engage help in order to be in a position to do so.

Such buds as are located on the stock near its base are left behind for next year pruning, but not more than two buds on "Auvernat" stocks and on red grape stocks. On white grape stocks as many as three and four buds are left for the reason explained in the chapter concerning the dressing of the vines; namely, that this wood, shooting forth from the stock and called "brain-wood," produces a greater yield in white grape vines than in red grape vines.

In old vines one should not remove the small buds which are

found on old wood, as they are to be used in the following years for renovating the vine.

A well-pruned and well-disbudded vine should have buds from the foot of the stock up to the top of the shoots. If this is not the case, the vine has been either improperly pruned or improperly disbudded.



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## Part III

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### *Accidents Affecting the Vine Its Diseases and Harmful Insects*

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#### CHAPTER I

##### *Accidents Affecting the Vine*

VINES are likely to suffer from frost-bite, winter and spring frosts, the “tacon,” the hail, and the shedding of the blossoms.

##### §1. *The Frost-Bite*

A shoot is said to be frost-bitten when one or more of the shoots branching out are spoiled and dead.

Summer frost-bite is due to deficient heat and is liable to occur whenever, owing to the rainy and cold season, the shoots have been prevented from growing properly, and their branches from becoming sufficiently hardy to withstand the early autumn frosts, or whenever a shoot has been too tightly fastened up, thereby hampering the proper circulation of the sap indispensable for its proper growth.

Winter frost-bite is due to the melting by the sun of the hoar frost covering a shoot. The shoot becomes parched, blackens, and falls to the ground.

When the hoar frost or white frost is removed by the wind shaking the shoots, or when, owing to overcast weather, the hoar frost dries out, or when it is melted by the fog before the sun appears, no frost-bite can possibly take place. This accident can be neither prevented nor made harmless.

§ 2. *Winter Frosts*

Winter frosts are at times so heavy as to reach down to the roots of the vine and to make it necessary to pull them out.

Sometimes the heavy cold freezes only the stools down to

the stump. Then the vines should be cut off at the base.

When this becomes necessary, it should be done as soon as possible so that the wounds, which are naturally very wide, may be afforded sufficient time to dry before the sap sets in.

In spite of the severity of the winter, the shoots nearest the stock are sometimes preserved by the snow covering them. In this case the wood is cut down only to these shoots.

Sometimes after a very severe winter one is in doubt whether the wood is still good or not. The



shoots are very brittle because they have suffered from the frost. Nevertheless, the wood is still green inside, however pale the colour may be.

The best plan has been to cut the vine very short and to leave only the upper shoots without cutting at the foot.

### § 3. *Spring Frosts*

The earth, dampened by winter rains and snows, emits vapours upon being heated by the spring sun. These vapours disappear gradually when the weather is mild, but they condense near the sur-

face of the earth if the air is cold, and cover the wood and the shoots of the vine, resulting in hoar frost.

The spring frosts are not injurious unless the shoots have started to grow. The vine is scarcely likely to suffer by such frosts before its shoots begin their growth; but whenever this happens, the vine is said to have been frozen "en bourre." Spring frosts are seldom sufficiently severe to give rise to this phenomenon, which, however, has been observed occasionally. Since the coldness of the air is more pronounced at sunrise, that is, at the

end of the night, it is at such a time that the hoar frost is more noticeable, both on the surface of the earth and on the vines and other plants. Hoar frost is likely to occur after a fall of snow or a hail-storm.

Vineyards located in the proximity of forests are more liable to hoar frost because the earth is generally cooler, and, moreover, the forest acts as a screen against the wind.

Lowlands are also liable to hoar frost because they are less exposed to the wind, and because the vapours are heaviest, owing to

the greater moisture of such lands, which serve the purpose of sewers for those adjoining. Dry, raised, and exposed lands are better protected against hoar frost for the reasons explained above.

Whenever hoar frost occurs, if the sun appears before the frost is melted, the heat of its rays scorches the bud and it dries up, becomes black, and is transformed into powder. These effects become noticeable after a few hours of sunshine.

When the budding shoot has attained a sufficient development, that is, when it is one-half a foot

long, or even longer, and its leaves are fully developed and its grapes begin to appear, it happens very often that the leaves and the grapes are still green and fresh after a hoar frost. But in reality great harm has been wrought if the point of the bud has been bitten by the frost, which is made apparent by the fact that such a tip looks withered and drooping. Whenever this happens, no grapes are to be expected from the stricken shoot, which miscarries, owing to the stoppage of the sap circulation brought about by the withering of the point.

The vapours from a river, since they are warmer than the vapours arising from the earth, often act as a protection against hoar frost for adjoining vines, whenever the wind blows from the river. Vineyards have been known to have been protected against hoar frosts by a brick kiln, whose smoke was being carried by the wind toward the vineyard, while all the adjoining vegetation was destroyed by the frost.

Whenever, during the spring, hoar frost is threatening, one should abstain from doing any work in vineyards and even from

mere weeding. By even slightly disturbing the earth, the vapours are afforded a more unobstructed and freer passage, and are more likely to cause hoar frost.

Nothing is more likely to originate hoar frost in vineyards than the spreading or digging up of manure. Owing to its inherent heat, it emits large quantities of vapours, which are condensed upon the wood and the buds by the coldness of the air.

#### § 4. *About Hail*

Large dry hail-stones, driven by a strong wind, destroy the grape

and break or wither the shoot. Even such grapes as have escaped direct damage from the hail are likely to suffer, owing to the fact that the vine, stripped of its shoots, grows new ones, which deprive the grapes of their nourishment. The berries are smaller and the quality of the wine is inferior.

Whenever hail falls toward the end of the month of June, or even later, the vine is unable to bring to maturity the new shoots grown, and the harm wrought is still felt in the following year, when a scarcity of shoots capable of producing grapes is noticed.



If hail strikes a vineyard near vintage time, it bruises the berries, and if these berries dry up before the vintage, they impart to the wine a sour taste, which detracts from its quality and makes it liable to turn sour. To obviate this trouble, it is necessary, when gathering the grapes, carefully to pluck out these hail-stricken berries.

§ 5. *Dropping Off and "Tacon"*

The dropping off arises from two causes: namely, from deficient or excessive sap in the vine.

The deficiency of sap is due to

dryness of the earth, and the excess of sap to excessive moisture of the soil.

In the former case the earth does not supply a sufficient quantity of sap to afford suitable nourishment to its shoots and to its grapes. In the latter, the circulation of the sap being too forceful, the grapes are not afforded sufficient time to ripen, and therefore miscarry.

These accidents are especially to be feared when the vine is blossoming and the grapes are forming. Since this is generally the time at which the second tilling

is performed, it should be carried out with the utmost care, as stated above.

The dropping from the vine is characterized by the vine shedding its grape bunches, which fall under the stocks. Sometimes only the berries are shed, and the grape bunches remaining on the stock appear very thinly provided with berries. There are still other bunches which preserve all their berries, but the latter are so small that even upon becoming ripe, they are not larger than a pin-head. Such grapes furnish very little wine, the stalks absorbing

almost as much juice as is extracted from the berries.

When the dropping off has begun, the harm is continuous to vintage time, unless the weather becomes exceptionally favourable through alternations of rain and clear hot weather.

The "tacon" is the withering of the shoots or the grapes, caused by cold rains and especially by large water drops formed by melting hail falling scattered when the weather is warm and the sun appears. The "tacon" withers the berry, scorches the bud, and harms the wood in such

a way as to make it necessary to cut the blighted shoot and to tend most carefully any shoots which may have been even slightly stricken.

“Tacon”-stricken grapes do not fail to grow, unless the stalk has been harmed, but some of them wither.

## CHAPTER II

### *Diseases of the Vine*

**T**HE diseases of the vine are the rust, the blight, and the scurf.

When a vine is attacked by rust, its leaves appear withered,

drooping, and of a faint green. This marks the beginning of the blight.

When blight develops, the leaves shrink and turn yellow instead of being broad and green.

The blight is caused either by excess of moisture or by dryness; by excess of moisture in such soils as retain the water, the roots eventually rotting and therefore being unable to nourish the stock; by dryness, when the surface layer is too thin, the stock withering from lack of nourishment.

Age and sometimes the improper tilling of the soil give rise

to these same results, irrespective of the quality of the soil.

Whenever these accidents occur on account of the age of the vine, there is no alternative left but to pull out the vines and to replant the vineyard.

If the accidents are due to the improper tilling of the soil, the troubles experienced may be overcome by a proper tilling performed at the proper time.

If they are caused by the moisture of the earth, there is no possible remedy, and the land should be considered as unfit for vine-growing.

If they are caused by the dryness of the soil, as a general rule, the trouble experienced may be eliminated by dumping upon the soil new earth, taken from swamps or ditches. In this way the necessary moisture is given to the soil, which remains damp for a long time to come.

The scurf is a kind of dry gum which forms on the stock. It is caused by a stoppage in the circulation of the sap, which does not have sufficient force to climb higher and thus stops at that point. Vines planted in light and moist soils are liable to this disease.



The shoot attacked by scurf should be cut near the stock, and if in the following year it is found decaying, it will be necessary to pull it out and to replace it either by layering or by planting.

### CHAPTER III

#### *Insects Injurious to the Vine*

##### § 1. *Vine-grubs*

**T**HE vine-grubs are the most dangerous of all. These insects have the general aspect and colour of beetles, but they are much smaller and almost invisible. They come out of the earth at a time when the bud has already

attained a certain development. They eat it away, perforating the leaves and splitting open the berries to absorb the juice. About the end of August they dig again into the earth and eat the roots of the vine throughout the whole winter and part of the spring.

The vine attacked by these insects may be easily recognized by the fact that its leaves are full of small holes and have a sieve-like appearance. This is the result of their summer activity. Furthermore, the shoots are short and slender and the berries very thinly

scattered and poorly developed. This is because the roots of the vine have been eaten away by these insects throughout the winter, which causes the sap to be lost through the wounds thus inflicted. In time the sap becomes insufficient to nourish the stock, which sooner or later dies.

Vineyards planted in light soils are more likely to be attacked by these insects. Heavy soils, which are more compact, are less liable to be infested by these grubs, as they find it more difficult to penetrate into such soils. Several

methods resorted to for their destruction have proved unsuccessful.

Cold rains in the course of the summer have been found to be the only effective means of destruction. In default of this natural remedy, no other is known except to pull out the vines so attacked, and to leave the soil fallow for about two years. The grubs then die for lack of nourishment or migrate to another soil.

§ 2. *Wine-weevils*

The wine-weevils are small, perfectly round insects and appear

on the ground when the shoot is about half a foot long. They stick to the shoot, splitting it and the berries, and laying their eggs on the leaves, which appear covered with small dots and become dry and drooping.

It is sometimes necessary to pluck out these weevils in view of their large number and of the damage they are inflicting upon the vines.

A means of destroying this pest has been tried, which it is claimed has proved successful. A few hemp seeds, ten or twelve feet apart, are planted along the middle of each

bed, beginning at the end of the bed. It is claimed that the smell of this plant will drive away these pests, or cause their destruction. But in order to prevent the vine being injured by the growth of the hemp, the latter should be pulled out as soon as one can reasonably expect the weevils to have disappeared definitely. The worms, which are found on the blossoming grapes, are hatched, according to a certain opinion, from the eggs of the wine-weevils.

In cool and damp weather the growth of the blossoms is much retarded. Dry and mod-

erate weather quickens the blossoming and causes the destruction of these pests. The weevils do not leave the grapes until the vintage.

§ 3. *Beetles and Other Insects*

Beetles eat away the vine as they do trees. A month after making their appearance they fall to the ground, where they lay their eggs, which are hatched in a few days, producing small worms, which later dig into the earth, and feed on the roots of the vine until they appear as beetles. These small worms come out of the earth at the beginning of May. Whenever

they are prevented from doing so by abnormally cold or dry weather, the vine is likely to suffer still more, since being older and larger they have greater strength to gnaw the roots.

The worms are especially fond of young plants, the roots of which are more tender, and it happens very often that the plant attacked withers away and dies. This has been proved beyond doubt by exposing the roots of plants which have died, these pests having been found adhering to the roots.

It is dangerous to plant whenever practically no beetles are



noticed on the ground, especially if the soil is light, as they are more prevalent in such soils than in heavy ones.

Sometimes their number is so great as to make it necessary to hire labourers to destroy them. The proper time for this work is at dawn, before the air warms, as then these insects fly away. They are found sleeping on the leaves. As fast as they are collected, they should be placed in a receptacle and burned.

Snails likewise stick to the buds and afterward to the grapes when they begin to ripen. They eat


the growing bud and damage the grapes by their trail, making the wine fatty. They are more prevalent in vineyards located near hedges or walls, where they find good shelter. They should be sought there, especially after a heavy dew-fall or a warm rain, as they then leave their shelter.

Caterpillars likewise eat the blossoming bud. As they generally come from adjoining trees or hedges, such trees or hedges should be carefully freed from these pests in the course of the winter, when the eggs of these insects are still enclosed in their sheaths.

Besides the eggs enclosed in the sheaths, other eggs are laid all around the branches without sheaths in small coiled strings. The latter are very difficult to detect.

There is a kind of caterpillar which comes out of the earth at springtime and sinks again into the soil in the autumn. They cannot be destroyed except by picking them out as soon as they appear.





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Part II

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*The Vintage*

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CHAPTER I

*Preparations for the Vintage*

§1. *Wine-press*

**E**XTENSIVE repair work as regards the tubs, the crushing troughs, and the wine-press should not be delayed until vintage time. Cask makers and carpenters are extremely busy then and one runs the risk of being poorly served and of paying very high prices. This repair work should be done in May or June.

If it becomes necessary to make

a new wine-press, the above applies even more forcibly.

In this district by the term "anchot" there is designated a round container similar to the tub, but having a smaller capacity. As a rule tubs have a capacity of from five to ten puncheons of wine together with the marc. The "anchot" is a kind of half size tub having a capacity of three or four puncheons of wine with or without the marc.

The "anche" is an oval-shaped container having, as a rule, a capacity of one and a half puncheons without marc. It is placed

under the spout of the wine-press to hold the wine as it flows from the press.

The crushing troughs will be described in due course.

The two-shaft wine-press was practically the only type used of old, and as they wear out, they are being replaced by wheel wine-presses.

The main difference between these two types of wine-presses is that the main parts of the former are two large square shafts, one of which is placed under the bottom of the press and carries the stress of the other when the pressure is ex-

erted, while the latter is held fast by one of its ends, a screw being fitted at its free end. By means of this screw the shaft is lowered for compressing, whereby the crushed grapes, generally called "marc," are squeezed and their juice is extracted.

The second type of wine-press is provided with only one large shaft under the bottom of the press, the upper shaft being replaced by a medium size wooden piece called the "beam."

This beam brings the pressure to bear upon the middle axis of the planks which cover the marc.



It is suspended by means of a dowel from a screw-fitted wheel, the screw engaging the nut.

For pressing the marc, the wheel is lowered by means of a cable, one end of which is fastened to the wheel, the other end being fastened to a vertical pivoted pole.

This pivoted pole, which is erected at a distance of twelve to eighteen feet from the wine-press, is turned by means of two levers, which are generally called "demoiselles," four men pushing the ends.

It is true that the old type wine-press is more powerful and that it

extracts a larger quantity of wine. However, the other type is also sufficiently powerful and, moreover, it may be built large enough to allow of ten to twelve measures of wine being obtained at a time.

The greatest objections against the two-shaft wine-press are that, first, the original cost is higher; second, they are more difficult to operate; third, they are much more bulky; fourth, repairs are more costly.

It happens very often that the repairs made entail a necessity for further repairs, because this

wine-press being made up of only large parts, a new part, owing to its stiffness, is liable to occasion the breakage of an old part, which has then to be replaced.

§ 2. *Liens*

When the vintage is plentiful, and the wine expensive, some land-owners are wont to have a second-grade wine made, called "Liens."

For this purpose an open puncheon is filled up to two-thirds of its height with grapes, which are then crushed, the puncheon being afterward filled

with water. It is then sunk in dregs, without being bunged, and, in order to quicken the boiling process, one to two pints of brandy are added.

This process is carried out eight or ten days before vintage time. For this purpose grapes are selected which are not as yet thoroughly ripe and are still slightly green, in order to prevent this drink from becoming less agreeable, owing to excessive sweetness.

### § 3. *Tubs and Casks*

From eight to ten days before vintage time, it is necessary to

mount the new casks, to refit the old ones, to put in shape the tubs and the "anchots," and a few days later to tighten the screw of the wine-press. Furthermore, the planks of the press should be laid on the bottom of the press and should be flooded with water to clean and soak them, after the spout has been stopped up. The tubs, the "anches," and the "anchots" should be likewise soaked. This water is drained off on the eve of the vintage, and it is replaced several times by fresh clean water until the water remains perfectly clear.

In order to drain the tubs before filling them with grapes, they are slightly tipped toward the bottom of the wine-press. They are then thoroughly dried with a sponge, which is also used for drying the tub after the fermented grapes have been emptied into the press.

Whenever a container has acquired an unpleasant smell since the last vintage, herbs having a strong smell are used to purify the tub, such as sage, thyme, marjoram, etc. These herbs are boiled in a large cauldron, and the boiling water is then poured into the

container, which is thoroughly washed and scrubbed. The container is afterward rinsed several times in succession with clear water, until the odour has disappeared.

No fodder should be stored in the wine-press room, especially near the press and the tubs, as there is the risk of the candles used at night, when making the wine, starting a fire.

CHAPTER II

*Wine Casks*

§ 1. *Proper Time for Buying the Casks*

**I**S it advantageous or not to buy the puncheons during the winter? This is a problem which each one solves according to his inclinations. Here are a few considerations in this regard.

There is no doubt but that casks can be bought more cheaply during the winter as the maker is then satisfied with a small profit, because with the cash he receives he is enabled to buy at the low price prevailing at that time of the year new materials for



making a further lot of casks, to be sold at a higher price during the year.

Against this advantage there are to be set off the accidents to which the vine is exposed; such as winter and summer frosts, hail, and the dropping off of the blossoms.

In such cases one finds one's self with a large number of punch-eons on hand which are useless for the current year, and which in the following year will not be as good as new ones, and will no longer be guaranteed by the maker, and this without taking

into account the fact that the outlay has been made two years earlier than necessary.

As a rule, the prices of casks advance as vintage time approaches. However, when the crop is not very plentiful, the increase is not sufficient to make it desirable to purchase punch-eons in advance.

Generally, it is sufficient to buy the casks when all danger of the dropping off of the grapes has passed. It is not advisable to wait any longer, as the middle course is the best.

The problem is more serious in

plentiful years. In such years, as soon as there is no further danger of the blossoms dropping off, and even as soon as the vine blossoms, the weather being otherwise favourable, the price of punch-eons increases and keeps on increasing until the vintage is finished. It has happened at times that their cost has exceeded the value of the wine contained in them.

Whenever a plentiful vintage is forecasted, the best course apparently is to buy, as soon as the danger of frosts is past, and before the blossoming, one half of the

puncheons which will be required at vintage time, the other half being bought after there is no danger of the blossoms dropping off. In this way the risk of buying too many or too few casks will be avoided as far as possible, and they will be procured at a moderate price.

In plentiful years, besides the danger of having to pay very high prices for the casks wanted if the purchase is delayed, there is the further risk of being supplied with poorly made casks, since the manufacturers are obliged to employ all available workmen, without

regard to their skill, and the latter work rapidly in order to earn more money, inasmuch as they are paid very high job rates.

Furthermore, toward the end of the season, the makers are obliged to use waste wood together with good wood. It results therefrom that in spite of the strict supervision exercised on the wine after the vintage, a large quantity is unavoidably lost.

The spare or extra puncheons are especially subject to this trouble, being the last made.

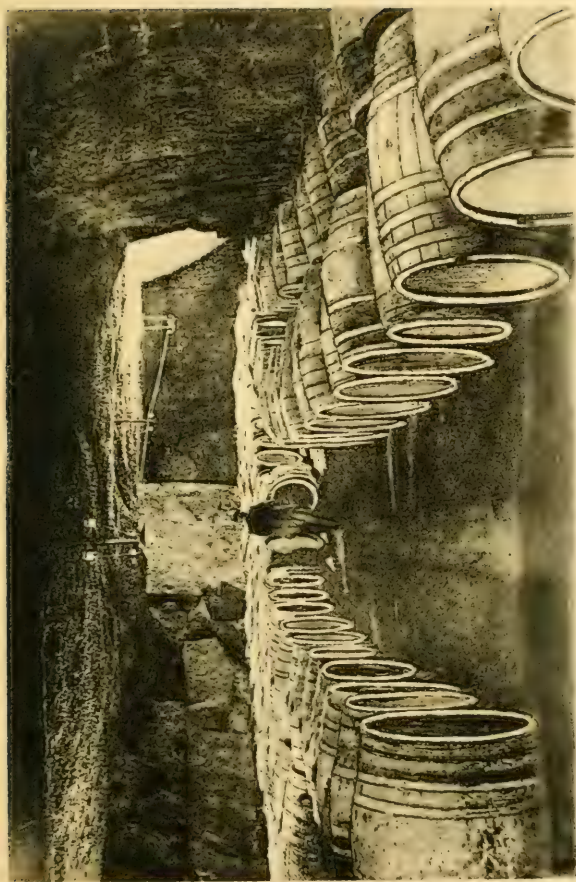
It is advisable to have the puncheons carried to the coun-

try a few months before the vintage. They are then afforded sufficient time to season before being mounted in place.

They should not be mounted until eight or ten days before the vintage. They are tighter when filled, as they have not had time to dry and become leaky.

§ 2. *Quality and Making of the Casks*

The puncheons, as well as the half puncheons or quarts, should be made of new oak wood without any red wood or orchard wood either for the heads or for the staves. The bung stave, which



WINE CASKS





may be made of red wood, is excepted from this rule. This practice is wrong, but has been authorized by the by-laws of the barrel and cask makers. Soft wood is always leaky, and the leaking wine wets and disintegrates the hoops, and proves injurious to the puncheon.

When the casks are made with comparatively thin staves, the puncheons have a larger capacity in spite of the fact that their outer dimensions do not appear to be any larger. However, thin staves are liable to split, especially when the hoops are driven in, not being

sufficiently strong to withstand the knocks of the workman's mallet.

If the staves are very wide, the puncheon may be built with fourteen of them, but it is advantageous to use a few more. The greater the number used, the rounder the cask and the more its capacity is increased.

Three and four part bottoms are the best. However, one may use five part bottom casks, but no bottom with more than five parts should be permitted.

The puncheons should have an outer length of two and one-half

feet, including the chime, which should be four inches and four lines, including the groove. The inner length between the chimes should therefore be twenty-five inches and four lines.

The outer circumference of the puncheon at the height of the bung should be exactly seven feet. The puncheon should have a capacity of two hundred and ten to two hundred and twelve pints, including the dregs, Orleans measure; that is, two thousand and forty-five pints, Paris measure, the Orleans measure being one-sixth larger than the Paris measure.

These two measures are in the ratio of five to six.

The half puncheon or quart should be two feet long and five and a half feet in circumference at the height of the bung, the inner length between the chimes being a foot and a half. Each chime should be one inch and ten lines, including the groove. Its capacity should be from one hundred and five to one hundred and six pints, including the dregs.

The quart, in spite of the fact that it is in reality a half puncheon, is so called because, besides being one half of a puncheon, it

is at the same time the quarter of a hogshead, which is equal to two puncheons.

A puncheon should be assembled by means of eighteen hoops, four on each side of the middle cross-section and five at each end. If assembled with a less number of hoops, it can be rejected. A quart should have fourteen hoops, the same applying to the half quart.

A bundle of hoops is made up of twenty-four, and a half bundle of twelve hoops. The large hoops for the tubs and the anchots are sold in bundles of six. The hoops

should be made either of oak (oak hoops are the best) or of birch; chestnut is even better, but it is rather uncommon. The best tub hoops come from high country, from Roanne to Nevers. Cologne hoops are also in current use, but they are not as good.

It would be advisable to use iron hoops for the tubs and the anchots. They are more costly, but they last indefinitely, whereas wooden hoops have to be replaced at frequent intervals.

Whenever old casks are used, they should be washed with two or three quarts of boiling water

after having been bunged up. If the casks have any defects, such as distortions, etc., they are revealed by a whistling sound occasioned by the air expanded by the heat rushing through the defective spots.

Afterwards they should be rinsed with fresh water until the discharged water is perfectly clean and clear. In this manner one may ascertain by careful inspection that the cask has absolutely no odour.

It would be advisable to take the same precautions in connection with new casks. This would make it possible to discover their

defects, if any. Furthermore, the hot water would dissolve the paint and prevent it from mixing with the wine.

Generally, they are merely cleansed with fresh water, some of which is left in the casks for a few hours, in order to soak the wood, to make the heads tight, and to swell the staves. But this cold water washing does not offer the advantages of the hot water washing. The only reason why the latter is not resorted to, especially when the crop is plentiful, is that it takes too long.



## CHAPTER III

*Proper Time for Gathering the Grapes*

**T**HE proper time for gathering the grapes is when they are perfectly ripe. Unless they are ripe, the wine cannot be good.

The ripeness of the grapes is shown when a berry plucked from the bunch does not have a small red mark at its lower end around its point. Furthermore, thoroughly ripe grapes are plucked from the stalk without offering the slightest resistance.

However, overripe "Auvernat" becomes withered, its juice becomes thick, it gives a lesser

yield of wine, and its wine is liable to become fatty. To avoid this, it is necessary, especially when the weather has been very warm, to gather the grapes before they are completely ripened. This slight unripeness does not affect permanently the taste of the wine, and generally increases its strength.

When the blossoming has extended over a long period, the grapes even of the same stock are apt to ripen at different times, the bunches which have been the first to shed their blossoms being the first to ripen. In this case it is better to delay the vintage for

some days, even at the risk of losing a few bunches through over-ripeness. In the mean time the other bunches will ripen and make up for this loss, both in the quantity and quality of the wine.

If the rain falls near vintage time, a few days should elapse before the grapes are gathered, in order that the grapes may profit therefrom. That the grapes grow in size after such rain is evidenced by those found strewn under the stalks, which have been forced out of the bunches by the growth of the other berries.

Prolonged rainfalls near vin-

tage time are apt to make a portion of the grapes rot before the rest are sufficiently ripe to be gathered. It would be dangerous to leave these rotten grapes on the vine, as they would find their way into the tub eventually, in spite of any previous picking, and impart to the wine an unpleasant taste; those who gather the grapes are never sufficiently careful, and they cannot be relied upon to pick the rotten berries with the care necessary.

The ripest grapes are the ones most apt to rot, and experience has shown how they may be taken



WORKERS IN THE VINEYARD



advantage of. They should be gathered a few days before vintage time and carried at once to the wine-press table without passing through the fermenting tubs, and immediately crushed by the beaters, as in the case of white grapes. The wine is good, and does not have the mouldy taste which is characteristic of the wine obtained from white grapes left too long on the vine before being gathered.

Since the colour is imparted to the wine when the grapes are fermented in the tub, this wine, made in the same way as white wine,

is colourless. This defect may be easily corrected, and the wine may be either sold at a lower price or kept for personal use. Thus the necessity of wasting any portion of the grapes is avoided. Experience has shown conclusively that favourable results may be obtained in this way.

#### CHAPTER IV

##### *How to Make Wine*

**I**N order to insure the proper making of the wine, attention should be paid to the colour and to the strength.

The colour depends, first, on



the selection of the grapes; second, on the manner of crushing.

§ 1. *Selection of Grapes*

We have in this territory two main varieties of red grapes.

The first variety is the "Auvernat." It is identical with the "Pineau" of Burgundy, and gives in the southwestern district, as in Burgundy, the best wine.

Besides the "Auvernat-black," we have also an "Auvernat-grey," which owes its name to its particular colour, and we have also another variety called "coloured Auvernat." These latter varieties

are grown only on a small scale, owing to the too weak colour of the former and the too dark colour of the latter.

The second main variety is the "Fromente-black," called also "Meunier," because of the white down covering the back of its leaves. Its wine is very good, even though it is inferior to the "Auvernat" wine. It is not as fine and it does not keep as well.

Generally, the two varieties are gathered at different times in order to make the wine separately. The "Auvernat" ripens at least

eight days before the "Fromente."

The "Auvernat-black," gathered alone and without a mixture, gives the wine which has, moreover, a sufficiently developed colour.

However, it happens sometimes that the "Fromente-black," either on account of its being planted in warmer soils, or because of the immaturity of the plants, ripens at the same time as the "Auvernat." As the "Fromente" is next to the "Auvernat" in point of quality, it may be gathered at the same time and may be mixed in the same tub. Care should

be taken that the mixture contains at least two-thirds of "Auvernat." In this way body is imparted to the wine without detracting from its quality.

If unripe "Fromente" is mixed with "Auvernat," even though the latter is perfectly ripe, the former, its characteristic properties being still undeveloped, weakens the "Auvernat," and imparts to it a certain acidity which proves most injurious.

When there are on hand either coloured or grey "Auvernat" grapes, they should be apportioned among the different tubs, in

order to equalize the strength and the colour of the wine, the grey "Auvernat" being of a weaker colour and the coloured "Auvernat" of a more inferior quality than the "Auvernat-black."

The "Auvernat-white" and the "Melier," which sometimes ripen at the same time as the "Auvernat-black," and whose quantity is generally too small to allow of their being used for the making of a special white wine, should likewise be apportioned among the different tubs in order to prevent too much alteration of the colour of the wine.

§ 2. *How to Crush Grapes*

One method of crushing grapes consists in arranging on each tub a crusher into which the dorsal carriers discharge their load upon their arrival from the vineyard, instead of emptying it directly into the tub. Since the crusher has a capacity of only five or six dorsals, it is easy to make sure that all the berries have been crushed, and if the wine pours into the tub with all of them thoroughly crushed, it is unnecessary to transfer it into another container.

The crusher is a kind of uncovered cage mounted on a sup-

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port, to which it is fastened and which is used to carry it about. It is square and made of sound oak planks, and has four sides and a bottom. The latter is pierced with holes, like a sieve, and lets the wine flow through, retaining the stalks and berries. Two opposite sides are provided with a trap, which are raised at the end of each operation, in order to discharge the marc into the tub, which is done by pushing the crushed grapes through the opening with the beater.

§ 3. *How Far the Tub Process should be Pushed*

Red wine acquires its colour by boiling in the tub. The juice of red grapes is in itself white. That this is undoubtedly so is proved by the fact that Champagne white wine is made of black grapes crushed in the wine-press as soon as they are gathered, and without their passing through the tub.

The longer the crushed grapes stay in the tub and the longer the boiling, the deeper coloured the wine. The shorter the stay in the tub, the lighter and more agreeable



the wine, but at the same time it is more apt to spoil. Wine which has remained too long in the tub is said to have been "forced." Wine too dark loses its quality, cannot be drunk for several years, and is sour and raw. The sour taste is imparted by the stalk, and the colour by the skin.

Wine is not considered to have been thoroughly fermented until the boiling has brought to the surface of the liquid all the marc, which then floats in the upper part of the tub. Near the end of the boiling process the marc settles down, and if it is not immediately

borne to the press, in less than a quarter of an hour the wine is "forced."

Boiling of the wine in the tub begins earlier or later, depending on the warmth of the weather prevailing at the time of the vintage.

When the season is warm, care should be taken that the fermenting is properly regulated, because at such times the wine boils as soon as crushed. This is not a real boiling, however, as it is induced by the heat of the grapes and not by the fermentation of the must.

When vintage is late, the

weather is generally cool at the time of cutting the grapes. Then the dorsal carriers do not discharge the grapes either into the tub or into the crusher before ten o'clock in the morning. The grapes arriving at the press before this hour are dumped into the "anchot" placed beside the tub. If these cool grapes were placed at the bottom of the tub, their coolness would retard the boiling, as it is the bottom layer which furnishes the necessary heat.

In this case the grapes crushed the first are those arriving at the press after ten o'clock. After din-

ner the grapes which arrived before ten o'clock are crushed.

At the same time the grapes which are coming in during the day from the vineyard are crushed. In this way the coolness of the first incoming grapes is offset by mixing with the grapes which are brought in later.

The "Auvernat" boils more quickly than other varieties, as it is more fiery in itself. As this fire is extinguished by boiling, one should not wait until the boiling thoroughly subsides before drawing it from the tub and carrying it to the wine-press. Otherwise it

would lose its quality and would have too dark a colour.

As it is dangerous to wait until the marc begins to fall to the bottom to ascertain how far the boiling has progressed, because one may be easily caught with the boiling too far advanced and the wine "forced," and as wine is seldom permitted to boil up to this point, especially high grade wine, other means are resorted to in order to ascertain how far the fermentation has gone. Some wine makers dip a stick into the tub and let the wine drip into a glass. If the wine makes a ring, that is, if upon fall-

ing into the glass it forms a ring of scum and foam, it is sufficiently fermented to be drawn.

As the stick dipped into the tub does not draw a sufficient quantity of wine, some wine makers, to make the experiment easier, use a tin plate pumping pipe which is twice as long as an ordinary pumping pipe. To drive a passage for the pumping pipe a stick is dipped into the marc. This device pumps a sufficient quantity of wine to enable one to test the colour, odour, and taste of the wine.

Sometimes one merely plunges

the hand into the tub, withdrawing a handful of marc and smelling it. The boiling is continued as long as the odour is sweet and until a strong biting smell is emitted.

Some wine makers provide a simple faucet at the bottom of the tub by which they draw the wine, from time to time, to ascertain how far the boiling has progressed, or a strong copper faucet may be used for the same purpose, and also to draw all the wine from the tub in order to transfer it to the puncheons when sufficiently boiled.

§ 4. *How Long Grapes Picked from the Bunch should be permitted to Boil*

Whenever the vine has suffered from blossom dropping, the berries are either too small or too thinly scattered on the stalks, and the proportion of stalks in the marc becomes too great. Excess of stalks is apt to make the wine sour during the boiling process and to decrease the quantity of wine. To obviate these two difficulties, the grapes are picked from the bunches before being dumped into the tub, and each tub is thus filled with berries, without stalks.

Some owners have all their



grapes picked from the bunch. When this is done, the wine may be allowed to boil in the tub without any fear of its being forced, as the forcing is occasioned solely by the stalks. In such a case, one may permit one's self to be guided by the colour so as to ascertain when the marc should be carried to the press.

Wine made from grapes picked from the bunch is more delicate, rawness being imparted by the stalks. However, such wine is more likely to spoil. Furthermore, in such a case, to prevent its becoming fatty, the grapes should

be gathered before they are thoroughly ripe.

To remove berries from the stalks, the large, round wicker basket from three to four feet in diameter, with sides five to six inches high, and a flat bottom, is used, the twined wicker leaves forming small square holes of about an inch all around the basket, affording a passage for the berries and the skins, but retaining the stalks.

When this appliance is used, an "anchot" is placed beside the tub, and on its surface the two levers which are used to turn the pivoted

hole of the wine-press, generally called "demoiselles," in order to afford a base for the basket. The man beating the grapes, instead of discharging the crushed grapes directly into the tub, takes them up with a bucket and dumps them into the basket. The attendant then rubs the bunches against one another with his hands in order to detach the berries, which fall into the "anchot;" the stalks are then dumped into a container standing nearby:

After this operation is completed, the contents of the "anchot" are poured into the tub.

The stalks are carried to the wine-press, where they are pressed only once to extract any wine they may still contain. The stalks of ten or twelve puncheons give approximately fifty pints of wine, which is brought back to the tub. In spite of the acidity of this wine, such a small quantity is not likely to injure the rest, and this process allows even such a small amount being taken advantage of.

## CHAPTER V

*How to Regulate the Wine-press*

**T**HE puncheons and the other casks should be ready by the time the wine is considered as having sufficiently fermented to permit the marc to be carried to the wine-press; that is, they should have been watered, made tight, dried, and mounted in rows on the scaffoldings, each cask resting between two large stones to keep it steady.

To take the marc to the wine-press, a man draws it from the tub with a bucket; to convey the bucket from the tub to the wine-

press, some wine makers have it passed from hand to hand, but this is a very long, tiresome, and wasteful process.

The best plan is to use an oak plank which has a one-inch groove extending along its whole length, sufficiently wide to receive the bucket. This plank is fastened at one end to the top of the tub and at the other end to the wine-press.

A man standing near the tub places the bucket on the plank. The bucket slides by gravity along the groove towards the wine-press, where it is received by a

second man, who in his turn hands it to the operator in charge of the wine-press. This handling is shorter and less tiresome, and no wine is wasted.

The marc is poured into the press in such a way as to fill it entirely, excepting a four or five inch space at each of the four corners, which is intended for draining the wine. The press is then covered with sound oak planks, which should project slightly all around the edge in order to insure a uniform pressure on the whole mass.

Before setting the planks, two

poles should be placed across the marc at a distance of one foot from each end, for the purpose of supporting the planks and preventing their sinking into the marc. Wine-growers call these poles "épingles."

After the marc has been arranged in the wine-press, the wine remaining in the tub is drawn out, and apportioned equally among all the puncheons which have been previously made ready for this purpose.

The wine dripping from the marc in the wine-press before



the pressing is then added, and even the wine expressed at the first pressing, which is called "settling of the shaft."

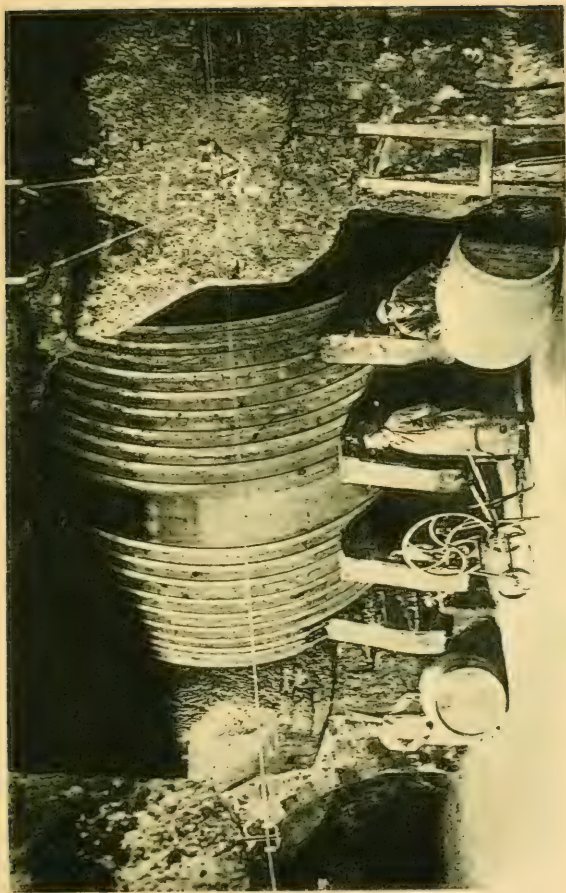
All the puncheons are filled with this first wine, which is the finest, leaving a vacant space of about twenty-five pints. This vacant space in each puncheon is filled afterward with expressed wine, divided equally among all the puncheons.

As the marc is made up of the stalks of the bunches as well as of the skins of the berries, the whole mass being pressed together, ex-

pressed wine is more raw than tub wine, but at the same time it keeps better.

These are the two reasons why this wine is apportioned among all the puncheons, whereby the wine of all the puncheons of the same vintage is made of a uniform quality.

Strictly speaking, only two men are required at the press, one to stand at the front and the other in the rear. However, it is wiser to employ three or even four men. A fourth man may be dispensed with except when it is necessary to turn the press, and generally



"A FOUUDRE"



one finds sufficient help among his own people without having to resort to outsiders.

Before placing the marc in the press, the screw should be lubricated throughout its whole length, and also the bottom of the pivoting hole. A dry, oilless white soap which does not soil is used for this lubrication.

The less the screw projects, the less the danger of its being broken. This is the reason why several stages of square wooden blocks, called by the wine-grower "couettes" or "coussins," are inserted between the planks and the

beam. If the screw squeaks during the pressing, it should be lubricated again. The pressing should be done leisurely and uniformly, and a rest should be taken from time to time in order to allow the marc to be thoroughly crushed.

The cable, one end of which is fastened to the pivot pole and the other to the wheel, should be wound twice around the latter in the first stage of the operation.

During the first pressing, the marc which is soaked with wine is more easily and more quickly crushed than during the later

stages, so that the cable unwinds much more quickly. This point should be taken into consideration lest one be caught unawares.

If this precaution should be neglected, the men operating the press would be exposed to the danger of being wounded by the iron pin which supports the end ring of the cable. This pin, which is merely inserted in the rim of the wheel, would be hurled against the men together with the cable, if they continued to pull the cable after it had been completely unwound.

Four men, or five at the most,

are sufficient to operate a long shaft or a wheel press. By employing a greater number of men, the risk is run of breaking some parts of the press, which of course would occasion a serious embarrassment in the vintage work.

After this first pressing, three further pressings follow. Before each of these operations, the column of marc is cut on its four sides, and the marc so cut out is scattered on the surface of the column, which is furthermore compressed toward its central axis in order to insure a better expression of the juice.



The "Auvernat" should be pressed at once, in order to prevent the marc from becoming heated and the wine evaporating or turning sour.

The marc may be permitted to drip from twelve to fifteen hours after the last pressing. The press is then loosened in order not to strain it uselessly.

CHAPTER VI

*How to Treat New Wine*

**W**INE in the cask should boil quickly, since this removes the greatest amount of impurities and better clarifies it. Wine thus boiled can be used sooner than that boiled slowly. For this purpose the casks should be filled daily for seven or eight days, and every second day thereafter, until such time as they are covered. Moderately hot weather is likely to make boiled wine turn sour.

For collecting the wine overflowing from the casks when the

wine boils, gutters and small vessels are employed. These troughs should be made of tin plate and not of lead, as the latter imparts an unpleasant taste to the wine. The troughs are fitted with a neck, which enters the bunghole of the puncheon and discharges into the vessel placed between two adjoining puncheons. Two gutters may discharge into the same vessel.

When wine boils very actively, care should be taken to empty the troughs in order not to waste any.

Wine overflowing from the

cask into the small vessel is poured into an open-mouthed receptacle, which is covered with a double cloth fastened by means of a ring in order to prevent the wine from becoming vapid. The scum and the dregs fall to the bottom. The wine above is good and may be used to fill the casks.

Since only the thickest scum, which is absolutely useless, overflows at first, the troughs and the vessels are not set in place until this occurs.

After the wine has ceased boiling, all the casks should be sampled in order to ascertain

which of the casks have the better flavour.

As soon as the wine has ceased boiling, it is covered to prevent its becoming vapid. For this purpose a vine leaf is generally used, which is held by a superposed tile or a bung turned on its largest side. The cask should be filled and bunged from six to eight days after such covering. At the same time a faucet should be driven beside the bung, which should be left raised for a few days in order to prevent accidents in case of stresses originating from the wine.

After the cask has been bunged,

it should be filled every fortnight up to the Feast of St. Andrew, the thirtieth of November, and then it should be left undisturbed until the end of the winter; that is, until the middle of February.

When the casks are full, special care should be exercised to prevent freezing, as frost may occasion a splitting of the bottoms and a leakage of the wine.

Since the casks containing new wine have to be unbunged very often, care should be taken to have the bung project from the stave in order to facilitate its removal. In this way the necessity

of piercing the bung with a bit, or of distorting by using a hammer, is prevented.

In order to avoid unbunging the puncheons for filling, some wine makers resort to a new method. Besides the ordinary faucet placed on the side of the bung to serve as a vent whenever this is necessary, they place a larger faucet on the other side, boring a hole sufficiently wide to receive the spout of an ordinary funnel by means of a large bit.

Whenever they desire to fill the cask, they remove both the large and the small faucets, and pour

the wine through the large opening by means of a funnel. The small opening, besides serving as a vent, shows when the cask is full.

In this way, since the faucets are easily fitted in place, one is assured that the cask is well closed, as the bung has not been removed. Now it is certain that the more carefully the cask is closed, the better the wine keeps. Nothing is more likely to spoil the wine than air penetrating the cask.



## CHAPTER VII

*White Wine*

**W**HITE wines are of two kinds, sweet and dry.

The Muscats, otherwise called "Genetins," of St. Mesmin, Marnigny, and Rebrechien, are sweet. The grapes are gathered when they begin to rot, and, if possible, after they have been touched by a frost. The hotter the season, the sweeter the wine. These grapes remain sweet for several months and are still very good after the sweetness has disappeared.

Dry white wines are made of other grapes than the Muscat-

Genetin, the "Melier" and the "Auvernat-white" being the best; the former prevents the wine from becoming fatty; the latter makes it clearer and more agreeable. These grapes are mixed with inferior varieties, such as the "Framboise" (Raspberry), the "Gamet," and many others; but the greater the quantity used of the two first mentioned, the better the quality of the wine.

If the soil is such as to produce a wine likely to become fatty, a small degree of sourness is imparted.

White wine is not fermented

in the tub. White grapes are brought to the wine-press directly from the vineyard, and are arranged in the press in the same manner as red grapes, with a vacant space for pressing.

White marc is pressed four times in addition to the preliminary one.

As white marc has less fire than red, a slighter pressure is applied in order to allow it to drip thoroughly.

CHAPTER VIII

*The Vine Espaliers*

**E**SPALIERS are among the main ornaments of gardens, either in cities or in the country. They clothe the walls and make them appear attractive by the verdure of their branches, by the brightness of their flowers, and afterward by their fruits, which grow continuously until, having become fully ripe, they are gathered. These espaliers are both useful and decorative.

Low walls, such as are used to mark boundaries, are more suitable for ordinary fruit trees

(peach trees, apricot trees, etc.). For vine espaliers, higher walls are more appropriate, especially the walls of buildings. The vines climb easily to a height of twelve and even fifteen feet.

Espalier grapes being intended rather for the table than for the tub, preference is given to such varieties as have the pleasantest taste and whose berries are large, even though having a tougher skin.

The main varieties used for this purpose are the following: first, Muscat, called "Frontignam." The white variety is preferred to the red as being more palatable.

Second, another variety of white Muscat, called "Passe-Musque."

The former has a full although shorter bunch, thickly set with round berries. It is recommended on account of its sweet and fragrant juice, and furthermore for its fine yellow colour when ripe, which appeals both to the sight and to the palate.

The latter has a bunch almost twice as long as the former. The berries are large and elongated; they are less fragrant, but sweet. This variety is subject to blossom dropping. However, if, in spite of this trouble, it succeeds in saving

one-fourth of its berries, the bunch still appears fully set and fine and the berries ripen even better.

Both the "Frontignam" and the "Passe-Musque" are used for making excellent jams. The latter, however, is preferable to the other. It is sweeter and has a finer flavour; but on the other hand, the "Frontignam" is better if either sun or oven-dried.

The quality of the wine does not correspond to the quality of the grapes. For this reason they are seldom used for wine making, and since they are suitable only

for espaliers, the cultivation of this variety is very much restricted. The espaliers should be so arranged as to have a southern exposure. Such an exposure allows a freer access to sunshine, thus enhancing the fragrance and colour of the grapes.

They may also be given a western and even an eastern exposure, but never a northern one, as this would deprive the grapes of their delicious flavour. The less advantageous the exposure, the more inferior the quality of the berries becomes.

These two varieties are also



used for arbors, covering either alleys or enclosures. Where an arbor is intended to cover an enclosure, the hornbeam, the linden tree, and the yew tree are preferable to the vine.

In such a case one of the ends of the arbor should face the south and the other the north, so that the sides may face along their entire length, one eastward and the other westward, and profit by the sunshine for one-half of the day.

If the ends of the arbor faced east and west, the north side would bear only tasteless grapes, owing to lack of sunshine.

CHAPTER IX

*Rapes*

**T**HERE are two kinds of rapes. The first is made of berries alone, with which a puncheon is one-half or two-thirds filled and later is filled with wine. Some wine makers mix the berries with the stalks, but this practice is wrong, as it is likely to impart the flavour of the stalks to the wine.

The second kind of rape is made of chips and berries. The chips are placed first in the puncheons. Three or four dorsals of berries are then poured through

the bung-hole and the puncheon is afterward filled with wine.

These rapes should be made by using the stronger and more deeply coloured grapes. For this reason preference is given to the "Samoireau" whenever it is possible to procure this variety.

These two kinds of rapes are not made outside of the wine-growing districts. On them are passed such weak wines as are liable to spoil, which restores the quality of the weak wines and makes them suitable for drinking.

They are also used to obtain a uniform quality of wine whenever

one has in his cellar several different types. For this purpose a puncheon or even half a puncheon of each kind of wine is poured on the rape.

The casks intended for this purpose should be made of very carefully selected wood, and should be strongly hooped and fitted with fixtures at each end, because when once placed in the cellar, they should not be moved again, as such shifting interferes with the clearing of the wine.

This may be used about three months after vintage time. One begins by drawing from fifty to

sixty pints, which is replaced by the wine that one wishes to treat. Once the rape has been started, the cask should be filled every eight days; otherwise, the chips nearest the bung are likely to dry out and even to become mouldy, and the rape to become spoiled.

There is a third kind of rape, which is made of chips only. Wine merchants request this rape from the seller who disposes of his crop before vintage time. These rapes are used mainly by Paris wine dealers to impart strength and colour to inferior wines, and to make them more salable.

CHAPTER X

*Temperature of the Wine Cellars*

**C**ONTINUOUS fermentation dissipates the spirits of wine; it becomes weaker and weaker, and then spoils.

Anything that increases this fermentation hastens its deterioration. Anything slowing it down furthers its preservation. From this it follows that heat is unfavourable to the wine, and coolness favourable, as shown by experience.

Precautions for the preservation of the wine should be taken according to the universally acknowledged methods.

The reason that wine is kept in cellars is because they are cool and—what is equally important—have a uniform temperature.

The sensations one experiences upon entering a cellar would lead to the opposite conclusion. To become convinced of this fact, it is only necessary to look at a thermometer permanently installed in a good cellar at a depth of not more than eighteen or twenty feet below the surface.

This will show, first, that at any season of the year the thermometer remains constant between the temperate mark and the

freezing point, the variations scarcely exceeding seven or eight degrees all the year round. Second, that the freezing point is approached only when the outside temperature is very low, and the moderate temperature at the time of the most intense summer heat.

It results therefrom that cellars are actually colder in winter than in summer, in spite of the current notion that temperature variations in cellars are the opposite of those of the outside air.

It is true that one has the feeling that cellars are warm in winter and cold in summer; but this



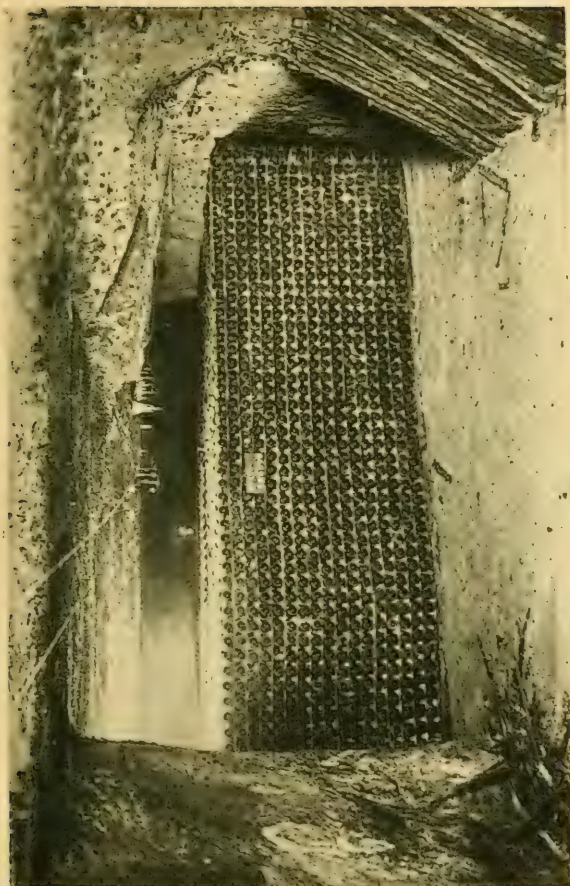
is misleading, and is due merely to an unconscious comparison with the outside temperature. They are thought cold because one has just left a warm atmosphere and warm because one has just left a colder temperature.

Since the temperature in the cellars during the winter is higher than that outside, it is advisable to keep new wine on the ground floor of a barn until the end of March, when it may be transferred. At that time the temperature of the cellar is only slightly higher than that outside, thereafter becoming gradually lower.

In order to keep cellars cool, their entrances and their windows should face either north or east, never south or west. A southern or western exposure would destroy the coolness of the cellar by admitting the warm air, and thus injure the wine.

The second obstacle to the preservation of the wine is the action of the air, which penetrates into the puncheons and into the casks when they are not carefully sealed. It increases natural fermentation and spoils the wine.

The action of the air is shown by the flowers that form on the



BOTTLED WINE IN CELLAR



surface of the wine in the vessels from which it is drawn daily for current use, and by the fact that it becomes weaker as the bottom of the cask is reached.

The same thing is noticed in bottles which have been left standing instead of being laid down. The cork, even if perfectly tight, becomes dry and shrinks, thus affording a passage to the air, which causes the formation of these flowers and weakens the wine. If the bottle is laid down, the cork is dampened and does not shrink but remains perfectly tight, and the wine does not spoil. Corks

sealed with pitch offer a still better protection.

The best way to ascertain whether the puncheons, casks, etc., are tightly closed, is to press the knee against the head. If the receptacle is perfectly tight, no whistling sound is heard at the bung. Furthermore, if the container is well filled, no wine spouts from a hole driven through it by a bit, owing to the lack of inner pressure.

Since air is injurious to wine, the containers should be kept as full as possible. They should therefore be filled up from time to time

to take the place of the wine which evaporates as well as of that which is absorbed by the casks themselves. It is estimated that each cask requires a pint monthly.

Care should be taken that no puncheon is filled up with a weaker or older wine. It is better to give the preference to a younger and stronger one. Furthermore, the cellars should be kept perfectly clean and free from any corrupting odour.

THE END







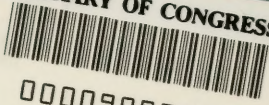








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