

**DEPARTMENT OF AGRICULTURE.  
VITICULTURAL STATION,  
RUTHERGLEN, VICTORIA.  
TRENCHING AND SUBSOILING  
FOR AMERICAN VINES**

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**RAYMOND DUBOIS & W. PERCY WILKINSON**

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TRENCHING AND SUBSOILING  
FOR  
AMERICAN VINES.

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## TRANSLATORS' PREFACE.

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In a retrospective survey of the early history of the reconstitution of French phylloxera-devastated vineyards on American resistant stocks, no feature is more conspicuous than the numerous disastrous failures recorded. These failures arose from very varied causes, among others, almost complete ignorance as to the classes of soil in which the American vines grew naturally, want of practical information with regard to their grafting affinity with European vines, uncertainty in respect to the varieties and even species planted, their doubtful resistance and occasional negative immunity to strong attacks of phylloxera, and, finally, adherence to the old methods of shallow preparatory cultivation in creating the new vineyards.

It is well known that these first failures of some 30 years ago in France, caused very heavy financial losses to viti-  
culturists, but, their secondary effect amply compensated the losses, for thorough studies were forced to be undertaken on exact lines to ascertain the causes of the failures, and, the true explanations being arrived at, vine-growers, wary of the former object lesson and benefited by increased knowledge, were able to triumph over every obstacle, and eventually reconstitute their vineyards under extremely varied conditions, with the fullest measure of permanence, and success.

The primary object of the present compilation is to place before those Victorian vine-growers, who have been so unfortunate as to find their vineyards already destroyed, through the irresistible progress of the phylloxera, detailed descriptions of the practical working methods and implements now

used in Europe, for overcoming one of the causes responsible in no small measure for numerous former failures in reconstitution with American vines, namely, ignoring the necessity for preparatory deep cultivation before planting out. At the same time, those growers not yet invaded would do well to prepare for the inevitable, as, ultimately, judging by European experience, the infection and destruction of all our vineyards by the phylloxera may be accepted as a certainty, being simply a question of time; every vine-grower, therefore, should feel compelled to study the ways and means for permanent reconstitution.

The practical experience of European viticulturists proves incontestably, that successful reconstitution on American vines, necessitates far deeper preliminary disturbance of the soil than that required ordinarily by European vines,\* owing partly to radical differences in their root structure and underground development, but, principally, to the fact that phylloxera living on them is only prevented from inflicting serious harm through their more or less resistant and luxuriant root growth. This shows how essential thorough and deep preparatory cultivation of the ground is, in order that the recuperative root system may freely expand, without check or hindrance, so as to obtain the utmost benefit from the resistant stock, and enable it to increase in diameter at the same rate as the scion, for it is well known that most American stock actually used for reconstitution do not develop in diameter at the same rate as the *Vitis Vinifera* scion, without this essential preliminary of deep cultivation. This is now so definitely accepted throughout

\* The advantages of deep cultivation, in the case of *V. Vinifera*, was recognised by the ancients. In the works of the Roman philosopher, Columella, *Rei Rusticæ Scriptores*, written early in the first century, during the reign of the Emperor Claudius I., the following very clear and precise passage on trenching occurs in Lib. III., sec. XIII: "The soil of the plains should be disturbed to a depth of 1½ feet, hilly soils to a depth of 3 feet, and steeper hills to a depth of 4 feet, for, if the bed of soil ploughed with the *postinum* is not made much deeper than is usually done on flat lands, the soil falling down from the top towards the bottom would leave a quantity of arable ground barely sufficient to allow it to be ploughed with the *postinum*."

European vine-growing countries that it would be exceedingly unwise, and undoubtedly financially disastrous, to disregard this first essential condition, *i.e.*, *preparatory deep cultivation*, if we desire to assure the success and permanence of reconstituted vineyards in Victoria.

We do not consider it necessary to quote extensively from European authorities in support of this well-established and incontrovertible fact, but the opinion of Professor Pierre Viala, Inspector-General of Viticulture for France, and L. Ravaz, Professor of Viticulture at the National School of Agriculture, Montpellier,\* as given in their work on American vines, may be accepted as unquestionably authoritative and representative; it is based on extensive practical experience and scientific study of the question, for principally under Professor Viala's direction, France has permanently reconstituted nearly 2,000,000 acres of phylloxera-devastated vineyards, embracing almost every class of soil:—

*“Deep Cultivation.*—The vine, like all plants, prefers a deeply loosened soil. Trenching or subsoiling is therefore necessary, and, if not indispensable (for all American vines can grow in untrenched ground), is at least of great utility for such varieties as the Riparia, most of the Rupestris, &c., which grow very slowly in compact soils. Trenching or subsoiling, however, obtains in many vine-growing regions for the varieties of the V. Vinifera, and in many places not a single vine is planted without previously trenching or subsoiling the ground to a depth of 20 inches, or even 3 feet.

“The vine grows more vigorously during the first years in trenched ground, and bears fruit at the third leaf, while in non-trenched ground it does not bear crops till the fifth or sixth year; an advantage of two or three good crops is thus

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\* Viala and Ravaz. *Les Vignes Américaines, Adaptation, Culture, Greffage, Pépinières.* 2nd ed. Paris, 1896.



derived. It is always important to gather a crop as soon as possible, to cover the considerable expenses incurred in planting a vineyard; trenching, therefore, is more than ever necessary; it hastens the growth of the vine, and places it in better conditions for its future development.

"It is especially necessary for grafted rootlings. These young plants, often weakly at the time of planting, and with a root system always weaker than that of ordinary rootlings, usually remain sickly when planted in soils which are not favorable; thorough trenching greatly facilitates their early growth.

"Generally, trenching to a depth of about 20 inches is sufficient for American vines; a greater depth, however, suits them better. It may be done either by hand or plough. If in both cases the soil is not very calcareous, the subsoil should be brought to the surface, where it improves by contact with the air and under the action of successive manurings, thus augmenting the layer of arable soil. Further, as this is devoid of grass seeds, the vineyard may be easily kept free from weeds for several years.

"On the other hand, in calcareous soils, or when the subsoil is very calcareous, the latter must not be brought to the surface, or even mixed with the arable soil. We all know that carbonate of lime is detrimental to the vine, consequently, it is useless to mix it with the arable clay-siliceous or other soils in which the roots grow well, or even to place it on the surface, where the rain would carry it to the roots. Such a trenching would cause the leaves to turn yellow, and consequently prove its harmful effect. It is better in such cases to *subsoil*.

"Trenching, or subsoiling, under suitable conditions frequently removes the excess of water from damp soils, diminishes their coldness, and renders assimilable the matters which otherwise could not have been utilized by the vines."

More recently, Professor G. Foëx, Director of the National School of Agriculture, Montpellier, has expressed the following decisive opinions\* :—

“Soils in which American vines are to be planted must be prepared with great care. From the different facts already mentioned in this book it results that with regard to adaptation to soil the greatest obstacle is, on the one hand, excessive moisture in winter and the cooling of the soil resulting from it, and on the other hand considerable loss of water through evaporation in dry summers. The best and only remedy for these two inconveniences is deep and thorough trenching. As a matter of fact, if the excess of water percolates easily through well-divided soil, it also remains longer under these circumstances, for the capillary attraction drawing it towards the surface where it evaporates is less felt than in compact soils. Finally the roots penetrate deeper and find better surroundings in soils deeply disturbed.

“*Depth of Trenching.*—Trenching previous to planting is therefore essential, but the depth of this cultural operation naturally varies with the nature of the soil. Soils naturally dry and poor must be disturbed deeper than fresh and fertile soils. In the first case the depth should be 24 inches, while in the second 16 or 20 inches might be sufficient. However, if the arable soil is shallow and rests on permeable limestone subsoil the latter should not be disturbed, for the roots can naturally penetrate it and get sheltered against drought.

“*Trenching must be done much deeper when a new vineyard is planted on the site of the old vineyard immediately after it has been uprooted. This is generally the case with American vines. Under these circumstances, a depth of 30 to 32 inches is required.*”

It has been urged against the hard-earned and costly experience of European viticulturists, which prove the impossibility of permanent reconstitution without previous deep

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\* G. Foëx, *Manuel Pratique de Viticulture pour la reconstitution des Vignobles méridionaux*. 6th ed. Montpellier, 1892.

cultivation, that those requirements do not apply to Victorian vineyards, the assertion most frequently advanced being that our vineyard soils do not require such deep cultivation as is necessitated in Europe for reconstitution. In other words, that our vineyard soils are naturally better suited to the vine without deep cultivation than those of France, Germany, Austria-Hungary, Switzerland,\* Italy, Roumania,† and other European countries, where deep cultivation is accepted as an essential preliminary in planting American vines, and, therefore, that our usual procedure of shallow cultivation is ample. We have no hesitation in condemning this fallacy, as the assertion does not tally with the poor average yield of Victorian vineyards, or with the frequent occurrence of *powridiè* (a cryptogamic disease, attacking both European and American vines, for which no direct remedy is known at present).

Other viticultural countries, besides European, have blundered over the preliminary preparation of the ground for American stocks, notably California, in quite recent years, where vine-growers confidently ignored previous European experience. We would do well to profit by the Californian failures. Judging by some of the opinions expressed adverse to deep cultivation for American vines the exercise of a little discretion and common sense will save some of our local vine-growers, about to reconstitute, from a repetition of

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\* The reconstitution of vineyards in Switzerland with American stocks was sanctioned by the Swiss Government in 1896 (*Rapport de la Commission administrative sur l'exercice 1895. Neuchâtel, 1896*), in consequence of the very limited success of the costly annual treatments involved in the attempts at extinction of the phylloxera.

The first Swiss State nursery of American vines was established at Auvier as far back as 1889. There are now State nurseries for the propagation of American stock in almost every canton. These nurseries occupy over 15 acres. The area of Swiss reconstituted vineyards is increasing rapidly every year. (J. Dufour, *Les Vignes Américaines et la Situation Phylloxérique dans le Canton de Vaud. Lausanne, 1899.*)

† G. N. Nicolaeu, *La lutte contre le phylloxera en Roumanie. Bucarest, 1902.*