



## STAT HISTORY

# TUSCAN WINE IN THE 19TH CENTURY: ENTREPRENEURSHIP, INNOVATION AND MARKET STRUCTURE

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## **Tuscan wine in the 19th century: entrepreneurship, innovation and market structure**

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### **Abstract**

Agriculture absorbed most of the entrepreneurial capacity in Tuscany up to the end of the 19th century. Since the Lorenese family had taken control of the region the development path followed liberalist policies and the dismantling of old feudal structures. This meant enhancing the weight of agriculture in the economy, while manufacture lagged behind. The organisation of agriculture, though, stimulated self-consumption. Productivity was low and exports difficult. This held particularly for the wine production. Inland consumption was high and growing, because wine substituted the insufficient caloric intake of the local population. Wines were of scarce quality, perished rapidly and were not homogenous in taste, and so hardly exportable. Many aristocrats worked on their estates to produce higher quality wines, but the most spectacular success was obtained by Bettino Ricasoli in the second half of the 19<sup>th</sup> century, setting standards for the famous "Chianti". Other organisational problems of the market, though, were still unsolved. Landowners lamented the absence of entrepreneurs that would buy the wines directly from producers, would purify and bottle them and then organise their export. The market was not specialised enough nor would producers cooperate. Limits that the entrepreneurial capability of single producers could not overcome.

## Crisis and innovation

In Tuscany, during the 17<sup>th</sup> and in the 18<sup>th</sup> century, a huge quantity of capital was invested in land. Following the crisis of trade, noblemen and merchants diverted many funds into agriculture<sup>1</sup>. The process accelerated in the second half of the 18<sup>th</sup> century thanks to the reforms of the Lorenese government<sup>2</sup>. By gradually eliminating feudal privileges and the use and abuse of *fideicommissum*, and by suppressing religious orders and various pious congregations, the Grand Dukes of the Lorena family literally opened up the market for landed properties. Under French rule, many other possessions changed hands when holders of public debt were offered former State and Church properties in exchange for their credits. All of this in a period characterised by soaring prices of agricultural products (Graph 1) and by very low interest rates, rarely higher than 3%. While some aristocratic families sold, at last and sometimes too late, their properties and slowly sloped down into poverty, others extended their land possessions or reorganised them in homogeneous entities. New landowners also emerged. Merchants and foreigners bought out public property or entire estates of decaying aristocratic families<sup>3</sup>. Acquisitions were speculative: the new owners, blinded by the increasing prices of wheat, oil, wine and silk, expected to reap substantial profits from their new lands, without further investments. Contrary to what happened in other territories, so, in Tuscany the change in ownership and the change in the scope of land possession were not followed by an increase in the productivity of agriculture<sup>4</sup>. Much capital was spent in acquiring properties and extending the cultivated area, reclaiming lands and introducing new methods of terracing on the hills<sup>5</sup>, but little was done regarding human capital and the use of scientific knowledge in the cultivation and the processing of food. When prices abruptly went down, following Restoration (Graph. 1), profit expectations were unfulfilled and

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<sup>1</sup> Paolo Malanima, *La fine del primato: crisi e riconversione nell'Italia del Seicento*, Milano, Bruno Mondadori, 1998, pp.200-201.

<sup>2</sup> On the agriculture in Tuscany during the 18th century, see: Ildebrando Imberciadori, *Campagna toscana nel '700: dalla reggenza alla restaurazione, 1737-1815*, Vallecchi, Firenze, 1953; Anna Maria Pult Quaglia, *L'agricoltura*, in *Storia della civiltà toscana*, IV, L'età dei Lumi, Firenze, 1999, pp. 383-407.

<sup>3</sup> The list of the richest families in Tuscany was completely revolutionised between the end the 18th century and the Restoration. Families like the Riccardi sold out their land holdings and vanished from the list of highest rentiers, others, like the Corsini, gained more wealth and influence. See: Giuliana Biagioli, *Il modello del proprietario imprenditore nella Toscana dell'Ottocento: Bettino Ricasoli. Il patrimonio, le fattorie*, Firenze, L. S. Olschki, 2000, pp. 37-41; Giuliana Biagioli, *Tra rendita e profitto: formazione e vicende di alcuni patrimoni nobiliari in Toscana, secoli XVII-XIX*, in Sise, *Tra rendita e investimenti. Formazione e gestione dei grandi patrimoni in Italia in età moderna e contemporanea*, Bari, Cacucci, 1998, pp. 3-34.

<sup>4</sup> The productivity of wheat cultivation in respect to the planted seeds even receded from 1650 to 1800. The mean value was 5,14 between 1650 and 1700, while just 4,47 between 1750 and 1800. See: Paolo Malanima, *Un sistema in trasformazione*, in: Luigi Lotti (a cura di), *Storia della civiltà toscana. L'Ottocento*, Firenze, Le Monnier, 1998, pp. 315-356, p.331.

<sup>5</sup> Amongst the most successful and renown reclaims of the 18th century was that in the Valdichiana in the extended possessions of the State and of the Order of Saint Stephen (Jean Charles L. S. de Sismondi, *Tableau de l'agriculture Toscane* [1801], Firenze, IRPET, 1980, p.17). Other major reclaims concerned the Maremma plain and more limited marshes as those of Fucecchio near Florence (Adriano Prosperi, *Il Padule di Fucecchio: la lunga storia di un ambiente naturale*, Roma, Ed. di Storia e Letteratura, 1995) and Bientina in the province of Lucca.

the speculative bubble exploded. The crisis hit particularly the new owners who had acquired land through debt financing and were now unable to repay their debts or even the interest due on them.

Lapo de' Ricci<sup>6</sup>, giving a speech at the *Accademia dei Georgofili* the 4 June 1829, precisely described what had been the first modern economic crisis suffered by Tuscany<sup>7</sup>. While other crises could be ascribed to the insufficient production of foodstuff, in respect to the necessities of an increasing population, in consequence of draughts or other climatic calamities, the crisis following Restoration was a crisis of overproduction, caused by ill-conceived investments and by the extension of culture to unproductive lands. The many meliorations, explained de' Ricci to the puzzled Georgofili, among them the transformation of woods into fields, the plantations of olive trees and vines on every available slope, the creation of new farms and the reparation of old ones, were all done without a precise profitability calculus. "The agrarian speculation spirit got overexcited", lamented de Ricci, and "everyone thought that transforming woods into vineyards and olive trees plantations would always generate a profit, in every circumstance, justifying whatever expense"<sup>8</sup>. Land was bought and cultivations extended with no regard to the fertility of the soil or to the circulating capital needed to make them profitable. Only in very few cases the speculation brought the expected results and mainly when old practices were maintained<sup>9</sup>, otherwise the sudden fall of prices brought ruin to the new and often improvised landlords<sup>10</sup>.

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<sup>6</sup> Lapo de' Ricci was an Accademico dei Georgofili since 1817 and in 1827 founded with Raffaello Lambruschini and Cosimo Ridolfi the 'Giornale Agrario Toscano'.

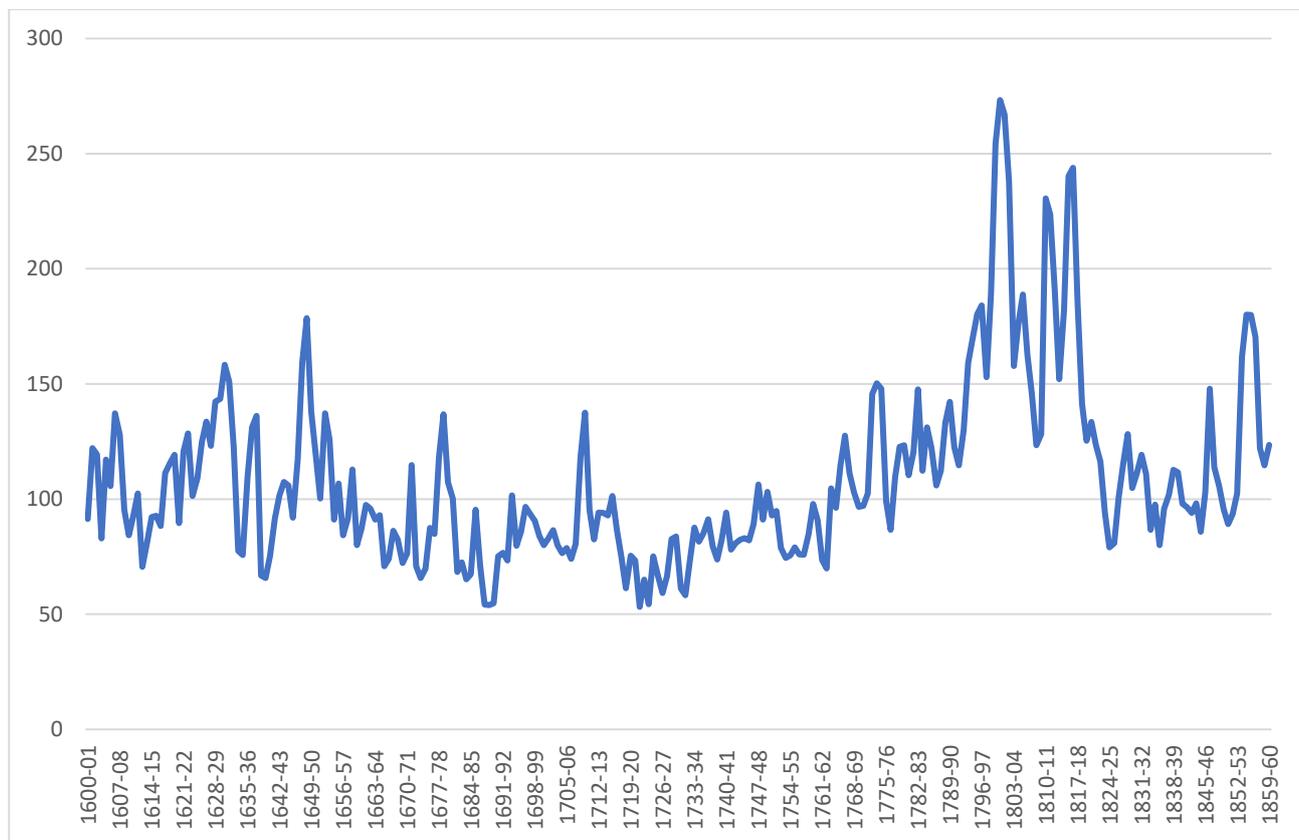
<sup>7</sup> Lapo de' Ricci, *Della necessita.' del capitale circolante per i proprietari terrieri. Memoria letta dal com. Lapo de Ricci all' Accademia dei Georgofili nella adunanza ordinaria del 4 Giugno*, "Giornale Agrario Toscano", 3, 11, 1829, pp.406-407

<sup>8</sup> Lapo de' Ricci, *Della necessita.' del capitale circolante per i proprietari terrieri. Memoria letta dal com. Lapo de Ricci all' Accademia dei Georgofili nella adunanza ordinaria del 4 Giugno*, "Giornale Agrario Toscano", 3, 11, 1829, pp.406-420 :407.

<sup>9</sup> Lapo de' Ricci, *Della necessita.' del capitale circolante per i proprietari terrieri. Memoria letta dal com. Lapo de Ricci all' Accademia dei Georgofili nella adunanza ordinaria del 4 Giugno*, "Giornale Agrario Toscano", 3, 11, 1829, pp.406-420 :410.

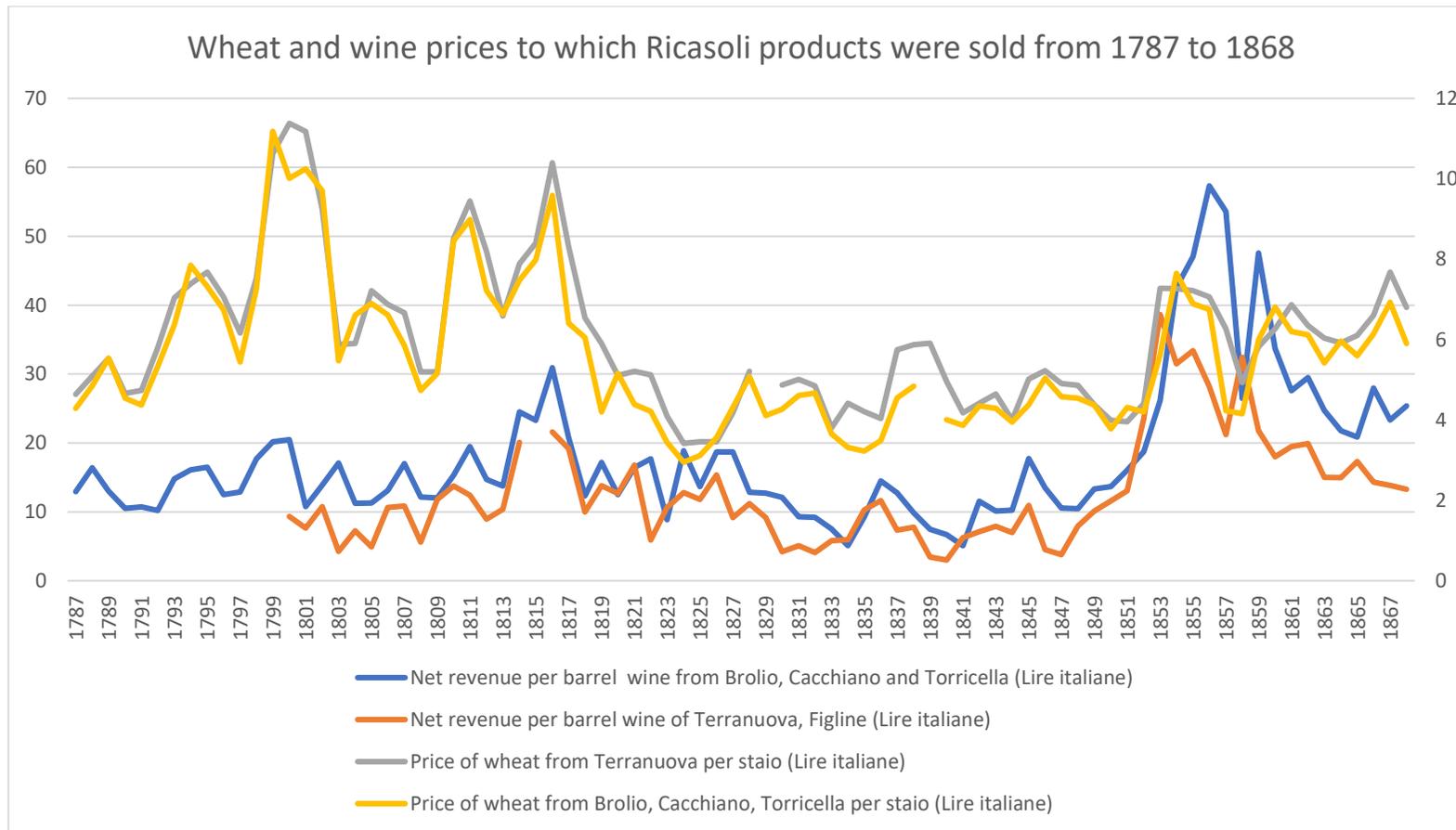
<sup>10</sup> Lapo de' Ricci, *Della necessita.' del capitale circolante per i proprietari terrieri. Memoria letta dal com. Lapo de Ricci all' Accademia dei Georgofili nella adunanza ordinaria del 4 Giugno*, "Giornale Agrario Toscano", 3, 11, 1829, pp.406-420 :411-412.

Graph. 1 *Wheat Prices in Tuscany from 1600 to 1860.*<sup>11</sup>



<sup>11</sup> The price in soldi of Lira fiorentina -20 soldi per lira- refers to 1 staio fiorentino - 24,3629 liters; 18 kg - of wheat. The Lira fiorentina, in the period analysed, was debased from a fixed content in silver of 4,5 gr in 1550-1710, to 4,3 gr in 1710-30, 4,2 gr. in 1730-40, 3,9 gr. in 1740-80 and finally 3,8 gr in 1780-1860. Source: Paolo Malanima, *Wheat prices in Tuscany, 1260-1660*, <http://www.iisg.nl/hpw/malanima.php> (accessed 19/08/2017).

Graph 2 Sale prices of wine and wheat produced in the Ricasoli holdings of Brolio, Cacchiano, Torricella, Terranuova and Figline from 1787 to 1868<sup>12</sup>



<sup>12</sup> Elaboration of data from: Giuliana Biagioli, *Il modello del proprietario imprenditore nella Toscana dell'Ottocento: Bettino Ricasoli. Il patrimonio, le fattorie*, Firenze, L. S. Olschki, 2000, pp.508-553.

The growing of vines was no exception in this general picture. The speculation on wine making followed the general agricultural trend. A comparison is possible through the data on the sale prices of the wheat and wine produced in the landed possessions of the Ricasoli family (Graph 2).

Thanks to the researches of Giuliana Biagioli<sup>13</sup>, price series are available for the holdings of Brolio, Cacchiano, Torricella, and for Terranuova and Figline from 1787 to 1868. Brolio, Cacchiano and Torricella were extensive landholdings, covering 2073,2 ha, located in the hills of Chianti, between Florence and Siena. The administration was centred in the 'fattoria' of Brolio, managing 26 surrounding 'poderi', and the 'fattoria' of Cacchiano, ruling over 16 'poderi' with sharecropping contracts<sup>14</sup>. Terranuova and Figline, instead, covered 324,3 ha of the fertile Arno plain and comprised 20 'poderi' under a unified administration. While wheat was better suited to these last possessions, wine would best be produced in the hills in the south of Florence. As a consequence, sale prices for the wheat grown in Terranuova and Figline would always be higher than those earned by the wheat of Brolio, Cacchiano and Torricella and wine prices, on the opposite, would be higher for the production in Chianti than for that of the Arno plain. Notwithstanding these differences, the evolution of prices in time did not differ substantially, neither between wheat or wine prices of the different holdings, nor between the two different cultivations. The increase in prices up to Restoration is evident: wheat was sold for 5 to 10 Lire per staio<sup>15</sup> between 1787 and 1817, with a peak value of 11 Lire in the crossing of the century; wine of the best quality was sold for 10 to 20 Lire per barrel between 1787 and 1814, peaking in 1817 with a value of 30 Lire per barrel. Afterwards, prices fell rapidly, stagnating till the middle of the century.

The history of Cosimo Ridolfi (1794-1865) and Bettino Ricasoli (1809-1880) as innovative entrepreneurs, in a Schumpeterian sense, began at that time, in the difficulties of the agrarian crisis post-Restoration. The stunning results of the introduced innovations, in the case of Ricasoli, can be appreciated by the soaring sale prices of his wines in respect to the increase in the sale prices of wheat between the 1850s and 1870s. The canonization of the recipe for the Chianti wine earned Bettino Ricasoli the appellation of 'pioneer of the Italian wine-making Risorgimento', an honour he shared with Cosimo Ridolfi and few others<sup>16</sup>. While the solutions that these innovative entrepreneurs found to the dwindling agricultural profits of

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<sup>13</sup> Giuliana Biagioli, *Il modello del proprietario imprenditore nella Toscana dell'Ottocento: Bettino Ricasoli. Il patrimonio, le fattorie*, Firenze, L. S. Olschki, 2000.

<sup>14</sup> On the productive structure organised in 'fattorie', administrative centres where many processing activities in regard to oil, wine and silk were completed, and 'poderi', farmhouses where extended families of 15-20 people lived in order to tend to all works of the surrounding land, see: Giorgio Giorgetti, *Agricoltura e sviluppo capitalistico nella Toscana del '700*, in *Agricoltura e sviluppo del capitalismo nei secoli XV-XIX*, Roma, Editori Riuniti, 1970, pp. 217-252; Mario Mirri (ed.), *Contadini e proprietari nella Toscana moderna*, vol. I, Firenze, Leo S. Olschki Editore, 1979.

<sup>15</sup> The staio was a measure of capacity equal to 24,36 lt (Anna Maria Pult Quaglia, *L'agricoltura*, in *Storia della civiltà toscana*, IV, L'età dei Lumi, Firenze, 1999, p. 387).

<sup>16</sup> Zeffiro Ciuffoletti, *I pionieri del Risorgimento vitivinicolo italiano*, Firenze, Edizioni Polistampa, 2006.

landholdings was unique, though, the problems of the Tuscan viticulture and vineyards were well-known, and had been debated in the renowned *Accademia dei Georgofili* well before the afore mentioned crisis.

### **Too much wine, too little wheat**

While Tuscan wines had been celebrated and sold on international marketplaces up to the beginning of the 18<sup>th</sup> century, later the growing production had been completely absorbed by internal demand. Wine would no longer be exported despite the spreading of the cultivation of vines. Only after Italy's Unification would wine be sold abroad again, in minor quantities, though, and only to be used in France as 'vino da taglio' to correct the alcoholic grade, the colour or the flavour of French wines. Wheat, on the other side, was always insufficient to cover the growing internal demand, so that it had to be continuously imported through the port of Leghorn. The strengths of the Tuscan economy lied otherwise.

In 1757 the major export value was granted by silk, almost five million Lire. Between 1837 and 1841, though silk held just the third place among export articles, with a revenue of little more than 1,6 million Lire<sup>17</sup>. In consequence of the free trade policy practiced by the Lorena governments since 1781, silk was increasingly exported as a raw product. In little less than a century Tuscany almost completely lost the value added of its renowned silk manufacture, while a thriving leather manufacture emerged whose exports revenue, from 189.000 Lire in 1757, became a little more than 1,3 million in 1837-41<sup>18</sup>. Also in this case, though, exports concerned the raw product<sup>19</sup>. At the same time, the straw hat had become first among the export articles, with a staggering value of 5,5 million Lire. Of the agricultural products, the greatest export value was earned by olive oil: 3,8 million Lire in 1837-41, instead of half a million as in 1757.

The steadily growing population<sup>20</sup>, accelerating to a yearly growth rate of 9%, in the decade 1784-1794, justified the soaring prices of agricultural products at the end of the 18<sup>th</sup> century and ensured to Tuscan landlords a demand in excess of offer for both wheat and wine, so that the horizon of entrepreneurial decision in regard to both was limited to local market conditions. While silk, oil and straw were produced with an eye to international market and high prices were seen as source of profit, Leghorn's wheat and

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<sup>17</sup> For this data see: Paolo Malanima, *Un sistema in trasformazione*, in: Luigi Lotti (a cura di), *Storia della civiltà toscana. L'Ottocento*, Firenze, Le Monnier, 1998, pp. 315-356, p.347.

<sup>18</sup> On the production of leather in what would become the district of Santa Croce sull'Arno, see: Valerio Bartoloni, *Terra di cuoio: economia e società a Santa Croce sull'Arno: 1771-1918*, Pisa, BFS, 1995; Valerio Vallini, *Concia al vegetale. Storia, produzione e sostenibilità del distretto della pelle. Santa Croce sull'Arno e Ponte e Egola*, Firenze, EDIFIR, 2013.

<sup>19</sup> Gino Capponi, *Memoria intorno alle mezzerie*, "Continuazione degli Atti dell'i. e r. Accademia economico-agraria dei Georgofili di Firenze", v. 12, 1834, pp. 175-192, p.190.

<sup>20</sup> The population in the Grand Duchy of Tuscany grew steadily from 1650 to 1800. See: Lorenzo Del Panta, *Una traccia di storia demografica della Toscana nei secoli 16.-18*, Firenze, Università degli studi, Dipartimento statistico-matematico, 1974.

wine imports concerned local producers only as a competition and low international prices, in consequence, as a potential menace. The struggles, though, to reinstate protectionist measures had no success. Physiocratic *laissez faire* imbibed the mentality of Tuscany's ruling class and no exceptions were allowed. This the case of the lamentations of landlords of the plains around Pisa that their wine suffered the competition of French, Spanish and Neapolitan ones, imported through Leghorn<sup>21</sup>. In 1828, answering the complaints of Count Francesco Mastiani<sup>22</sup>, Lapo de' Ricci perfectly described the consequences that the roller-coaster ride of prices between the end of the 18<sup>th</sup> and the first decades of the 19<sup>th</sup> century had had on the local production. Tuscany's landscape had not gone unscathed by the stimuli that the abrupt changes in prices had given to local entrepreneurship.

The production, as seen, had been continuously extended, by reclaiming lands in the fertile valleys of the Maremma and Valdichiana or by cultivating less productive lands in the higher hills, but it also became more intensive in labour and in land depletion<sup>23</sup>. Wheat, vines, olive trees and often other arboreal species were grown on the same land at the same time while rotation and fertilizers were insufficient to safeguard the nutritional value of the earth<sup>24</sup>. The use of ploughs was rendered difficult by the rows of vines and deep ploughing, while necessary for the cultivation of wheat and grains, would damage the vine roots, so that most of the work had still to be done by hand, hoeing. The great care needed by vines, all year round, was furthermore impeded by the work related to the other cultivations. As a result, productivity was low and the families of peasants living on sharecropping were often exploited and starving<sup>25</sup>.

Nonetheless, wheat and vines inexorably went from being substitutes to complementary growing plants and the mixed cultivation of both spread from the hills, where it was traditional, to the lower plains. Lapo de' Ricci calculated that in 1828 in the valley surrounding Pisa one stioro<sup>26</sup> produced wine for 24 Lire, but also wheat, hay, wood, fruit for a value of another 10 Lire, so that the landowner could count on a rent of at least 17 Lire per stioro, but, considering the biased division of the produce that penalised the peasants, probably even more<sup>27</sup>.

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<sup>21</sup> *Corrispondenza intorno al dazio sopra i vini esteri*, "Giornale Agrario Toscano, II, 8, 1828, pp.526-544.

<sup>22</sup> Francesco Mastiani had been one of the most powerful administrators of the French government in Pisa and had earned the title of Count of the Empire. He perfectly represents the new

<sup>23</sup> See: *Dei danni della troppa estesa sementa. Memoria del sig. I. Iacopohi di Cascina nel Pisano*, "Giornale Agrario Toscano", III, 10, 1829, pp.218-230.

<sup>24</sup> A colorful description of this kind of mixed cultivation, in regard to the hills surrounding Florence is to be found in: *Della coltivazione dei contorni di Firenze*, "Giornale Agrario Toscano", IV, 13, 1830, pp.64-77.

<sup>25</sup> On the Tuscan agriculture in the first half of the 19th century, see: Carlo Pazzagli, *L'agricoltura toscana nella prima metà dell'800: tecniche di produzione e rapporti mezzadrili*, Firenze, Olschki, 1973.

<sup>26</sup> 1 stioro=0,0525 ha.

<sup>27</sup> *Corrispondenza intorno al dazio sopra i vini esteri*, "Giornale Agrario Toscano, II, 8, 1828, p.536.

Apart from such micro-analyses<sup>28</sup>, and the more general reports born out of the activity of the *Accademia dei Georgofili*<sup>29</sup>, though, there is no precise data in regard to the change in the extension of the cultivated area and in the typologies of agricultural produce of the Grand Duchy of Tuscany prior to the new cadastre, completed between 1817 and 1834<sup>30</sup>.

Known as the cadastre 'Ferdinando-Leopoldino' from the names of the Grand Dukes of the Lorena family, Ferdinando (1769-1824) and Leopoldo II (1797-1870), who started and completed it, the measurement of all the surface of the State, resulting in geometrically represented maps, had a French origin and inspiration<sup>31</sup>. French was the definition of the criteria of subdivision of the territory and the kick off in the measurements in 1810<sup>32</sup>. The archival source of the cadastre, even if only partially preserved, is precious to understand where and why wine was produced in Tuscany at the beginning of the 19<sup>th</sup> century. The data give a rough indication of the extension of land occupied by vineyards (Tab.1). Slopes or fields exclusively dedicated to the growing of vines, a common sight in today's Tuscan landscapes, were, as seen, rather exceptional, so that the functionaries decided to create a category for all land where vines were grown alongside cereals, legumes and hay, and another one, even more inclusive, for those farmlands where grapevines and olive trees coexisted with all other seed-plants cultivations. In 1834, the sum of these two categories covered more than 18% of the total surface of the Grand Duchy, while arable land, dedicated to the growth of cereals, only 16%. In the inland hills, that occupied 1.163.329 of the 1.988.515 ha of Tuscany's soil, the percentage of mixed cultivation grew to 24%, while arable land covered only 16% of the total.

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<sup>28</sup> The extension of the mixed cultivation and the planting of new vineyards has been studied only in few cases, thanks to preserved family archives. The case of the Ricasoli has been quoted extensively. Zeffiro Ciuffoletti refers also the cases of the Torrigiani family in their possessions of Vico d'Elsa, and of the banker Emanuele Fenzi in his land holdings in Sant'Andrea in Percussina and Granatieri near Scandicci (Zeffiro Ciuffoletti, *Bettino Ricasoli fra High farming e mezzadria: La tenuta sperimentale di Barbanella in Maremma (1855-1859)*, "Studi Storici", 16, 2, 1975, p. 497).

<sup>29</sup> Galluzzo. *Vendemmia e manifattura del vino*, "Giornale Agrario Toscano", II, 6, pp.123-125; *Intorno ai vini del Casentino. Lettera del D. Attilio Zuccagni Orlandini al March. Ridolfi*, "Giornale Agrario Toscano", III, 10, 1829, pp. 258-263; *Notizie agrarie sulla comunita' di Pontedera*, "Giornale Agrario Toscano", III, 11, 1829, pp.446-449;

<sup>30</sup> The reference study dedicated to the cadastre 'Ferdinando-Leopoldino' still is: Giuliana Biagioli, *L'Agricoltura e la popolazione in Toscana all'inizio dell'Ottocento: un'indagine sul catasto particellare*, Pisa, Pacini, 1976.

<sup>31</sup> Giuliana Biagioli, *L'Agricoltura e la popolazione in Toscana all'inizio dell'Ottocento: un'indagine sul catasto particellare*, Pisa, Pacini, 1976, pp. 18-33.

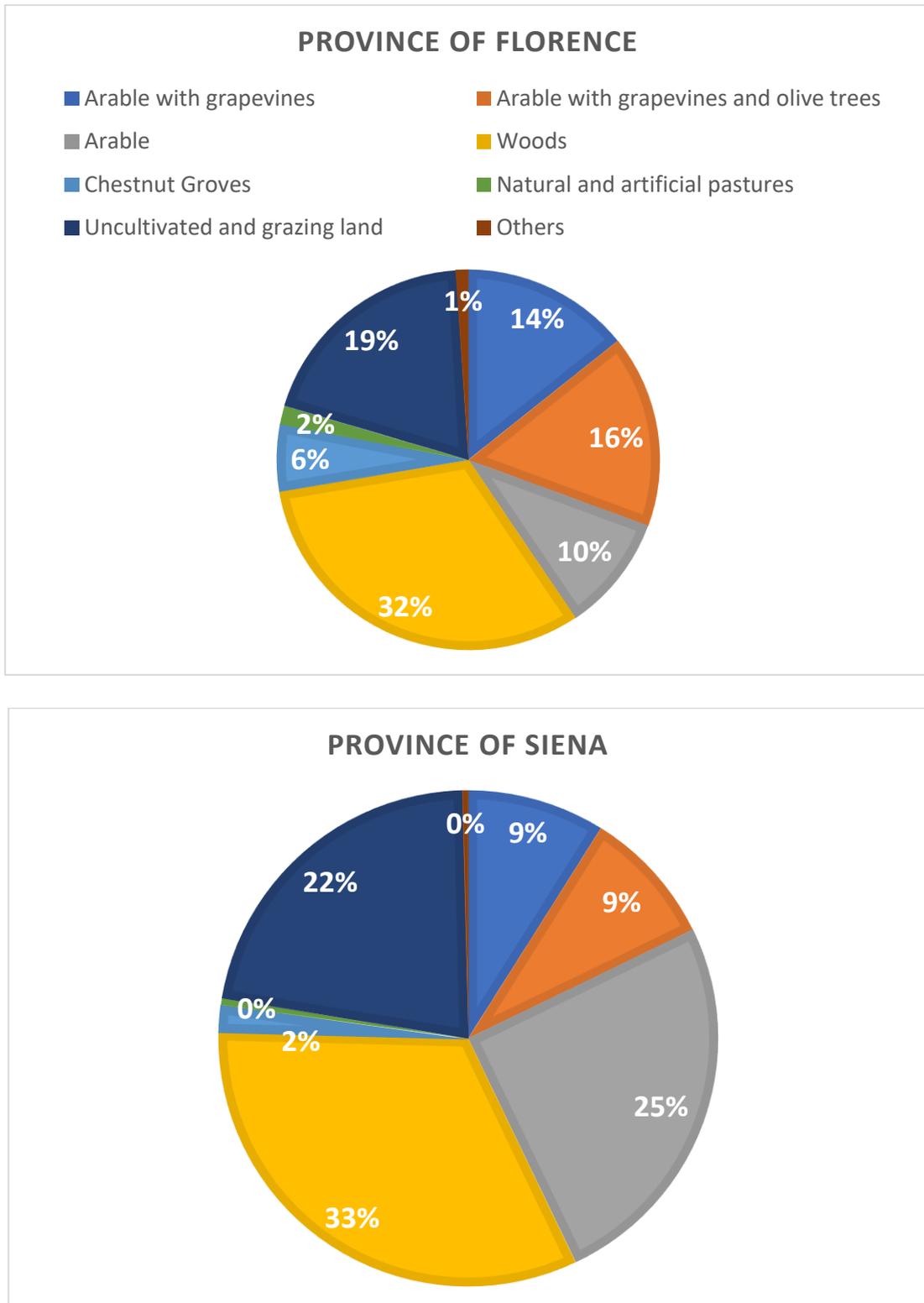
<sup>32</sup> The main difference imposed by the Lorena Grand Duke in respect to the previous work, done under French rule, was the abandonment of the hectare in favour of the 'braccio fiorentino', a non-metric and non-decimal measure that complicated much the work of the commission and delayed the completion of the cadastre (Giuliana Biagioli, *L'Agricoltura e la popolazione in Toscana all'inizio dell'Ottocento: un'indagine sul catasto particellare*, Pisa, Pacini, 1976, p. 49).

Tab 1 *Distribution of the types of cultivation on the total extension of the Grand Duchy of Tuscany, according to the altitude zones, in 1834 (cadastre data)*<sup>33</sup>

Type of cultivation	Inland mountains		Coastal mountains		Inland hills		Coastal hills		Flatland		Total Tuscany	
	Extension (hectares)	%	Extension (hectares)	%	Extension (hectares)	%	Extension (hectares)	%	Extension (hectares)	%	Extension (hectares)	%
<b>Arable with grapevines</b>	18.666,14	5,3	386,74	3,34	152.392,39	13	7.835,88	2,51	30.443,20	23,33	209.724,35	10,55
<b>Arable with grapevines and olive trees</b>	12.741,52	3,43	412,97	3,56	128.188,71	11	6.242,60	2	6.163,95	4,72	153.749,75	7,73
<b>Arable</b>	47.961,5	12,92	1.044,17	9,01	195.005,19	16,8	53.125,06	17,02	20.611,87	15,8	317.747,79	16
<b>Woods</b>	91.093,96	24,54	1,668,87	14,4	302.074,32	26	113.830,02	36,4	21.537,38	16,5	530.204,56	26,6
<b>Chestnut Groves</b>	57.867,83	15,69	3.452,59	29,8	31.623,92	2,7	5.287,43	1,69	1.569,75	1,2	99.801,51	5,02
<b>Natural and artificial pastures</b>	5.871,98	1,58	518,64	4,48	8.729,37	0,75	4.181,48	1,33	4.866,85	3,73	24.168,32	1,2
<b>Uncultivated and grazing land</b>	118.435,12	31,9	3.666,52	31,65	296.107,69	25,5	112.366,07	36	29.245,98	22,41	559.821,38	28,15
<b>Others</b>	6.121,91	1,64	85,92	0,74	6.353,52	0,55	1.924,6	0,62	9.934,96	7,6	24.420,91	1,22
<b>TOTAL pastures, wood and arable land</b>	358.759,96	97	9.567,55	96,98	1.120.475,11	96,3	304.793,14	97,57	124.373,94	95,3	1.919.638,57	96,47
<b>Water, streets and buildings</b>	12.318,98	3	349,99	3,02	42.853,32	3,7	7.273,6	2,43	6.081,23	4,7	68.877,03	3,53
<b>TOTAL SURFACE OF TUSCANY</b>	371.078,94	100	11.586,41	100	1.163.329,43	100	312.066,64	100	130.454,17	100	1.988.515,6	100

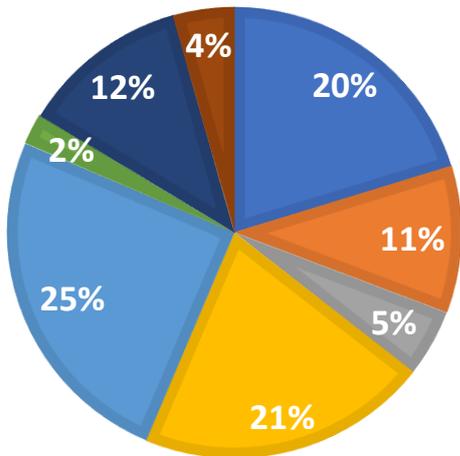
<sup>33</sup> Elaboration on data: Giuliana Biagioli, *L'Agricoltura e la popolazione in Toscana all'inizio dell'Ottocento: un'indagine sul catasto particellare*, Pisa, Pacini, 1976, pp. 132-133.

Graph 2. Distribution of the types of cultivations in the provinces of Tuscany (excluding non-cultivable land), in 1834 (cadastre data)<sup>34</sup>

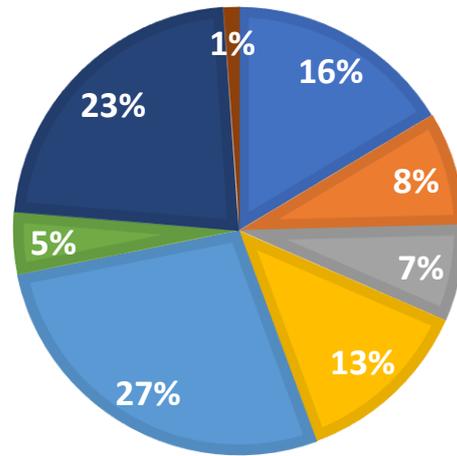


<sup>34</sup> Elaboration on data: Giuliana Biagioli, *L'Agricoltura e la popolazione in Toscana all'inizio dell'Ottocento: un'indagine sul catasto particellare*, Pisa, Pacini, 1976, p.150-151, 177, 196, 207, 212-213, 227, 256-257.

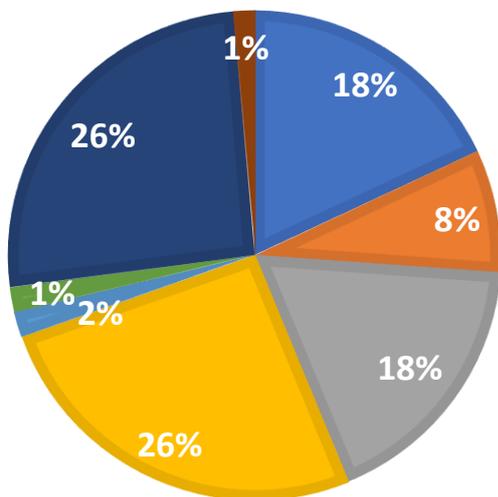
**PROVINCE OF PISTOIA**



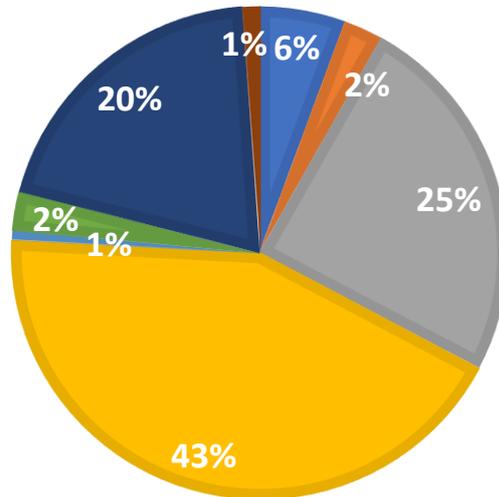
**PROVINCE OF LUCCA**



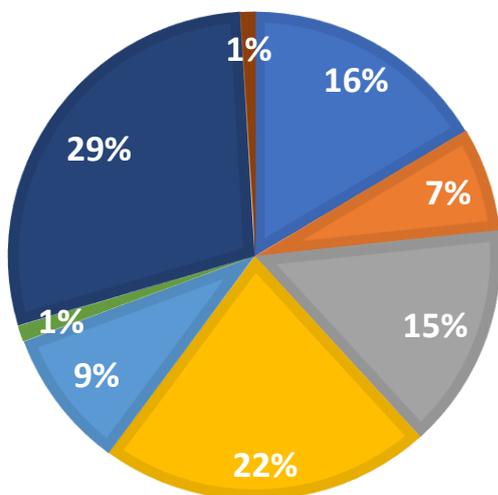
**PROVINCE OF PISA**



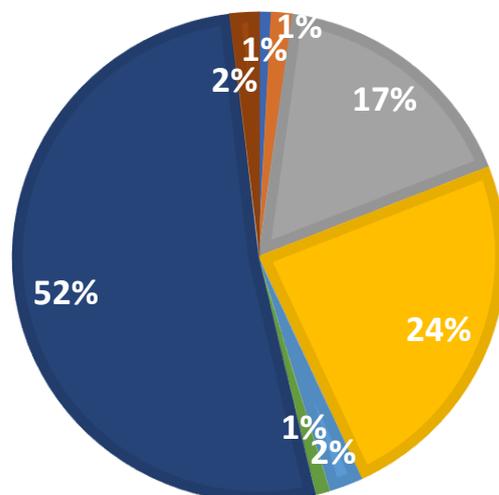
**PROVINCE OF LEGHORN**



**PROVINCE OF AREZZO**



**PROVINCE OF GROSSETO**



Giuliana Biagioli, analysing the cadastre data, subdivided it into the modern-day provinces of Tuscany: Arezzo, Florence, Grosseto, Leghorn, Lucca, Pisa, Pistoia and Siena. The results, in regard to the distribution of cultivations are significant (Graph 2). Mostly hilly provinces had a majority of mixed cultivations: Florence 30% of all cultivable land<sup>35</sup>, Pistoia 31%, Pisa 26%, Lucca 24% and Arezzo 23%. The coastal provinces, comprising the Maremma plain, and Siena, including the fertile Valdichiana, showed, instead, a prevalence of monocultures: in Siena and Grosseto both 25% of all cultivable land was classified as arable and in Grosseto 17%.

The same territories where the mixed culture was diffused, were characterised by the prevalence of sharecropping contracts. The intensity of labour, in fact, necessary for this kind of cultivation could be granted only through the work of an extended family completely dedicated, thanks to the possibility to earn half of the produce, to the land assigned. When Cosimo Ridolfi, after the terrible years of the oidio plague, confronted the wine production of farms with sharecropping contracts to that of farms with direct management<sup>36</sup>, the results were unequivocally. Sharecropping had increased production from the 334 barrels of the years 1856-60 to the 1443 barrels of 1866-70. In the same time span, direct management, instead, had diminished the produced barrels from 192 to 154<sup>37</sup>. Bettino Ricasoli, also, who in the 1850s had passionately introduced the use of machines and tenancy contracts in his possessions in the low plain of Maremma<sup>38</sup>, believed that the Tuscan hills could best be cultivated through sharecropping contracts.

Sharecropping did not only guarantee the highest level of rent, but also allowed a certain flexibility of response to market perturbations that proved important for proprietors and peasants alike. A precious feature, especially in times of almost erratic price changes. In case of low sale prices, the proprietor would assign to the peasant his whole share of the produce - be it wheat or wine - while in case of high prices he collected more than his share, exchanging it with other products or cash. Wheat could so be exchanged with a greater quantity of lower quality cereals or legumes and wine for wheat etc. The case can be made by comparing the production of wine, the percentage of marketed wine and the sales prices of wine for the Ricasoli holdings of Brolio, Cacchiano, Torricella, from 1786 to 1876 (Graph. 3) and for Terranuova and Figline in the years 1800-1868 (Graph. 4). The emerging relationship is straightforward: higher prices correspond to a lesser production and to higher percentage of the produced wine sold on the market.

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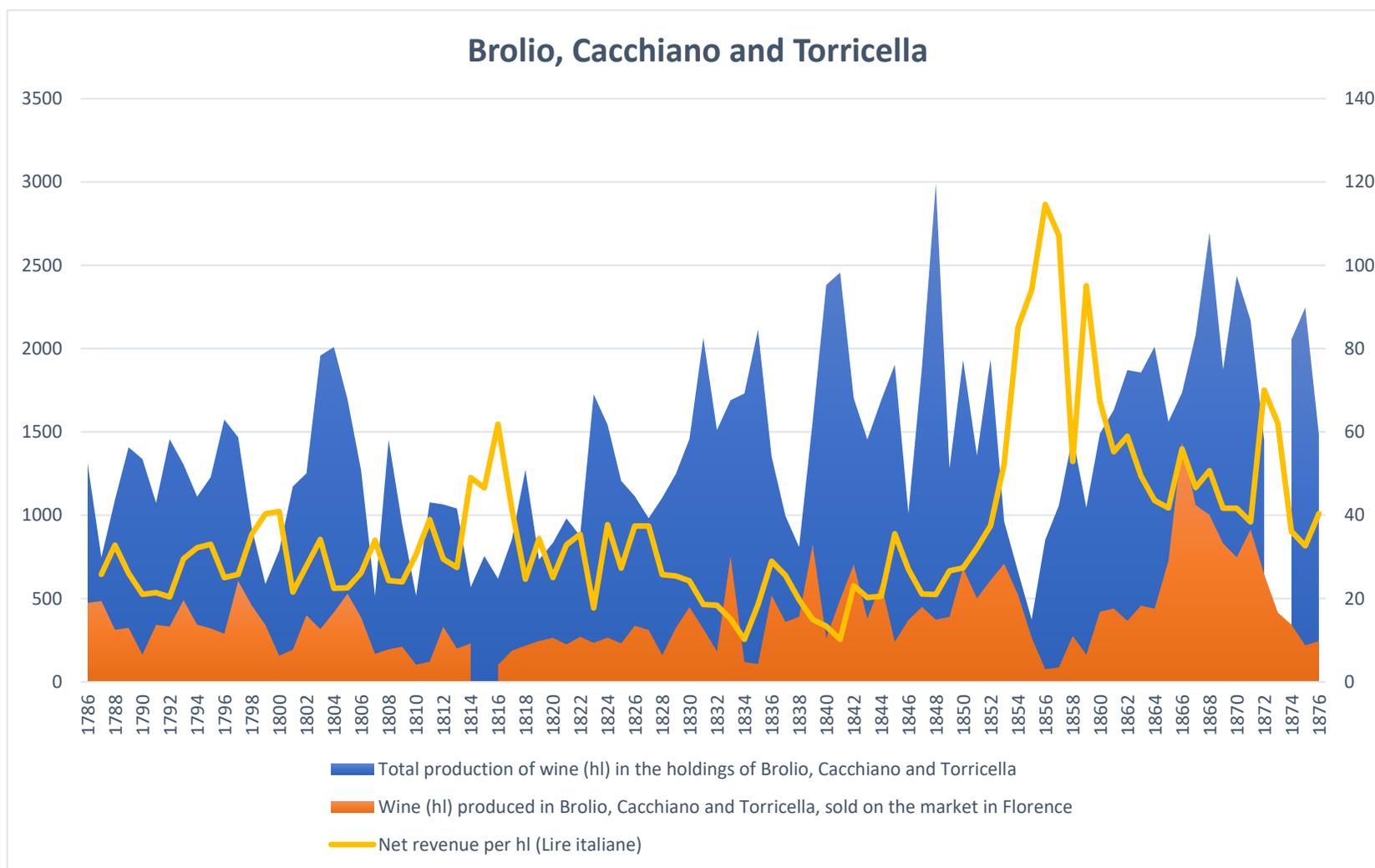
<sup>35</sup> Cultivable land corresponds to the total surface excluding buildings, water surfaces and streets.

<sup>36</sup> Direct management could be practiced directly by the proprietor, by living on the possession and supervising the administration and the agricultural works or could be delegated to an agent. See: Édouard-Michel Lecouteux, *Delle basi delle intraprese rurali*, "Giornale Agrario Toscano", Nuova Serie, 2., 1854, pp. 117-38.

<sup>37</sup> Data have been taken from Archivio Ridolfi di Meleto, *Libri Mastri 1852-1868*; quoted in: Giuliana Biagioli, *Il modello del proprietario imprenditore nella Toscana dell'Ottocento: Bettino Ricasoli. Il patrimonio, le fattorie*, Firenze, L. S. Olschki, 2000, pp.219-220.

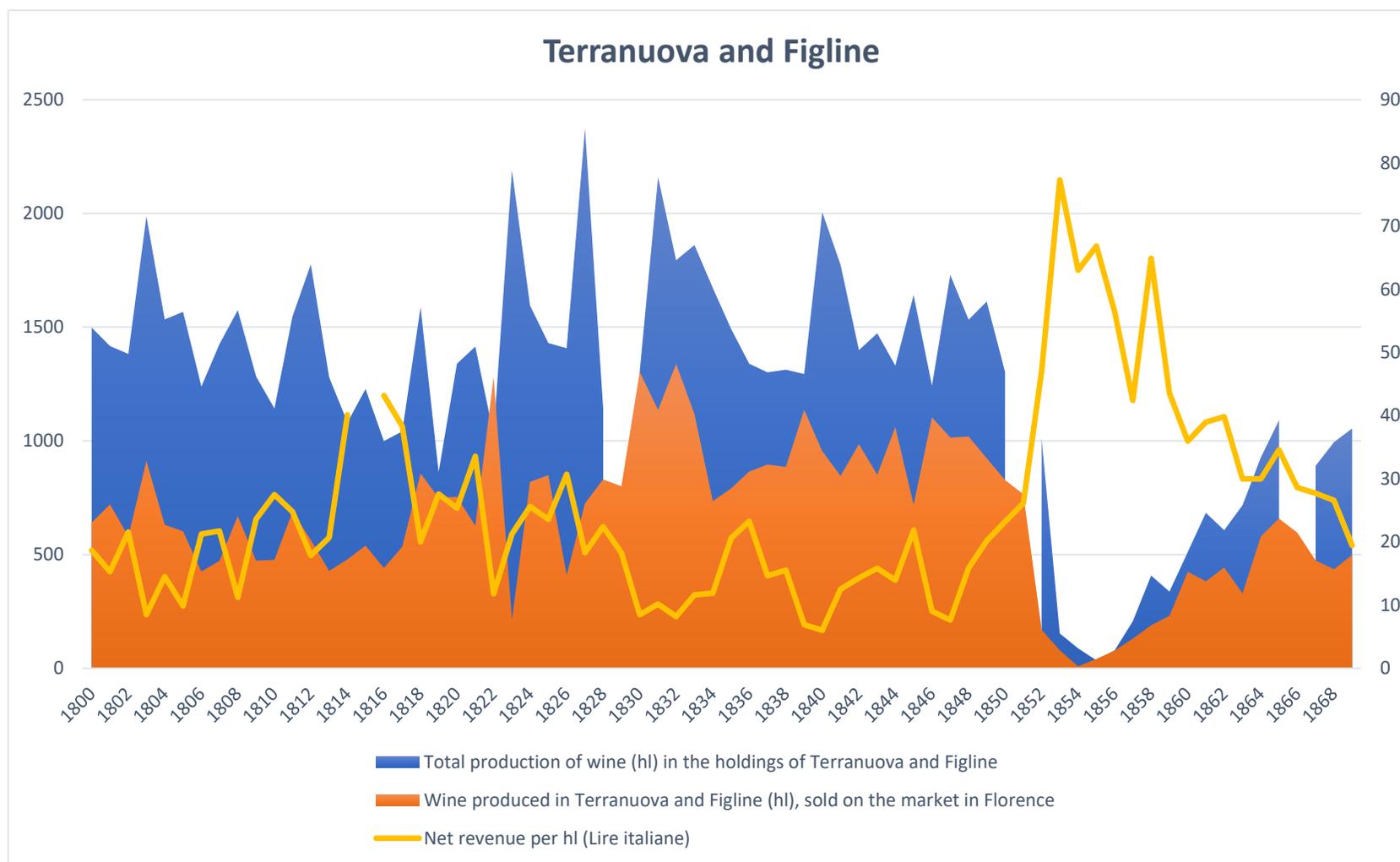
<sup>38</sup> Zeffiro Ciuffoletti, *Bettino Ricasoli fra High farming e mezzadria: La tenuta sperimentale di Barbanella in Maremma (1855-1859)*, "Studi Storici", 16, 2, 1975, pp. 495-522.

Graph 3 Production and sale of wine (hl) produced in the Ricasoli holdings of Brolio, Cacchiano and Torricella and net revenue (Lire italiane per hl sold) from 1786 to 1876<sup>39</sup>



<sup>39</sup> Elaboration of data from: Giuliana Biagioli, *Il modello del proprietario imprenditore nella Toscana dell'Ottocento: Bettino Ricasoli. Il patrimonio, le fattorie*, Firenze, L. S. Olschki, 2000, pp.514-16; 524-26.

Graph 4 Production and sale of wine (hl) produced in the Ricasoli holdings of Terranuova and Figline and net revenue (Lire italiane per hl sold) from 1800 to 1868<sup>40</sup>



<sup>40</sup> Elaboration of data from: Giuliana Biagioli, *Il modello del proprietario imprenditore nella Toscana dell'Ottocento: Bettino Ricasoli. Il patrimonio, le fattorie*, Firenze, L. S. Olschki, 2000, pp.537-38; 545-46.

While the mixed culture spread even into Tuscany's valleys and sharecropping along with it, the whole system begun to be questioned. In the 1830s the *Accademia dei Georgofili* hosted many discussions on the sharecropping system and the low productivity of the mixed culture. Gino Capponi concluded his own essay with an undisputable judgement: "I find in our economy a sufficient measure of equilibrium, equilibrium of mediocrity, but so low that it borders poverty"<sup>41</sup>. While Capponi, at least valued, as many other Tuscan proprietors, the social equilibrium that followed from the sharecropping system, Cosimo Ridolfi was more condemning in his verdict on Tuscany's agriculture. "This art - he wrote- to extend, not to enhance, which all of Tuscany's capital and labour are employed, did not create many a fortune in our country but instead destroyed many huge patrimonies. Being it our main industry and our greatest hope, its worsening was more fatal for us than for countries abundant in other resources"<sup>42</sup>.

In this picture, the growing consumption of wine was just a confirmation of the increasing poverty of Tuscany's peasants and labourers. Net incomes worsened considerably in the period 1760-1820. Salaries almost halved for construction workers in Florence, while in agriculture they lost twenty percent of their purchasing power<sup>43</sup>. Already living at the brink of subsistence, people increasingly substituted wine to wheat in their daily diet. Wine was used and abused just to reach the needed caloric intake. Consumption concerned the lower qualities of wine, produced by mixing all harvested qualities of grapes together. The wine had short duration, just a few months, and no recognisable organoleptic character. The better qualities of wine were consumed by peasants only at harvest time, when the caloric need increased, and in the markets of the main cities. A glimpse on the segmentation of markets and of the seasonality of prices in regard to wine consumption is offered by the 'Giornale Agrario Toscano', journal of the *Accademia dei Georgofili*, for the years 1828-1831 (Tab. 2-3). Data is scanty, but sufficient to underline some characteristics of wine consumption in Tuscany. The only market for high quality wines in Tuscany was Florence (Tab. 3). Wines were sold there according to their origin and at especially high prices. The best sorts came from Carmignano, a village in the hills on the south of Prato, and from the Chianti region<sup>44</sup>. Both types, in the years considered, fared around 30 lire for a soma, equal to two barrels of 20 fiaschi, or 91l. The data of the 'Giornale Agrario Toscano' correspond to the sales price obtained by Bettino Ricasoli for his wines (Graph. 3-4). In effect, Ricasoli always sold his best sort of wines in Florence, even if transport difficulties, up to the construction of the via Chiantigiana between 1836 and 1843, eroded the higher profits obtainable.

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<sup>41</sup> Gino Capponi, *Memoria intorno alle mezzerie*, "Continuazione degli Atti dell'i. e r. Accademia economico-agraria dei Georgofili di Firenze", v. 12, 1834, pp. 175-192, p.189.

<sup>42</sup> Cosimo Ridolfi, *Considerazioni sull'Industria e specialmente sull' Agricoltura. Memoria del sig. march. Cosimo Ridolfi, vice presidente, letta nell'Adunanza ordinaria del dì 7 Luglio 1833*, pp.32-59.

<sup>43</sup> Paolo Malanima, *Un sistema in trasformazione*, in: Luigi Lotti (a cura di), *Storia della civiltà toscana. L'Ottocento*, Firenze, Le Monnier, 1998, pp. 315-356, pp.353-54.

<sup>44</sup> See: Renato Stopani, *Il Chianti dal secolo dei Lumi all'Unità d'Italia*, Radda in Chianti, Centro Studi Chiantigiani "Clante", 2004.

Tab. 2 Wine prices (Lire) per barrel<sup>45</sup> on main Tuscan markets as reported by the 'Giornale Agrario Toscano' for the years 1828-1830<sup>46</sup>

Market	Poggibonsi		Siena		Arezzo		Borgo S. Lorenzo		Volterra		Pontedera		Prato		Pescia		Orbetello		Florence		Empoli		Barberino		Pisa		Leghorn			
Type of wine A=high quality B=low quality	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	French wine)	Tuscan wine		
Dec 1827	14	11,5	13,75	9	22	10	11,5		14,25	10,25	11	9	18	12	20	10	10	8	23,85	7,75										
Mar 1828	13,5	11,6	15	8	17	10	10,5		15	11,5			17,5	10	20	10	13	8	20	14,75	18	12,5	13	12	17	12,7				
Jun1828	15	12,5			13		15,5	14	16	11,5					22,5	19					21	14	18	16,5						
Sep 1828			14	8,5	13	8	16	12,5			13,25	11,5																		
Dec 1828			11,25	8			9	8	10	7	8,25	6,75			15	6,5	20	15										10		
Mar 1829															16	5												10,25		
Jun 1829									10	7					15	4,5											8	8,5		
Sep 1829															13	6														
Dec 1829																														
Mar 1830															18	4												7		

<sup>45</sup> Original prices in Lire (1 Lira/20 soldi/12 denari) were transformed so that soldi and denari became a more intelligible decimal of the Lira. When a range of prices was indicated it has been substituted by a mean value. A barrel of wine corresponded to 45,5l (Anna Maria Pult Quaglia, *L'agricoltura, in Storia della civiltà toscana*, IV, L'età dei Lumi, Firenze, 1999, p. 387).

<sup>46</sup> Elaboration of data from: "Giornale Agrario Toscano", vol.I-III, 1828-1830.

Tab. 3 *Wine prices (Lire) per soma*<sup>47</sup> in Florence as reported by the 'Giornale Agrario Toscano' for the years 1828-1831<sup>48</sup>

Date/type of wine	Carmignano wine	Chianti wine	Villamagna wine	Antella wine	Low quality	Aleatico perfetto (fiasco <sup>49</sup> )
April 1828	42,5	45	40,5	36	29,5	
December 1829	30	31	28	29	23	
April 1830	30	31	29	28	22	5
June 1830	31	31	26	26	21	
June 1831	22	21	21	20	12	4
November 1830	34	34	26	26	21	
October 1831	34	36			22	3,5
December 1831	19				12,5	3,5

Landlords as Bettino Ricasoli sold their wines in Florence directly to customers, through the characteristic openings in the walls of their town residences at street level known as 'buchette'. These openings sometimes had an ornamental aedicule so as to resemble a veritable wine tabernacle. Customers could buy a fiasco or a glass of wine, both with a standard capacity to discourage frauds. In the evening, the sale of wine was prohibited to maintain public order.

Per-capita total consumption of wine has been calculated for Tuscany in 1879 in 167l yearly<sup>50</sup>. The statistics of Luigi Serristori, compiled in 1839, instead, report the yearly consumption of wine in Florence from 1815 to 1824 (Tab. 4). In this time span, total consumption increased from almost 300 thousand to 523.693 barrels. The growth in consumption could not be entirely attributed to the growth of the population, because per-capita consumption also increased from 3,7 barrels yearly to 5,4, equal to 227,5l.

<sup>47</sup> Original prices in Lire (1 Lira/20 soldi/12 denari) were transformed so that soldi and denari became a more intelligible decimal of the Lira. When a range of prices was indicated it was substituted by a mean value. A soma of wine corresponded to two barrels of 45,5l (Anna Maria Pult Quaglia, *L'agricoltura*, in *Storia della civiltà toscana*, IV, L'età dei Lumi, Firenze, 1999, p. 387).

<sup>48</sup> Elaboration of data from: "Giornale Agrario Toscano", vol.I-IV, 1828-1831.

<sup>49</sup> A fiasco corresponded to 1/20 of a barrel (Anna Maria Pult Quaglia, *L'agricoltura*, in *Storia della civiltà toscana*, IV, L'età dei Lumi, Firenze, 1999, p. 387). Aleatico was a dessert wine so costly that its price on the market was expressed per fiasco and not per barrel as other wines.

<sup>50</sup> E. Raseri, *Alimenti e bevande prevalenti nell'alimentazione dei poveri e in quella dei ricchi*, "Annali di Statistica", 2, 8, 1879, pp.72-73.

Tab. 4 *Yearly consumption of wine in Florence (1815-1824)*<sup>51</sup>

Year	Population	Consumption of wine (barrels)	Consumption per- capita	Year	Population	Consumption of wine (barrels)	Consumption per- capita
1815	79.772	296.526	3,7	1825	89.373	502.373	5,6
1816	80.021	369.241	4,6	1826	90.423	446.060	4,9
1817	82.113	328.048	3,9	1827	90.930	479.772	5,2
1818	81.956	378.296	4,6	1828	92.362	450.960	4,8
1819	82.884	428.064	5,1	1829	92.763	426.183	4,5
1820	83.006	437.950	5,2	1830	93.437	459.659	4,9
1821	84.794	439.090	5,1	1831	94.156	476.235	5,0
1822	85.249	437.294	5,1	1832	94.519	499.646	5,2
1823	86.976	445.175	5,1	1833	95.927	475.030	4,9
1824	88.088	507.338	5,7	1834	96.240	523.693	5,4

Besides Florence, other relevant wine markets were Arezzo, Empoli, Pescia, Pisa and Prato (Tab. 2). Although these markets never reached the prices of Florence, nonetheless, in 1828, they granted sellers of high quality wines a price between 17 and 20 Lire per barrel. In the same year, markets as Barberino (Mugello), Bibbiena, Massa Marittima, Montevarchi, Pitigliano, Poggibonsi, Stia and Volterra<sup>52</sup> still assured that high quality wines could be sold for 13 to 16 Lire per barrel. To the same category, with a price of 13,75 Lire per barrel of high quality wine, pertained Siena. Bettino Ricasoli used to sell all his lower quality wines in Siena because, despite the lesser price he would obtain in respect to Florence, there were minor transportation costs. At the lower end of the scale, Borgo San Lorenzo, Campiglia, Orbetello, Pitigliano and Pontedera granted better wines only prices around 10-11 Lire: prices that, in the other markets, would be paid for the lower quality wines.

The picture emerging from the data of the 'Giornale Agrario Toscano' is that of segmented markets where different qualities of wines were sold in different locations with regard to the income level of market participants. Local production was also relevant in defining the price of markets, because wines were sold almost entirely near the production site so that areas of high quality wine production show higher local prices of wine in respect to areas with low quality wine production.

<sup>51</sup> Luigi Serristori, *Statistica dell'Italia*, Firenze, stamperia granducale, 1839, p. 63.

<sup>52</sup> Not all of the cities here quoted have been included in Table 2, because the 'Giornale Agrario Toscano' reported for these markets only one or two prices in all the years considered. For all of these, data have been taken from: "Giornale Agrario Toscano", vol.I-II, 1828-1829.

As with the different prices faced by Ricasoli's wines in Florence and Siena, also in the aforementioned markets prices grew and fell according to the general price trend, maintaining, though, their respective distance from one another. Only exception: Orbetello, with a strange doubling of prices between December 1827 and December 1828 that probably had to do with the smuggling of foreign wines, an activity thriving there as in the island of Elba. In the same December 1828, the 'Giornale Agrario Toscano' began to report wine prices in Livorno, underlining the perceived threat posed by French, Spanish and Neapolitan wines that offered a higher quality in respect to Tuscan ones for the same price of the worst local produces.

A last observation concerns the seasonality of prices, reflecting the scarce durability of most of Tuscan wines. Pescia, with the steadiest data record, confirms that the price for higher quality wine would be lower at the time of harvest, when most of the lower quality wine flooded the markets and grew then up to March/June of the following year. Lower quality wine followed the opposite direction, given that its quality worsened immediately and would so reap lower prices with the passing of time.

### **Better wines, exportable wines**

The problems of the Tuscan wine production were well known to the most advanced agronomists and proprietors and were discussed at length in the sessions of the *Accademia dei Georgofili* from its foundation in 1753<sup>53</sup>. The Tuscan wine production, in fact, once well-known abroad through wines like the Montepulciano, the Pomino, the Chianti, the Carmignano and the Aleatico had lost fame and fortune to foreign producers in Spain and France. Tuscan wine was of lower quality in respect to foreign ones and was sold at a higher price. Resorting to the mixed culture might have been the easiest solution to enhance revenues, while the growing internal market, for sheer hunger, absorbed whatever Tuscany's agriculture produced, but the worsening state of Tuscan winemaking could not appease the enlightened Georgofili.

Already the 4 January and the 1 March 1770 Giovanni Targioni Tozzetti (1712-1783), a physician who supervised the botanical garden of Florence and taught botany<sup>54</sup>, held two lectures titled "Reflections on the limited durability of the Tuscan wines". The lectures were then published in the first volumes of the Act of the Accademia in 1791<sup>55</sup>. Targioni Tozzetti also prepared a volume<sup>56</sup> on oenology, that remained unpublished<sup>56</sup>.

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<sup>53</sup> Zeffiro Ciuffoletti, *L'Accademia economico-agraria dei Georgofili*, "Quaderni storici", XII, 36, 1977, pp. 865-875.

<sup>54</sup> Tiziano Arrigoni, *Uno scienziato nella Toscana del Settecento. Giovanni Targioni Tozzetti*, Firenze, Edizioni Gonnelli 1987.

<sup>55</sup> Giovanni Targioni Tozzetti, *Riflessioni sopra la poca durata dei moderni vini di Toscana. Lezione I*, "Atti della Real Società economica di Firenze ossia de'Georgofili", vol. I, 1791, pp.94-137; *Riflessioni sopra la poca durata dei moderni vini di Toscana. Lezione II*, "Atti della Real Società economica di Firenze ossia de'Georgofili", vol. I, 1791, pp.138-167).

<sup>56</sup> Giovanni Targioni Tozzetti, *Adnotata e cogitata de vinorum natura, preparazione, conservazione et usu*, 2 voll, Biblioteca nazionale Centrale Firenze, Manoscritti, Targioni Tozzetti, 237.

Having ascertained that for its geographical position and its geological composition, Tuscany could aspire to produce the best possible wines, Targioni Tozzetti lamented: “The one and only deficiency of modern day Tuscan wines is their lack of durability. Three fifths of them do not make it through their first 6 or 8 months, one fifth barely survives one year or fifteen months, and the last fifth does a great feat by lasting longer than three years”<sup>57</sup>. This deficiency impeded the sale of Tuscan wines abroad, while foreign wines were imported at high prices. It also hindered producers from creating long-lasting wine cellars that could be used to counter years of bad harvest or the worst effects of price variability.

There were treatises on how to produce durable wines - Targioni Tozzetti quoted the one written by Cosimo Trinci and the one by Giovanni Vittorio Soderini<sup>58</sup> - and there were many grape varieties in Tuscany that could serve to produce them, as the Trebbiano, the Canaiuolo, the Uva schiava, the Raffaone, the Raverusto, the Vaiano and the Zeppolino Imperiale. Too many varieties, though, were a negative feature and excessive mixtures should have been avoided<sup>59</sup>. Great attention, then should have been given to the nature of the soil and to choose the vine variety that would be more appropriate to each land. Great care should have been dedicated to the growing of the vines, their pruning, their fertilizing, the support they needed, the exposition to the sun and so on.

The vinification process<sup>60</sup> was further crucial for the durability of wines. One point, already underlined by Targioni Tozzetti, would recur in the practice of winemaking and in the debates of the Georgofili for more than a century: the opportunity to press the grapes and to complete their first fermentation in open vats - the so-called Florentine process- or in closed barrels<sup>61</sup>. Other crucial operations were the boiling of the wort, the fermentation process, the repeated pouring into barrels and the conservation<sup>62</sup>. The whole process could be meliorated, concluded Targioni Tozzetti, by learning from foreign producers and by applying scientific principles.

Following the lectures of Targioni Tozzetti, in 1771, the *Accademia* had launched a competition having as question: “What should the public authority and what should the landed proprietors do to increase, expand

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<sup>57</sup> Giovanni Targioni Tozzetti, *Riflessioni sopra la poca durata dei moderni vini di Toscana. Lezione I*, “Atti della Real Società economica di Firenze ossia de’Georgofili”, vol. I, 1791, p. 102.

<sup>58</sup> Soderini Giovanni Vittorio, *Toscana Trattato della coltivazione delle viti, e del frutto che se ne può cavare*, Firenze: per i Giunti, 1610; Cosimo Trinci, *L'agricoltore sperimentato opera di Cosimo Trinci che insegna la maniera piu sicura di conoscere, piantare, allevare, o condurre sino dalli più teneri anni età per età alla lor perfezione alcune piante più utili, e necessarie al vivere umano, con altre considerazioni intorno al tempo, e maniera di arare, e seminar le terre; e di stagionare, e conservare l'ulive, e l'olio*, Lucca, Salvatore, e Giandomenico Marescandoli, 1726.

<sup>59</sup> Giovanni Targioni Tozzetti, *Riflessioni sopra la poca durata dei moderni vini di Toscana. Lezione I*, “Atti della Real Società economica di Firenze ossia de’Georgofili”, vol. I, 1791, pp. 122-123.

<sup>60</sup> For a description and an analysis of the process from a modern point of view see: Carlo Pazzagli, I vini toscani nella prima metà dell’Ottocento, “Quaderni della rivista di Storia dell’Agricoltura”, 1, 1988, pp.267-284: pp.277-280.

<sup>61</sup> Ibid. pp. 127-128.

<sup>62</sup> Giovanni Targioni Tozzetti, *Riflessioni sopra la poca durata dei moderni vini di Toscana. Lezione II*, “Atti della Real Società economica di Firenze ossia de’Georgofili”, vol. I, 1791, pp.140-145.

and maintain the foreign trade of Tuscan wines”<sup>63</sup>. The prize of the *Accademia* was won by Giovanni Cosimo Villafranchi<sup>64</sup>, but greater diffusion had the work of Ferdinando Paoletti<sup>65</sup>, also written in response to the question posed by the Georgofili and titled: the art of making the perfect and exportable wine<sup>66</sup>.

From these first volumes, born out of the researching activity of the *Accademia dei Georgofili*<sup>67</sup>, to the manuals of the 19<sup>th</sup> century, the recipe for the perfect wine did not change much from one handbook to the other. The problems of winemaking were clear and the solutions were sought with a constant practical experimenting in the raising of the vines and in the process of vinification<sup>68</sup>. Notwithstanding the reference to foreign ‘experts’ or chemists, science had little to do with the bettering of Tuscan winemaking. Most innovations were incremental and came out of the experience of enlightened proprietors, self-educated farmers, parish priests and country vicars.

As seen, little changed up to the 1830s when the debate on Tuscan winemaking inflamed again the sessions of the *Accademia dei Georgofili*<sup>69</sup>. Vineyards popped up everywhere in Tuscany, wines of dubious quality flooded the markets of the Grand Duchy, peasants could count on wine to inebriate their otherwise scarce caloric intake, but as to the quality and exportability of Tuscany’s wines nothing of relevance had been done. Gino Capponi (1792-1876)<sup>70</sup>, at last, while discussing the merits of sharecropping<sup>71</sup>, touched a crucial point of the production process of wine that would prove capital in the future.

To better Tuscany’s wine, the marquis Capponi proposed the specialisation of viticulture: a good peasant was not *de facto* a good viticulturist. The vinification process, then, should have been centralised. Tuscany’s sharecroppers and peasants just threw all grapes together in vats, with no selection or care. It would have been much better if grapes would have been collected and processed in bigger centres by competent

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<sup>63</sup> Paolo Nanni, *Ferdinando Paoletti e la “nuova agricoltura”*, “Rivista di Storia dell’agricoltura”, a. XLI, n. 2, 2001, p.45.

<sup>64</sup> Giovanni Cosimo Villifranchi, *Oenologia toscana o sia Memoria sopra i vini ed in specie toscani scritta a vantaggio del paese*, Firenze, Gaetano Cambiagi, 1773.

<sup>65</sup> Paolo Nanni, *Ferdinando Paoletti e la “nuova agricoltura”*, “Rivista di Storia dell’agricoltura”, a. XLI, n. 2, 2001, pp. 31-48.

<sup>66</sup> Ferdinando Paoletti, *L’arte di fare il vino perfetto e durevole da poter servire all’esterno commercio*, Firenze, Stecchi & Pagani, 1774.

<sup>67</sup> Ubaldo Montelatici, *Ragionamento sopra i mezzi piu’ necessari per far rifiorire l’agricoltura*, Napoli, Giovanni di Simone, 1753.

<sup>68</sup> Antonio Saltini, *Per la storia delle pratiche di cantina. (parte I) Enologia antica, enologia moderna un solo vino, o bevande incomparabili?*, “Rivista di storia dell’agricoltura”, 38, 1, 1998, pp. 23-50.

<sup>69</sup> Ildebrando Imberciadori, *Economia toscana nel primo ‘800*, Firenze, Vallecchi, 1961, pp. 180-184.

<sup>70</sup> On Gino Capponi and Tuscan agriculture see: Carlo Pazzagli, *Gino Capponi*, in “Dizionario Biografico degli Italiani”, 19, 1976, *ad nomen*.

<sup>71</sup> Interesting, in highlighting the position of Gino Capponi on sharecropping, the letter he wrote to J. L. Simonde de Sismondi the 27 February 1837. See: Giuseppe Calamari, *La mezzadria toscana in una lettera inedita del Capponi al Sismondi*, “Buletino storico pistoiese”, XLII, 1, 1940, pp. 37-43.

personnel. Furthermore, a new category of merchants had to emerge that should have studied foreign markets and selected the wines to be exported and the respective best sale markets abroad<sup>72</sup>.

The ideas proposed by Gino Capponi were shared by many landowners who tried to put them in practice. Already in 1824, Pietro Betti had sent his wine to Boston to test its capacity to resist to such a long journey<sup>73</sup>. From 1824 to 1830, also Lapo Ricci, owner of an estate in Castellina in Chianti, had sent caskets with a capacity of 600 bottles each of red wine to New York, London, Scotland, Antigua, Egypt, Boston, New Orleans and Denmark, obtaining his price already at the delivery in the dock of Pignone in Florence. In fact, he had sold his wine directly to English merchants who had then organised the delivery and the sale all over the world<sup>74</sup>.

As seen, apart from these and other minor experiments, two examples of innovative entrepreneurs stand out in the Tuscan winemaking industry of the 19<sup>th</sup> century: Cosimo Ridolfi e Bettino Ricasoli. The two aristocrats introduced new production processes, opened new markets and changed the organisational structure of the entire productive sector, so that they surely must be counted among Schumpeter's innovators.

Cosimo Ridolfi, renowned for his model farm of Meleto and for having abolished sharecropping in his possessions, occupied the chair of agronomy at the university of Pisa between 1840 and 1845 and was appointed president of the *Accademia dei Georgofili* between 1842 and 1865. Agronomist and politician, Ridolfi was among the founders of the *Cassa di Risparmio di Firenze*, in 1828, an institution committed to supporting agricultural investments. Ridolfi, obviously, dedicated his attention also to winemaking<sup>75</sup>. The perfection he wanted to obtain for his wines had as main scope to make them exportable. "I started my search for a method to produce good wines, - he wrote - without any preoccupation in regard to their flavour, simply striving for wines that would always find their market by possessing the following characteristics that are typical of every expensive wine: perfect transparency, strength, long durability, and improved character and heightened colour with the passing of time"<sup>76</sup>. Such a perfect wine should have the "taste known as dry"<sup>77</sup> and this taste should have remained the same year after year<sup>78</sup>.

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<sup>72</sup> Gino Capponi, *Memoria intorno alle mezzerie*, "Continuazione degli Atti dell'i. e r. Accademia economico-agraria dei Georgofili di Firenze", v. 12, 1834, pp. 175-192, p.183.

<sup>73</sup> Pietro Betti, Memoria sopra diverse qualità di vini Toscani che ressero ad una lunga navigazione Del Dott. Pietro Betti Letta il 22 Agosto 1824, "Continuazione degli Atti dell'i. e r. Accademia economico-agraria dei Georgofili di Firenze", v. 5, 1827, pp.262-267.

<sup>74</sup> Lapo Ricci, *Tentativi per lo smercio all'estero del vino toscano*, "Giornale Agrario Toscano, vol. III, pp. 212-218; Lapo Ricci, *Sul possibile commercio del vino comune di Toscana in lontani paesi*, "Giornale Agrario Toscano", vol.IV, 1830, pp.443-455.

<sup>75</sup> Cosimo Ridolfi, *Memoria sulla preparazione de' vini toscani*, Firenze, Guglielmo Piatti, 1821.

<sup>76</sup> Cosimo Ridolfi, *Memoria sulla preparazione de' vini toscani*, Firenze, Guglielmo Piatti, 1821, pp.27-28.

<sup>77</sup> Ibid.

<sup>78</sup> Lapo de' Ricci explains what is meant by the term 'dry' in reference to a wine: "when it has nothing in excess and, let's just say it, it is neither sweet nor bitter" a definition on which 90% of all associates of the 'Giornale Agrario

In these few lines, Cosimo Ridolfi wrote down his entrepreneurial idea: quality and brand awareness of the product so that it could compete in the market of luxury wines. To achieve his goal, Ridolfi began selecting the best grape varieties and the best production methods. "Everybody should choose his own preferred varieties - he advised - that best thrive on the soil of his land, taking care to always select the sweetest and flavourful ones"<sup>79</sup>. He himself preferred the Aleatico bianco, the Moscadello, the Malvagia, the Tribbiano, S. Colombano and the Lacrima bianca. After selecting the vines, Ridolfi continuously experimented the production processes, publishing his results in handbooks and journals. He often derived the most innovative techniques from abroad, through specialist literature, but also journeys. In the case of the 'spumante', particularly interesting for Ridolfi because it earned on the market a price double than that of other wines<sup>80</sup>, Ridolfi went so far as to the Champagne region to learn the best techniques. In Italy, in fact, the produced spumante wines held residues and deposits of the fermentation process that tarnished their appearance, lowering their price.

In France, Ridolfi immediately became aware of the peculiar organisation of the local wine production. He described it as follows to the Georgofili: "If transforming a wine in spumante is the art of the producer, making it clear would be just a game for him (...); it is instead the most important task of the wine merchant, who buys the wine in great quantities from the producer to distribute it to retailers"<sup>81</sup>. In the Champagne, Ridolfi learned easily the procedure to clear the spumante, but he also experienced the extreme specialisation of work of the local wine industry. The tasks were accurately distributed between the producer and the wholesaler and the wholesaler himself eliminated residues from the wines he bought and also corrected them - in most suspicious ways in the eyes of Ridolfi - before bottling them and distributing them.

For the whole clearing process to succeed, besides the ability of the workmen, Ridolfi also noted that the bottles had all to have the same size and the same characteristics<sup>82</sup>: "characteristics that were common to all bottles expressively produced for the spumante wines of the Champagne, that were sanctioned and

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Toscana would agree (Lapo Ricci, *Tentativi per lo smercio all'estero del vino toscano*, "Giornale Agrario Toscano", vol. III, p. 215).

<sup>79</sup> Cosimo Ridolfi, *Memoria sulla preparazione de' vini toscani*, Firenze, Guglielmo Piatti, 1821, p.32.

<sup>80</sup> Cosimo Ridolfi, *Del modo di ottenere limpidi i vini spumanti*. Memoria del m. Cosimo Ridolfi letta all'Accademia de' Georgofili il dì 8. Luglio 1821, in: Cosimo Ridolfi, *Memoria sulla preparazione de' vini toscani*, Firenze, Guglielmo Piatti, 1821, pp.42-52.

<sup>81</sup> Cosimo Ridolfi, *Del modo di ottenere limpidi i vini spumanti*. Memoria del m. Cosimo Ridolfi letta all'Accademia de' Georgofili il dì 8. Luglio 1821, in: Cosimo Ridolfi, *Memoria sulla preparazione de' vini toscani*, Firenze, Guglielmo Piatti, 1821, pp.46-47.

<sup>82</sup> "che tutte le bottiglie sian d'una egual capacità, che il loro collo sia ben fatto, uniformemente ristretto, e che la loro bocca sia ben rotonda, e d'un diametro perfettamente eguale in modo che un tappo di sughero che ben s'adatta all'una a tutte possa adattarsi" (Cosimo Ridolfi, *Del modo di ottenere limpidi i vini spumanti*. Memoria del m. Cosimo Ridolfi letta all'Accademia de' Georgofili il dì 8. Luglio 1821, in: Cosimo Ridolfi, *Memoria sulla preparazione de' vini toscani*, Firenze, Guglielmo Piatti, 1821, pp.49).

protected by law and that consumers would not allow to miss"<sup>83</sup>. In synthesis, the excellent results of the Champagne production derived from the complex organisation of the whole industry, government and consumers included. The individual effort of a producer would never have been enough to obtain the same success.

For his wine, Ridolfi personally sought out export markets. He reported his own experience in an article in 1831<sup>84</sup>, contributing to the debate flourished on his *Giornale Agrario Toscano* after the experiments reported by Betti and Ricci. Already in 1827, a barrel of his red wine produced 'alla francese' had crossed the ocean to land in Rio de Janeiro. Another barrel had taken the route to Cairo, along with a barrel of Tribbiano Fiorentino, a dry white wine, and some bottles of dessert wine. In both cases the Tuscan wines were judged to be too light, with an insufficient proof spirit. From these and other adventures in foreign markets, Ridolfi concluded that: "it is not enough to prepare good wines according to our definition of good wines in order to sell them successfully abroad; it is necessary to produce wines suitable to the taste of the people you want to sell them to, or to know how to choose the right markets for the wines one is producing". These two different tasks could not be fulfilled by the wine producer himself, but, for Ridolfi, should have become the occupation of a new kind of entrepreneur. For the export of wines, too, recurred the necessity of more specialisation of the wine industry, as in France already was the case.

Besides what he was already doing through the *Accademia dei Georgofili*, the 'Giornale Agrario Toscano', the chair of agronomy in Pisa, the publication of handbooks and articles, Ridolfi could do little for the Tuscan wine industry. What he had witnessed in France, the implementation of public regulations of the wine sector, the separation between production, refinement and commercialisation and the existence of sophisticated consumers, could not be replicated in Tuscany. The grand Duchy lacked the organisational capacity - be it at state or industry level - that could coordinate production, through quality standards and controls, and could also facilitate exports through marketing campaigns and the promotion of brand awareness.

Ridolfi was surely an innovative entrepreneur who reaped for himself the sought-out success, but he could not impose to the whole Tuscan wine industry the specialisation, already invoked by Gino Capponi, that was needed to make local wines competitive on international markets. In the second half of the nineteenth century, so, sharecroppers, landowners and tenants persisted in growing vines along with olive trees, wheat and mulberries, in harvesting grapes while still unripe, in producing wines with little knowledge of correct procedures and selling it at the first possible occasion with little profit. It took the firmness of the

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<sup>83</sup> Cosimo Ridolfi, *Del modo di ottenere limpidi i vini spumanti*. Memoria del m. Cosimo Ridolfi letta all'Accademia de' Georgofili il dì 8. Luglio 1821, in: Cosimo Ridolfi, *Memoria sulla preparazione de' vini toscani*, Firenze, Guglielmo Piatti, 1821, pp.49.

<sup>84</sup> Cosimo Ridolfi, *Replica al Sig. Col. Cav. Ricci intorno al di Lui Saggio pubblicato nel fascicolo antecedente, ultimo dell'anno caduto*, "Giornale Agrario Toscano", 1831, pp.42-49.

'Iron baron', as Bettino Ricasoli was nicknamed, to erase such long-standing malpractices and impose, at least in his land holdings, the successful production of what would become the 'Chianti' wine<sup>85</sup>.

Ricasoli followed literally the indications of Cosimo Ridolfi. He firstly experimented with the grape varieties, selecting the ones he considered the best for wines that would be recognisable. His Chianti would so be simply produced with just San Giovese grapes, lightened by Canaiolo and possibly but not necessarily by Malvagia grapes<sup>86</sup>. Other innovations introduced by Ricasoli concerned the fermentation process, completed in closed barrels as in France, and the presentation of the product: the Chianti of Brolio was sold in bottles like those of the best French wines.

France, indeed, would be the constant reference model for Bettino Ricasoli as it had been for Cosimo Ridolfi. Ricasoli visited all major French wine production regions in his travel to London to visit the Universal Exhibition of 1851<sup>87</sup>. He left a diary with his personal notes on all vineyards he visited<sup>88</sup>. The future prime minister of Italy humbly waited hours and sometimes days to be admitted in the presence of those merchants that in France organised the production and the commercialisation of wines. Content to eat a quick soup or a mere broth, he enthusiastically reported all novelties and improvements that he experienced in his visits. He concluded: "In considering all the visited vineyards, their locations, the care in which they are maintained, we are astonished by the variety of products, all excellent, and all with their own character. (...) In Burgundy, vast province, you will find the plain and the hills, well separated. Inferior as the wines of the plain are, they are gold in respect to our Tuscan ones: precious the wines of the hills. (...) how can the plain produce wines so infinitely superior to the best ones of Tuscany?...Now let's proceed through Bordeaux and into Médoc. Another climate, another soil, another conformation of the region. There are no hills (...) and also there the grapes, grown upon the river, in a land conquered from the river, named Petrus, produce a wine of such a higher quality in respect to our best? And that it should be better is a surprise, given that our wines are of no value if not from vines grown on the sunlit slopes of the hills. Now to the Languedoc. Here the hill is distanced from the sea at least a league and on this slope the water runs towards the sea and all is vineyards: here the Frontignan, there the Lunel, here the Clairette and finally

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<sup>85</sup> See: Zeffiro Ciuffoletti, *Alla ricerca del "vino perfetto": il Chianti del barone di Brolio: Ricasoli e il Risorgimento vitivinicolo italiano*, Firenze, L. S. Olschki, 2009.

<sup>86</sup> The famous recipe of the Chianti was penned down firstly in a personal note of the Baron of the 7 October 1871 (Giuliana Biagioli, *Il modello del proprietario imprenditore nella Toscana dell'Ottocento: Bettino Ricasoli. Il patrimonio, le fattorie*, Firenze, L. S. Olschki, 2000, p.354), the following year in a letter written by Bettino Ricasoli to Cesare Studiati, professor of agronomy in Pisa. The letter is now republished along with all correspondence between Ricasoli and Studiati in: Zeffiro Ciuffoletti, *Alla ricerca del "vino perfetto": il Chianti del barone di Brolio: Ricasoli e il Risorgimento vitivinicolo italiano*, Firenze, L. S. Olschki, 2009.

<sup>87</sup> See. Giuliana Biagioli, *Il modello del proprietario imprenditore nella Toscana dell'Ottocento: Bettino Ricasoli. Il patrimonio, le fattorie*, Firenze, L. S. Olschki, 2000, pp.343-349; Gilbert Garrier, *Un baron toscain dans les vignes francaises: Bettino Ricasoli (septembre - octobre 1851)*, in Marcella Díaz-Rozzotto (ed.), *Hommage à Jacqueline Brunet*, Besançon, Diffusion Les Belles Lettres, 1997, pp. 303-309.

<sup>88</sup> Archivio di Stato di Firenze (ASF), Ricasoli Carteggio, A1 Diari, n.4.

there a strong red wine, fragrant, ruby in colour, durable and ever better with the passing of time, loose and spirited. (...) The Beaujolais is a dry region with well sunlit hills. It is easily comprehensible that their products should be excellent. Nonetheless, the quality of the Hermitage, of the Côte-Rôtie and of the Beaujolais is not so far from certain Tuscan wines as to vanquish every hope of producing a similar quality even with different grapes. Less hope is given in regard to wine of the Côte d'Or and of Médoc, of first and second quality, the Frontignan and the Lunel. The fragrance, the grace, the taste of these wines are characteristics that kill every hope of ever equalling them”<sup>89</sup>.

In awe as he was of the quality of French wines, the recipe for a successful wine making that Ricasoli gathered in his learning trip though France had nothing of particularly exceptional:

“The wine growers and the winemakers all agree that:

- 1) The soil must always be turned over so that the air can reach the roots and this is the first condition to have healthy and productive vines
- 2) Vines must be fertilised, but too much fertilising can damage the quality of wine; even without fertilising the vine lives long and well, but a continuous and intelligent care must never be missed. This is the basic principle of viticulture
- 3) Wines must be decanted two times a year for the first three to five years”<sup>90</sup>

Inspired by this experience, Ricasoli dedicated 25 years to recreate in Brolio what he had learnt in France. He imposed strict procedures in regard to the care of vines to the sharecroppers of his ‘poderi’ and instructed the administrators of the ‘fattorie’ to have them implemented at all times and with no exceptions. Much work was dedicated from then on to the accurate hoeing of the vines, to their trimming and to the timely harvesting of grapes. Further attention was given to the selection of the grapes after harvest, while the entire vinification process was done directly by the baron and registered in every detail in numerous booklets<sup>91</sup>.

The value of Ricasoli’s work was immediately recognised. Already in 1861, the oenologist Egidio Pollacci praised the wines of Brolio as being the only ones, in Italy, that could compete with the best French ones and with those produced on the Rhine river. The high quality of the Ricasoli wines lied in the harmony of the various components that guaranteed the excellency of taste<sup>92</sup>. In the 1870s the Ricasoli wines, in certain cases aged more than ten years won prices and medals in Italy and abroad, specifically for having

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<sup>89</sup> Archivio di Stato di Firenze (ASF), Ricasoli Carteggio, A1 Diari, n.4, pp. 145-147.

<sup>90</sup> Ibid.

<sup>91</sup> The most important facts and information in regard to every year’s vinification, between 1851 and 1876 were collected by Bettino Ricasoli in a folder, titled ‘Storia della cantina di Brolio’ (ASF, Ricasoli, CARteggio, F1, n. 18).

<sup>92</sup> Egidio Pollacci, *Analisi chimica dei vini della provincia senese seguita da nozioni pratiche sulla preparazione dei vini comuni, degli aleatici, e dei vini santi del prof. Egidio Pollacci*, Siena, Ignazio Gati libraio-editore, 1861, p.58.

improved their organoleptic characteristics with the passing of time. With the appreciation came also the diffusion of the Ricasoli recipe among the other producers of the region. Soon the entire production process was adopted, with minor variations, in the whole Chianti, coming to define the recognisability of its wine.

A century after the *Riflessioni sopra la poca durata dei moderni vini di Toscana* by Giovanni Targioni Tozzetti<sup>93</sup>, Bettino Ricasoli had apparently solved the major problems of Tuscan winemaking as identified by the *Accademia dei Georgofili*: low quality and short duration. What could still hinder this high-quality wine from becoming one of the main export articles of Tuscany?

Ricasoli himself, as Ridolfi had done, dedicated much attention to the export of his wines. In 1868, he sent some barrels to South America and had them sent back to Italy in 1870, so that he could test the quality of the wine after two passages over the Atlantic Ocean. In the 1860s, he also sent his wines to England, Prussia and the United States, this time to be sold. The results, though, were not satisfying. Even he, Schumpeterian entrepreneur as no other in Tuscan winemaking, was defeated by the problems so clearly identified by Gino Capponi. He wrote in a letter the 30 April 1872: “As to wines, a real international commerce needs, to progress, the uniformity and constancy of the wine; and this cannot be achieved without great industrial factories in which to dedicate to wine all the work and time necessary to produce it in accordance to the taste of the foreign markets. The House Ingham is proof of this. The landowners can only begin the work, but the same must be finished by the commercial establishment. The landowner must sell the wine immediately, when it is still raw, four or five months after the harvest; then it becomes property of the trading and manufacturing company that completes the work having the necessary capital, knowledge and information”<sup>94</sup>.

As early as in 1835, Bettino Ricasoli himself had founded a “Società Enologica Toscana”<sup>95</sup>, with friends, relatives and merchants of Livorno<sup>96</sup> to “diffuse the education among peasants, find a sale market for the wine of lower quality, validate on wider markets those wines of higher quality that did not find appreciation on foreign markets and therefore could not be sent abroad. Further to distil all those wines that could not aspire to any other use, condition all the good wines so that they could be sold abroad, produce high quality wines buying directly the grapes and processing them with particular techniques”. Ambitious as the

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<sup>93</sup> L'intervento, tenuto ai Georgofili nel 1770, fu pubblicato nel primo numero degli Atti dell'Accademia nel 1791 (Giovanni Targioni Tozzetti, *Riflessioni sopra la poca durata dei moderni vini di Toscana. Lezione I*, “Atti della Real Società economica di Firenze ossia de' Georgofili”, vol. I, 1791, pp.94-137; *Riflessioni sopra la poca durata dei moderni vini di Toscana. Lezione II*, “Atti della Real Società economica di Firenze ossia de' Georgofili”, vol. I, 1791, pp.138-167).

<sup>94</sup> Bettino Ricasoli, *Lettere e documenti*, vol.10, Firenze, Successori Le Monnier, 1895, p.257

<sup>95</sup> ASF, Ricasoli, Carteggio, H1 Società Enologica.

<sup>96</sup> The board was composed by: Barone Bettino Ricasoli, Leopoldo Pelli-Fabbroni, Vincenzo Brocchi, Antonio Guazzesi, Antonio Sperra and Giacomo Tough. The wine manufacture should have been managed by Vincenzo Peruzzi, the distillery by Cosimo Ridolfi, and the trading bank by Giuseppe Ambron. ASF, Ricasoli, Carteggio, H1 Società Enologica, n.1.

plan was, it soon collapsed. Tuscan wines, albeit being of low quality, were much too expensive to find a market abroad, even grapes were sold at prices that made their processing unprofitable.

Almost forty years after that first clumsy attempt, Bettino Ricasoli was still aware, as Ridolfi and Capponi had been, of the necessity of more specialisation in the Tuscan wine industry, to make local wines exportable. He was also aware, though, that an exportable mass production implied common rules, quality checks and cooperation among Tuscan wine producers to create widely recognisable and recognised wines at competitive prices. A utopia, even in 1870s. In all the years spent at Brolio implementing good practices among his sharecropping peasants Ricasoli lamented that not even his relatives would follow his example and abide to the simple rules he tried to spread in his neighbourhood<sup>97</sup>. Not much had changed in this regard after the Italian unification process.

In vain did Vittorio degli Albizi<sup>98</sup>, returned in Italy from France, where his family owned a major winemaking estate in Burgundy, speak in front of the *Accademia dei Georgofili* in favour of turning viticulture into a monoculture practiced in dedicated vineyards<sup>99</sup>. The agrarian enquiry, launched by the Italian government after unification and completed in 1880, photographed a Tuscany where cultivations had been further extended in respect to the cadastre data of 1834, covering 51% of all the surface of Tuscany (Tab.5). All the while techniques remained the same and the mixed cultivation continued to be practiced widely. The 'vigne alla francese', monocultures of vines, were still a rarity in the Tuscan landscape. The kicking off of Tuscan viticulture would have to wait the 1960 and successful entrepreneurial stories as those of Cosimo Ridolfi and Bettino Ricasoli were destined to be an exception in 19<sup>th</sup> century Tuscan winemaking.

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<sup>97</sup> Giuliana Biagioli, *Il modello del proprietario imprenditore nella Toscana dell'Ottocento: Bettino Ricasoli. Il patrimonio, le fattorie*, Firenze, L. S. Olschki, 2000, p.352.

<sup>98</sup> Zeffiro Ciuffoletti, *I pionieri del Risorgimento vitivinicolo italiano*, Firenze, Edizioni Polistampa, 2006, pp.29-31.

<sup>99</sup> *Sulla produzione del vino in Italia. Memoria letta dal Socio ordinario March. Vittorio Degli Albizi nelle adunanze ordinarie del di 7 Aprile e 21 Luglio 1807*, Firenze, Cellini, 1867.

**Tab. 5 Comparison between the cadastre data (1817-1834) and the data resulting from the Agrarian Enquiry in 1880<sup>100</sup>**

	Cadastre (1817-1834)				Agrarian inquiry 1880			
	Cultivated area %	Woods %	Uncultivated area %	Buildings, water and streets %	Cultivated area %	Woods %	Uncultivated area %	Buildings, water and streets %
Florence	38	35	22	5	46	27	22	5
Arezzo	38	30	28	4	49	24	22	5
Siena	42	33	21	4	50	29	17	4
Pisa	40	30	23	5	63	20	12	5
Leghorn	40	40	17	3	53	22	19	6
Lucca					55	38	2	5
Total	40	33	23	4	51	26	18	5

<sup>100</sup> Elaboration of data in: G. M. Mazzini, *Atti della giunta per la inchiesta agraria sulle condizioni della classe agricola. Vol. III, fasc. I. La Toscana agricola*, Roma, Forzani e C, Tipografi Del Senato, 1881, pp. 142-143.