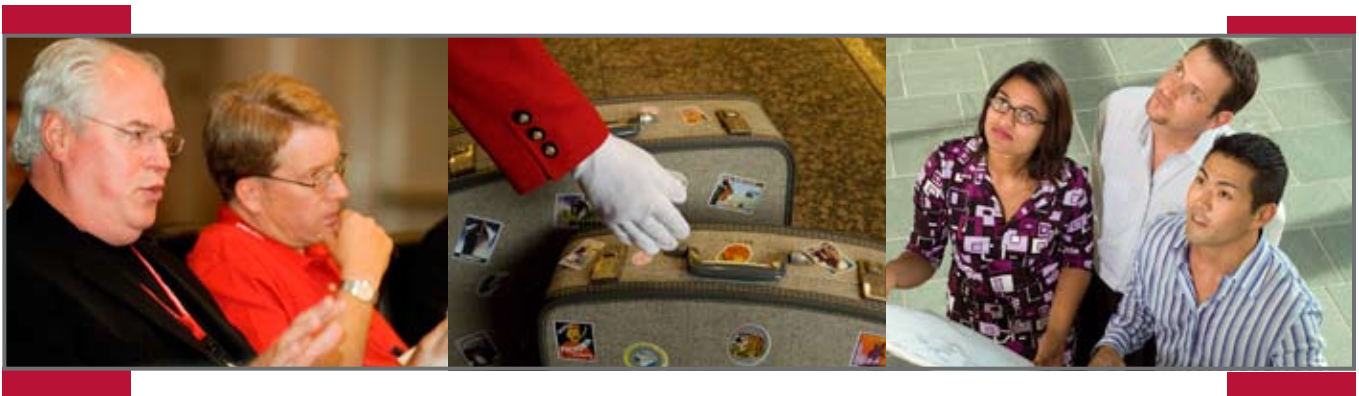


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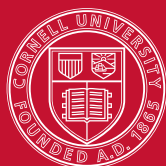


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Cornell Hospitality Report

by Gary M. Thompson, Stephen A. Mutkoski,
Youngran Bae, Liliana Ielacqua, and Se Bum Oh

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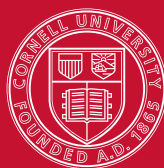
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EXECUTIVE SUMMARY

The French châteaux producing Bordeaux wines were classified by rank in 1855, creating a taxonomy that continues in force to the present day. An analysis of the ratings of vintages from 1970 to 2005 from three popular rating sources—Robert Parker, Stephen Tanzer, and *Wine Spectator*—provides a lens into the status of that 1855 Classification, as well as allows a comparison of those three raters. The analysis found considerable internal consistency in the three rating sources and a high degree of correlation between those experts' ratings. However, the raters differ systematically in the scores they assign. This study is based on 399 combinations of château and vintage for the “classified growths” for which we were able to find ratings from all three sources. We identify the top-rated years and top-rated châteaux, and compare this information to the 1855 Classification. Given our findings we propose an update to the 1855 Classification that incorporates the ratings we examine. To begin with, several châteaux showed remarkable staying power over the intervening 150 years. However, some châteaux had advanced in the rankings, while others have faded, at least based on this sample of vintages. Notable changes include Château Leoville-Las-Cases (Saint-Julien) moving from second to first growth, replacing Château Mouton-Rothschild (Pauillac), and two châteaux moving from the fifth growth to the second growth: Château Lynch-Bages (Pauillac) and Château Pontet-Canet (Pauillac). Market prices of the 2005 vintage tend to support our findings. For example, as of early May 2008, the price of the Château Leoville-Las-Cases (Saint-Julien) was about three times that of the other nominally second-growth wines. While we believe it is unlikely that the classification will be changed, we believe that our proposed classification update (and our rank-ordering of the châteaux) can help guide wine purchase decisions of consumers and the restaurant industry.

ABOUT THE AUTHORS

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“Foodservice Management Systems: Issues and Concepts,” and “Foodservice Management Systems: Operations,” he also serves as a food and beverage management consultant to several hotel, restaurant, airline and cruise line companies. In 2006 the European Wine Council honored Mutkoski with its Wine Educator of the Year award.



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Bordeaux wine is perhaps the epitome for wine lovers, particularly those wines from the Médoc in France. Bordeaux is the largest fine-wine producing region in the world, and its products dominate both the futures market and the auction market for fine wine. This region is known for the quality and longevity of its red wines, which are blended from the grapes of Cabernet Sauvignon, Merlot, Cabernet Franc, Petit Verdot, Malbec, and Carmenère. When the ideal conditions materialize—just the right amount of rainfall at the right times and warm to hot weather—as they did in 1982, for example, the wines can be legendary.

EXHIBIT 1

1855 Classification of Bordeaux wine producers

Growth	Château
First Growth	Haut-Brion (Pessac)
	Lafite-Rothschild (Pauillac)
	Latour (Pauillac)
	Margaux (Margaux)
	Mouton-Rothschild (Pauillac) Elevated in 1973
Second Growth	Brane-Cantenac (Cantenac-Margaux)
	Cos-d'Estournel (Saint-Estephe)
	Ducru-Beaucaillou (Saint-Julien)
	Durfort-Vivens (Margaux)
	Gruaud-Larose (Saint-Julien)
	Lascombes (Margaux)
	Leoville-Barton (Saint-Julien)
	Leoville-Las-Cases (Saint-Julien)
	Leoville-Poyferre (Saint-Julien)
	Montrose (Saint-Estephe)
	Pichon-Longueville Baron (Pauillac)
	Pichon Longueville Comtesse de Lalande (Pauillac)
	Rauzan-Gassies (Margaux)
Rauzan-Segla (Margaux)	
Third Growth	Boyd-Cantenac (Cantenac-Margaux)
	Calon-Segur (Saint-Estephe)
	Cantenac-Brown (Cantenac-Margaux)
	Desmirail (Margaux)
	d'Issan (Margaux)
	Ferrière (Margaux)
	Giscours (Labarde-Margaux)
	Kirwan (Cantenac-Margaux)
	La Lagune (Ludon)
	Lagrange (Saint-Julien)
	Langoa-Barton (Saint-Julien)
	Malescot St. Exupéry (Margaux)
	Marquis d'Alesme Becker, Margaux
Palmer (Cantenac-Margaux)	

Growth	Château
Fourth Growth	Beychevelle (Saint-Julien)
	Branaire-Ducru (Saint-Julien)
	Duhart-Milon-Rothschild (Pauillac)
	La Tour-Carnet (Saint-Laurent)
	Lafon-Rochet (Saint-Estephe)
	Marquis-de-Terme (Margaux)
	Pouget (Margaux)
	Prieure-Lichine (Cantenac-Margaux)
Fifth Growth	Saint-Pierre (St.-Julien)
	Talbot (Saint-Julien)
	Batailley (Pauillac)
	Belgrave (Haut-Médoc)
	Camensac (Saint-Laurent)
	Cantemerle (Haut-Médoc)
	Clerc-Milon (Pauillac)
	Cos-Labory (Saint-Estephe)
	Croizet Bages (Pauillac)
	Dauzac (Margaux)
	d'Armailhac (Château Mouton d'Armailhac) (Pauillac)
	Grand-Puy-Ducasse (Pauillac)
	Grand-Puy-Lacoste (Pauillac)
	Haut-Bages-Libéral (Pauillac)
Haut-Batailley (Pauillac)	
Lynch-Bages (Pauillac)	
Lynch-Moussas (Pauillac)	
Pédesclaux (Pauillac)	
Pontet-Canet (Pauillac)	
du Tertre (Margaux)	

In 1855, Bordeaux wines were categorized into five tiers, or “growths,” based on the reputation of the wines and their prevailing market prices. The ratings were part of preparations for the 1855 Universal Exposition in Paris, when the Bordeaux Chamber of Commerce commissioned the Union

of Brokers (Syndicat des Courtiers) in Bordeaux to produce a list of châteaux grouped by rank or rating. Because these brokers were the wine buyers who connected the wine producers to the merchants, they knew the properties and the wines well, and they had recorded the selling prices paid

EXHIBIT 2

Major wine-rating services

Rating Source	Robert Parker <i>The Wine Advocate</i>	Stephen Tanzer <i>International Wine Cellar</i>	<i>Wine Spectator</i>
Website	erobertparker.com	www.wineaccess.com/expert/tanzer/newhome.html	winespectator.com
Circulation (magazine or newsletter)	40,000 (web search)	Unknown	363,000 (publisher's website)
First published	1978	1985	1976

EXHIBIT 3

Raters' description of wine quality as related to rating score

Rater	Score	Description
Robert Parker	96-100	An extraordinary wine of profound and complex character displaying all the attributes expected of a classic wine of its variety. Wines of this caliber are worth a special effort to find, purchase, and consume.
	90 - 95	An outstanding wine of exceptional complexity and character. In short, these are terrific wines
	80 - 89	A barely above average to very good wine displaying various degrees of finesse and flavor as well as character with no noticeable flaws.
	70 - 79	An average wine with little distinction except that it is a soundly made. In essence, a straightforward, innocuous wine.
	60 - 69	A below average wine containing noticeable deficiencies, such as excessive acidity and/or tannin, an absence of flavor, or possibly dirty aromas or flavors.
	50 - 59	A wine deemed to be unacceptable.
Stephen Tanzer	95-100	Extraordinary
	90-94	Outstanding
	85-89	Very good to excellent
	80-84	Good
	75-79	Average
	70-74	Below average
	< 70	Avoid
Wine Spectator	95-100	Classic: a great wine
	90-94	Outstanding: a wine of superior character and style
	85-89	Very good: a wine with special qualities
	80-84	Good: a solid, well-made wine
	75-79	Mediocre: a drinkable wine that may have minor flaws
	70-74	Not recommended

for these wines for many years before preparing the official classification. With one minor change, the “1855 Classification” continues in use today, with the sixty-one châteaux on this list, often referred to as the “classified growths.” Exhibit 1, on the previous page, presents the current version of the 1885 Classification. Wine prices often follow the classifica-

tion, with the first-growth wines commanding a substantial premium over the others. For example, as of early May 2008 prices of the first-growth wines from the 2005 vintage averaged \$1,184.50 per standard (.75 litre) bottle, compared to \$145.49 for the second-growth wines.

EXHIBIT 4**Number of wines rated for each vintage**

Vintage	Number of Wines	Vintage	Number of Wines
1970	1	1996	26
1982	29	1997	29
1985	5	1998	28
1986	3	1999	33
1988	1	2000	33
1989	3	2001	36
1990	8	2002	35
1992	1	2003	38
1993	1	2004	36
1994	1	2005	27
1995	25	Total	399

EXHIBIT 5**Average ratings by growth and rater**

Growth	Robert Parker	Stephen Tanzer	<i>Wine Spectator</i>	Average
1	95.9	93.5	95.1	94.8
2	92.3	91.2	91.7	91.7
3	89.8	89.0	90.0	89.6
4	89.4	88.4	88.9	88.9
5	89.8	88.8	89.6	89.4
Average	91.0	89.9	90.7	90.5

It is widely accepted today that in any given year there are châteaux that do not produce at the level of their ranking. Some châteaux may continue to underperform for an extended period of time. Others manage to outperform their classification designation and unofficially achieve a new status within their growth designation (e.g., the “Super Seconds” and others that outperform their classification). Some perform so well that they are no longer considered by the marketplace to be in their original category. None of those changes is reflected in the 1855 Classification.

Over the years, when consumers wanted to purchase wine, they might do so based on sampling a bottle, perhaps at a restaurant, or based on listening to the recommendations of their friends. In the past thirty years, though, consumers have been able to avail themselves of wine rating services. Perhaps the best known rater is Robert Parker, who established his publication, *The Wine Advocate*, in 1978. In the opinion of many, Parker’s influence on wine

industry is far more extensive than the circulation of his newsletter would suggest, and he has been called the most “influential critic in the world today.”¹ Two other prominent rating sources are the publication *Wine Spectator*, which first appeared in 1976, and the *International Wine Cellar*, founded by Stephen Tanzer in 1985. Details on the rating sources are given in Exhibit 2.

All three of these prominent rating services rate wines on a scale in which a maximum score of 100 points is given only to “perfect” wines. (Exhibit 3 presents the scores and rating descriptions for each of the rating sources.) Each rating source charges less than \$100 per year for electronic access to its rating scores (as of this writing). The Bordeaux ratings from each source typically are based on the opinion of only one person—Robert Parker at *The Wine Advocate*, Stephen Tanzer at the *International Wine Cellar*, and James Suckling at *Wine Spectator*. While the terms the raters use varies, all three appear to agree that wines that rate 90 or higher are outstanding wines.

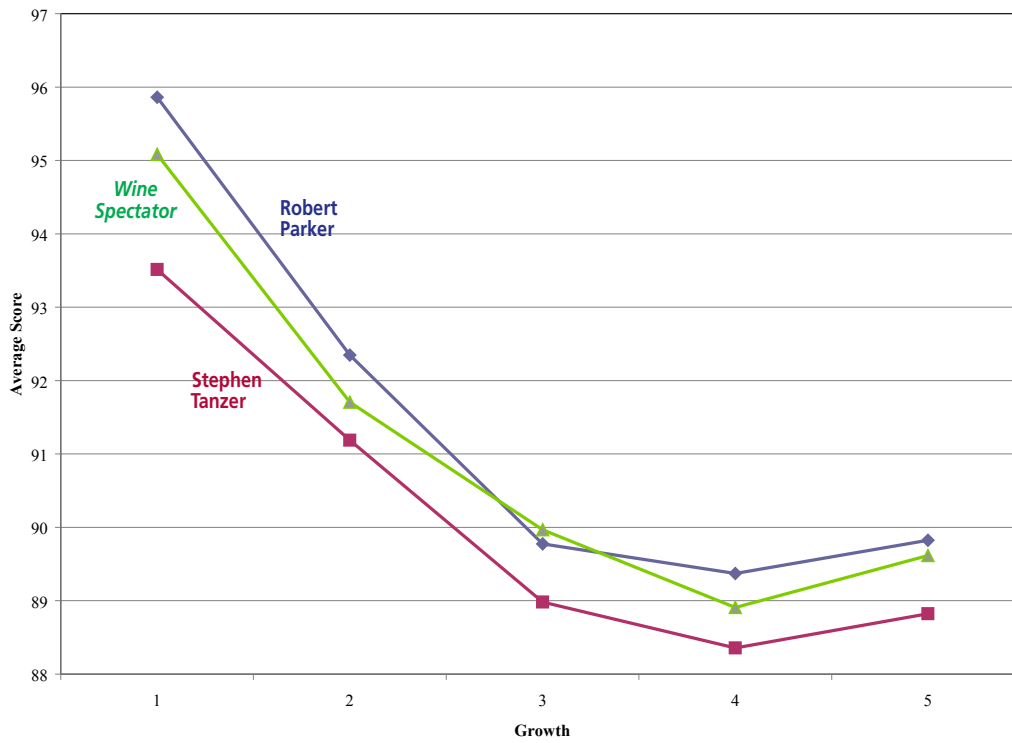
Ratings are not unimportant for wine sellers. *Wine News* writer Howard Goldberg observed: “Americans buy by the numbers—the critics’ numbers, that is. So, for the next 150 years, scholars can investigate whether, or to what degree, the vertical numerical structure and spirit of the top-down 1855 Classification has promoted the top-down 100-point grading system perpetuated by our most famous market-moving claret lover, Robert M. Parker, Jr.”² Since ratings have become so instrumental in the wine market, we investigated and report on the degree of congruence between the raters’ ratings of individual wines.

In addition to comparing the rating services, our goal for this report is to test the 19th century classification scheme by examining the ratings of Bordeaux wines from 1970 to 2005, using the scores from all three of these rating

¹ William Langewiesche, “The Million-Dollar Nose,” *The Atlantic Monthly*, Volume 286, No. 6 (December 2000), pp. 42–70.

² Howard Goldberg, in *Wine News*.

Average ratings by growth and rater, graphed



services. In doing so, we will investigate a number of questions, such as whether there are notable differences in the scores of the raters, as well as the vintages and the châteaux. After explaining our data collection and data processing efforts, we report on the wide variety of analyses we performed. We close with implications and conclusions, including a discussion of the possible extensions to this work.

Data Collection and Processing

From the web, we collected each rater's scores for the Bordeaux wines. Our goal was to collect ratings from each rating source for all of the growths from 1970 through 2005. We obtained varying numbers of scores from each source, the greatest from Robert Parker and the fewest from Stephen Tanzer. Since an important objective of our study was to examine differences among the raters, we narrowed the set of wines considered to the 399 wines for which we were able to obtain ratings from all three raters (see Exhibit 4, on the previous page). Vintages from 1995 onwards are well represented in the data set, while earlier vintages are not so. For example, we have common ratings from 27 of the 61 classified growth wines from the 2005 vintage. One exceptional year is 1982, which we believe is strongly represented because of its reputation as a stellar vintage.

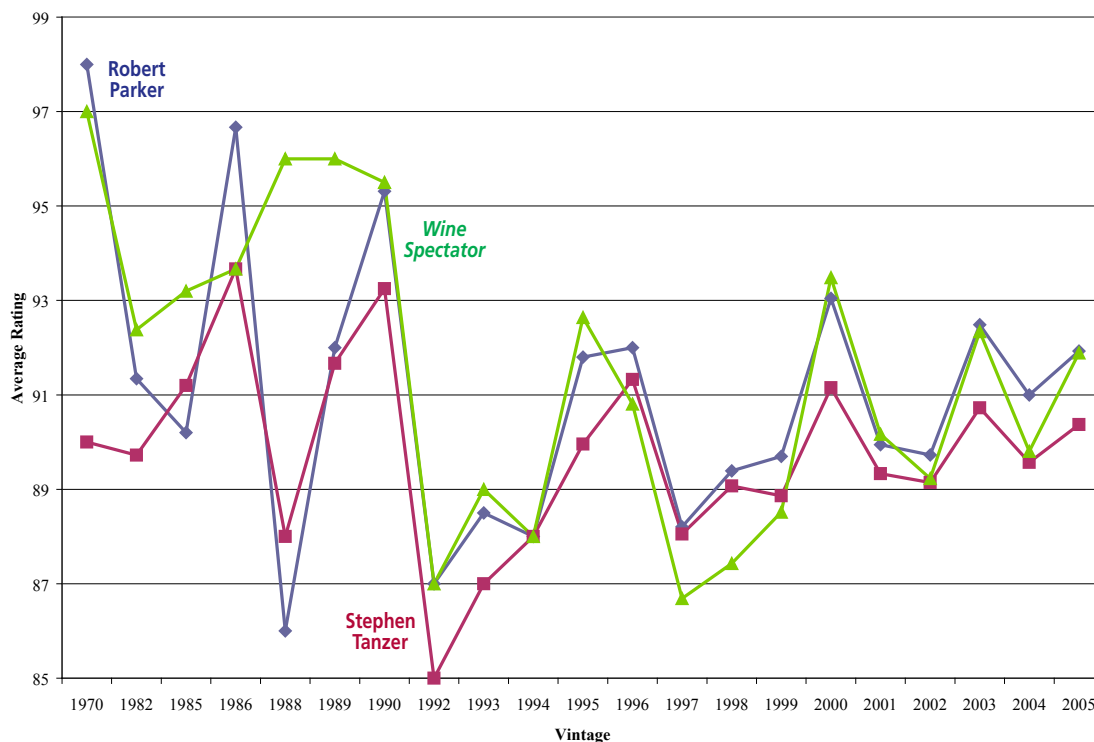
In some cases we have multiple ratings of the same wine from the same rating source. For all of the analyses we performed, we used the highest of the rated scores. This is akin to considering the wine at its peak.

Wine Rating Analyses

Comparing the raters. Exhibit 5, also on the previous page, summarizes the average rating scores by rater and growth for the 399 wines in our data set. Ratings of the first growths are typically higher than those of the second growths, which in turn are greater than those of the third growths. However, the ratings of the third, fourth, and fifth growths appear to be quite similar. In general, Robert Parker gives the highest average scores, while the lowest scores come from Stephen Tanzer. Exhibit 6 presents much of the data reported in Exhibit 5 in a graphic form, emphasizing both the differences and similarity between the raters.

Comparing raters' consistency. We examined several aspects of the data set to get a sense of congruence of the ratings. Exhibit 7 shows the average rating, by rater and by vintage. The average rating for each vintage is obtained by averaging the scores for all the particular wines in the data set for that vintage (for each rater). While it may appear that there are more discrepancies in ratings prior to 1995, it

Average ratings by vintage and rater, graphed



is important to recall that the earlier vintages were underrepresented in our data set (again, see Exhibit 4).

Exhibit 8 illustrates the average rating for the three raters by château (overleaf). In total, 44 of the 61 classified growths are represented in the data set, while the other 17 classified growths are absent because we were unable to obtain common ratings for them. Each data point in Exhibit 8 represents an average of the ratings from all the vintages for the specific classified growth (for each rater). We believe that the degree of consistency in ratings demonstrated by this exhibit is striking. While it may seem unusual to display these data as a line chart (compared to a column chart, for example), we believe that the lines better display the raters' scoring consistency for each château.

To further explore the consistency between raters, we examined the correlations of their ratings (presented in Exhibit 9, also on the next page). Robert Parker and *Wine Spectator* have the highest correlation, at 0.84. Even the lowest correlation in ratings, 0.71 between Stephen Tanzer and *Wine Spectator*, is still a high level of correlation. These correlations are quite remarkable, given, as we noted earlier, that the ratings from each source come from the opinion of only a single person. One possible explanation for the consistency across raters is that the wines themselves have intrinsic

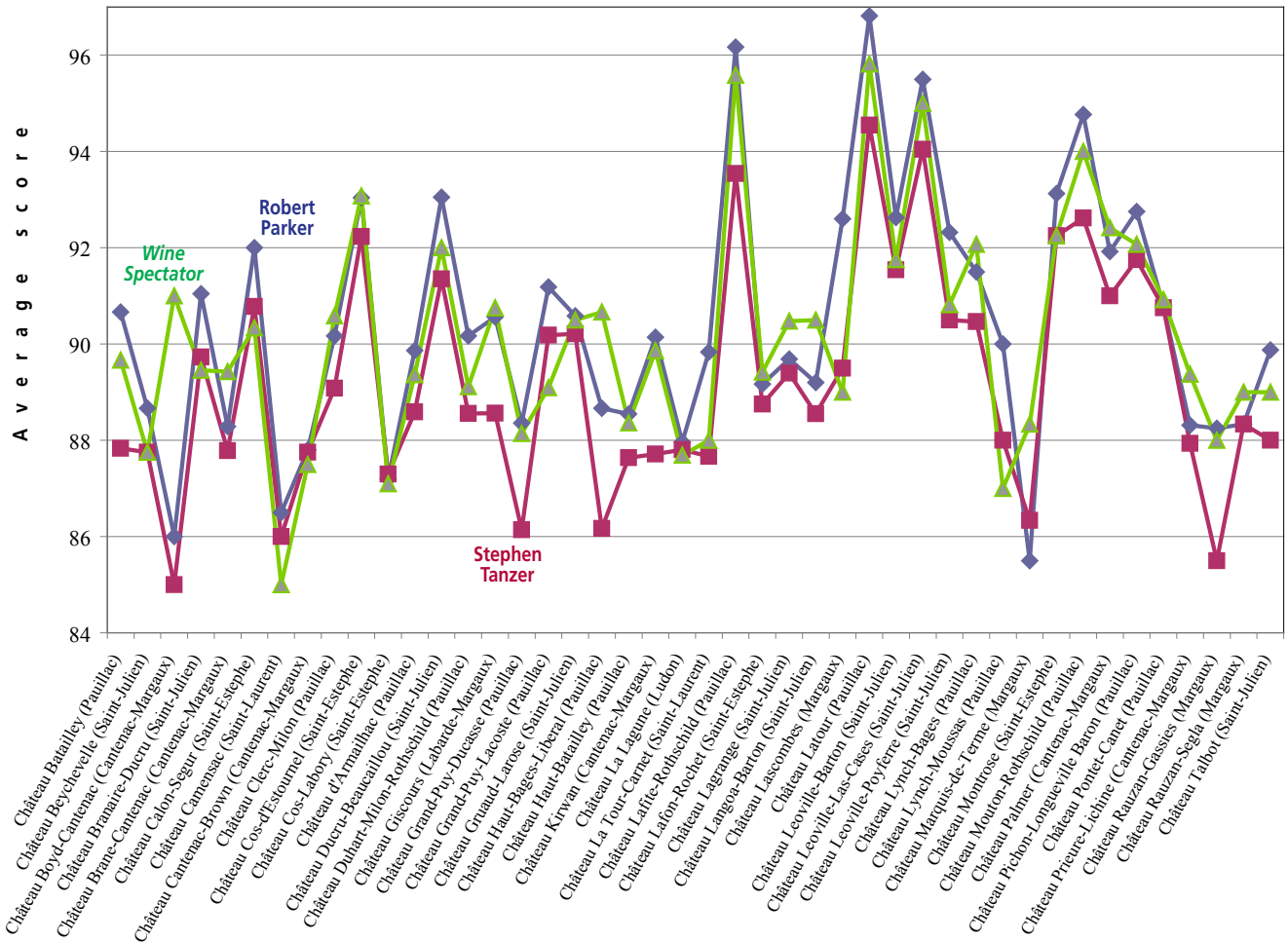
characteristics that the raters are capturing in their scores. Further, it would be a necessity that the raters are keying off the same (or related) intrinsic characteristics of the wines.

Regression analysis. To test the mathematical relationships between the ratings and determinant factors, we developed a regression model with the rating score as the dependent variable. The independent variables included the raters, the vintages, and the châteaux. We arbitrarily chose Robert Parker as the reference rater (simply because he is first alphabetically), and used binary coding variables to represent the scores of Stephen Tanzer and *Wine Spectator*. Since a number of vintages had low representation in our data set, we combined those vintages (i.e., 1970, 1986, 1988, 1989, 1992, 1993, and 1994) as the reference, and then used binary coding variables to represent the other vintages. The reference château was also chosen arbitrarily on the basis of alphabetical order, namely, Château Batailley (Pauillac). We then used binary coding variables for the other châteaux. The results of our regression analysis are presented in Exhibit 10, overleaf. The model, which included a total of 59 independent variables, explained a respectable 64.7 percent of the variation in the ratings.

Comparing vintages. The regression results with respect to the vintages, in descending order of rating ef-

EXHIBIT 8

Wine ratings by château



fect are presented in Exhibit 11. These results indicate that, based on the 399 wines in our data set, four vintages—1990, 2000, 2003 and 2005—had higher ratings than the reference vintages, and that difference was statistically significant. The 1990 vintage received the highest scores, with ratings 2.1 points higher than that of the reference years. Ratings for 2005 and 2000 were each 1.7 points higher than that of the reference years, while 2003 averaged 1.2 points higher. The surprise here is that the legendary 1982 vintage did not emerge as being better than the reference vintages. Indeed, ratings for the vintages of 1982, 1985, 1995, 1996, 2001, and 2004 were statistically indistinguishable from those of the reference vintages. In general, wine aficionados tend to consume lower rated wines sooner than they do higher rated wines, since it is often the higher-rated wines that are also more cellar worthy. Four vintages—1997, 1998, 1999 and 2002—had statistically significant, and lower, ratings than

EXHIBIT 9

Wine rating correlations

	Robert Parker	Stephen Tanzer
Stephen Tanzer	0.844	1
Wine Spectator	0.711	0.706

the reference vintages. Our data suggest that the late 1990s was far from a peak period for Bordeaux wines!

Comparing the raters, revisited. The regression results provide additional insights into the differences in ratings among the rating sources. On average, *Wine Spectator* ratings were 0.33 points below those of Robert Parker, a statistically significant difference. Stephen Tanzer was the most

EXHIBIT 10

Regression results for score, as a function of rater, vintage, and château

Château	Coefficient
Château Beychevelle (Saint-Julien)	-0.07423
Château Boyd-Cantenac (Cantenac-Margaux)	-1.30829
Château Branaire-Ducru (Saint-Julien)	2.138382**
Château Brane-Cantenac (Cantenac-Margaux)	0.096076
Château Calon-Segur (Saint-Estephe)	2.67896***
Château Camensac (Saint-Laurent)	-0.53678
Château Cantenac-Brown (Cantenac-Margaux)	-0.3567
Château Clerc-Milon (Pauillac)	1.81466*
Château Cos-d'Estournel (Saint-Estephe)	4.591962***
Château Cos-Labory (Saint-Estephe)	-0.66695
Château d'Armailhac (Pauillac)	1.189474
Château Ducru-Beaucaillou (Saint-Julien)	4.167746***
Château Duhart-Milon-Rothschild (Pauillac)	1.045428
Château Giscours (Labarde-Margaux)	1.315212
Château Grand-Puy-Ducasse (Pauillac)	-0.86648
Château Grand-Puy-Lacoste (Pauillac)	2.062719**
Château Haut-Bages-Liberal (Pauillac)	-0.88889
Château Haut-Batailley (Pauillac)	0.098564
Château Kirwan (Cantenac-Margaux)	0.3176
Château La Lagune (Ludon)	-0.33657
Château La Tour-Carnet (Saint-Laurent)	0.022266
Château Lafite-Rothschild (Pauillac)	7.12018***
Château Lafon-Rochet (Saint-Estephe)	0.981327
Château Lagrange (Saint-Julien)	1.455002*
Château Langoa-Barton (Saint-Julien)	1.376638
Château Lascombes (Margaux)	1.669799*
Château Latour (Pauillac)	7.316635***
Château Leoville-Barton (Saint-Julien)	3.99518***
Château Leoville-Las-Cases (Saint-Julien)	6.716867***
Château Leoville-Poyferre (Saint-Julien)	3.28122***
Château Lynch-Bages (Pauillac)	3.009862***
Château Lynch-Moussas (Pauillac)	-1.98417
Château Marquis-de-Terme (Margaux)	-1.82284
Château Montrose (Saint-Estephe)	4.174516***
Château Mouton-Rothschild (Pauillac)	5.604782***
Château Palmer (Cantenac-Margaux)	3.647993***
Château Pichon-Longueville Baron (Pauillac)	3.848429***
Château Pontet-Canet (Pauillac)	2.68966***
Château Prieure-Lichine (Cantenac-Margaux)	-0.10145
Château Rauzan-Gassies (Margaux)	-0.44445
Château Rauzan-Segla (Margaux)	2.549624**
Château Talbot (Saint-Julien)	0.525095

Château	Coefficient
Intercept	89.0638***
Stephen Tanner	-1.12281***
<i>Wine Spectator</i>	-0.33459*
1982	0.063625
1985	-0.0934
1990	2.075254***
1995	-0.0625
1996	0.002653
1997	-3.63182***
1998	-2.20789***
1999	-1.87649***
2000	0.668287***
2001	-0.77314
2002	-0.99396*
2003	1.22199**
2004	-0.52882
2005	1.739505***

Notes: *Significant at alpha = 0.05; **significant at alpha = 0.01 level; ***significant at alpha = 0.001 level.

EXHIBIT 11

Vintage score differences

Vintage	Mean Score Difference
1990	2.1***
2005	1.7***
2000	1.7***
2003	1.2**
1982	0.1
1996	0.0
1995	-0.1
1985	-0.1
2004	-0.5
2001	-0.8
2002	-1.0*
1999	-1.9***
1998	-2.2***
1997	-3.6***

Notes: *Significant at alpha = 0.05; **significant at alpha = 0.01 level; ***significant at alpha = 0.001 level.

Bordeaux wine consumers should not compare scores from one rating service to the other, but should choose the rater who best matches their own tastes.

conservative rater of all, with average ratings 1.12 points below those of Robert Parker, a difference that was also statistically significant.

Reconsidering the 1855 Classification. The regression results are also useful for ranking the châteaux, as reported in Exhibit 12. The “Rating Difference” column represents the rating score differential of the châteaux compared to the reference, Château Batailley (Pauillac). Exhibit 12 also places the châteaux in what we have termed the “2008 Classification,” based on their rating scores. For consistency, we assume that each growth in the 2008 Classification will contain the same number of châteaux as did the 1855 Classification. For example, since only three of the 1855 first-growth châteaux were represented in our dataset, we thus limit the 2008 classification to three first-growths. One could argue that with investment in technology, along with improved vineyard management and wine making decisions that there would be the potential for more châteaux to reach first- or second-growth quality and status. One could also propose that some of the châteaux that did not make it into the 1855 Classification produce at a level today which would clearly make them eligible should the classification be revised. While we recognize that a major shakeup of the 1855 Classification is unlikely to occur, in reality the market is already considering these changes, as indicated by the relative prices of wine from the various châteaux.

Based on the rating performance of the wines in our data set, a number of châteaux would be rated higher in the 2008 Classification than they had been in the 1855 Classification. Château Leoville-Las-Cases (Saint-Julien) advances to the first growth from the second, Château Palmer (Cantenac-Margaux) and Château Calon-Segur (Saint-Estephe) also advance, from the third growth to the second, and Château Lynch-Bages (Pauillac) and Château Pontet-Canet (Pauillac) make large jumps from the fifth growth to the second. Also advancing are Château Grand-Puy-Lacoste (Pauillac), Château Clerc-Milon (Pauillac), and Château d’Armailhac (Pauillac), which rise from the fifth to the third growth; Château Branaire-Ducru (Saint-Julien), advancing from the fourth to the third growth; and Château Haut-

Batailley (Pauillac) and Château Batailley (Pauillac), which rise from the fifth to fourth growths. Due to the zero-sum nature of this classification, if some châteaux are moving up in the ratings, others must see declining ratings. In total, the revised classification shows one château dropping three growths, four châteaux dropping two growths, and seven châteaux dropping one growth. We should note, however, that since we limited our study to wines with common ratings, our data set included information on only forty-four of the sixty-one classified growths. As such, these changes may appear more extreme than they would have been had all sixty-one châteaux been considered. Nonetheless, our results suggest that twenty-three of the forty-four classified growths in our data set could be misclassified. In light of these findings, it is quite apparent that the 1855 Classification is out of date, and consumers should be wary of relying on it for their wine purchasing decisions. Our findings offer strong, scientific support for what has been recognized for at least two decades, as written by Frank J. Prial: “There are fourth and fifth growths that should be seconds and thirds; alternatively, there are highly rated properties that should be demoted.”³

The wine market provides evidence supporting at least three of the classification changes reported in Exhibit 12. Château Leoville-Las-Cases (Saint-Julien), which we place in the revised first growth, sells at over three times the average price of the other 1855 second growths (based on data collected in early May 2008 for the 2005 vintage). Even at this premium, however, Château Leoville-Las-Cases (Saint-Julien) is only about one-third as expensive as the 1855 first-growths. Given that its rating is close to the 1855 first-growths in our data set, Château Leoville-Las-Cases (Saint-Julien) must be viewed as a relative bargain. As further support for our findings, as of early June 2005 the average price of standard bottles of Château Lynch-Bages (Pauillac) and Château Pontet-Canet (Pauillac)—the châteaux our findings would have moved from the fifth to the second growth—was 2.6 times higher than the average price of standard bottles of the other 1855 fifth-growth châteaux.

³ Frank J. Prial, “Wine: The Battle of 1855,” *The New York Times*, August 20, 1989.

EXHIBIT 12
Proposed reclassification based on ratings analysis

2008	1855	Change	Château	Rating Difference
1	1		Château Latour (Pauillac)	7.32***
1	1		Château Lafite-Rothschild (Pauillac)	7.12***
1	2	+1	Château Leoville-Las-Cases (Saint-Julien)	6.72***
2	1	-1	Château Mouton-Rothschild (Pauillac)	5.60***
2	2		Château Cos-d'Estournel (Saint-Estephe)	4.59***
2	2		Château Montrose (Saint-Estephe)	4.17***
2	2		Château Ducru-Beaucaillou (Saint-Julien)	4.17***
2	2		Château Leoville-Barton (Saint-Julien)	4.00***
2	2		Château Pichon-Longueville Baron (Pauillac)	3.85***
2	3	+1	Château Palmer (Cantenac-Margaux)	3.65***
2	2		Château Leoville-Poyferre (Saint-Julien)	3.28***
2	5	+3	Château Lynch-Bages (Pauillac)	3.01***
2	5	+3	Château Pontet-Canet (Pauillac)	2.69***
2	3	+1	Château Calon-Segur (Saint-Estephe)	2.68***
2	2		Château Rauzan-Segla (Margaux)	2.55**
3	2	-1	Château Gruaud-Larose (Saint-Julien)	2.27**
3	4	+1	Château Branaire-Ducru (Saint-Julien)	2.14**
3	5	+2	Château Grand-Puy-Lacoste (Pauillac)	2.06**
3	5	+2	Château Clerc-Milon (Pauillac)	1.81*
3	2	-1	Château Lascombes (Margaux)	1.67*
3	3		Château Lagrange (Saint-Julien)	1.46*
3	3		Château Langoa-Barton (Saint-Julien)	1.38
3	3		Château Giscours (Labarde-Margaux)	1.32
3	5	+2	Château d'Armailhac (Pauillac)	1.19
4	4		Château Duhart-Milon-Rothschild (Pauillac)	1.05
4	4		Château Lafon-Rochet (Saint-Estephe)	0.98
4	4		Château Talbot (Saint-Julien)	0.53
4	3	-1	Château Kirwan (Cantenac-Margaux)	0.32
4	5	+1	Château Haut-Batailley (Pauillac)	0.10
4	2	-2	Château Brane-Cantenac (Cantenac-Margaux)	0.10
4	4		Château La Tour-Carnet (Saint-Laurent)	0.02
4	5	+1	Château Batailley (Pauillac)	0.00
5	4	-1	Château Beychevelle (Saint-Julien)	-0.07
5	4	-1	Château Prieure-Lichine (Cantenac-Margaux)	-0.10
5	3	-2	Château La Lagune (Ludon)	-0.34
5	3	-2	Château Cantenac-Brown (Cantenac-Margaux)	-0.36
5	2	-3	Château Rauzan-Gassies (Margaux)	-0.44
5	5		Château Camensac (Saint-Laurent)	-0.54
5	5		Château Cos-Labory (Saint-Estephe)	-0.67
5	5		Château Grand-Puy-Ducasse (Pauillac)	-0.87
5	5		Château Haut-Bages-Liberal (Pauillac)	-0.89
5	3	-2	Château Boyd-Cantenac (Cantenac-Margaux)	-1.31
5	4	-1	Château Marquis-de-Terme (Margaux)	-1.82
5	5		Château Lynch-Moussas (Pauillac)	-1.98

Notes: *Significant at alpha = 0.05; **significant at alpha = 0.01 level; ***significant at alpha = 0.001 level.

Another example supporting these findings comes from a tasting done by Eric Asimov, Frank J. Prial, and Florence Fabricant, all from the *New York Times*, and Jamie Ritchie, the head of Sotheby's North American wine department. In 2005 they conducted a blind tasting in which they ranked 25 classified growths from the 2001 vintage. "We found some correlation between price and quality, but not entirely," they wrote. "After all, our top wine, the Pontet-Canet from Pauillac, a great value at \$30, was not nearly the highest-priced wine in the tasting. What's more, Pontet-Canet is merely a fifth growth. How could it beat out the three first growths in our tasting, not to mention many of the other, higher-ranking estates?"⁴ Granted this tasting by four people is not a scientific study or a valid sample size, but then neither is a single wine rater's score, no matter how consistent that rater may be.

Rating inflation? The low ratings of the late 1990s and the generally high ratings of vintages in the early 2000s suggest the possibility of ratings inflation (i.e., ratings are increasing over time). To test this notion, we developed a second linear regression model that included the vintage as a linear independent variable for each rater. These variables were not significant in the resultant model, leading us to conclude that while some vintages score higher than others due to intrinsic variation in the quality of the growing seasons, there is no evidence to suggest that any of the raters have been getting more lenient (or more harsh) in their ratings over time. We note, however, that the lower representation in our data set of vintages prior to 1995 could have masked any upward or downward ratings trends.

Implications

For consumers. We see three key findings from our study. First, it should hardly be surprising that the relative rankings of the châteaux have changed in the 150 years since the 1855 Classification was established. Our results, which would have placed more than half of the châteaux in differ-

ent categories than found in the 1855 Classification, offer strong evidence that consumers should not adhere strictly to the historical classification for their purchase decisions (assuming, of course, that the consumers consider those classifications at all). Perhaps the remarkable finding relates to the first- and second-growth châteaux that retained their standing for well over a century.

A second key finding was the high levels of correlation we observed between the scores of the three rating services. This suggests that the raters agree on and are able to identify important characteristics of the wines. Thus, consumers who refer to ratings need not consult multiple sources.

That said, however, we suggest that consumers cannot compare ratings from one service to the other. We say this due to the statistically significant differences between the scores awarded by the raters. Robert Parker was the most generous in assigning scores, while Stephen Tanzer was the most conservative. Stephen Tanzer's scores were a little more than one point lower, on average, than Robert Parker's, while *Wine Spectator's* scores were about one-third of a point below Robert Parker's. While we firmly believe that these differences do not mean that one rating source is better than another, the rub comes at 90 points, which seems to be the "magic number" for wine ratings. Wines receiving that rating or higher sell out more quickly than lower-rated wines do. Moreover, some wine vendors even offer their own "ratings," and it certainly appears that the scores the vendors assign their products rarely fall below 90.

Our findings suggest, however, that not all 90-point wines are equivalent. That is, 90 points awarded by Robert Parker is not the same as 90 points from Stephen Tanzer or *Wine Spectator*. Our findings indicate, in fact, that a 90-point rating from Stephen Tanzer is approximately comparable to a 91-point rating from Robert Parker. These differences mean that consumers should consider the source of the ratings when judging whether they may wish to purchase a wine. Indeed, the differences suggest that consumers look for a rater whose tastes correspond with their own, and then put more credence on the ratings from that source. A

⁴ *The New York Times*, June 1, 2005.

Based on the rating performance of these wines, a number of châteaux would be rated higher in our “2008 Classification” than they were in 1855.

method we recommend to consumers for finding an appropriate rater is as follows. Begin by selecting a few wines. Next, give them your own personal ratings, without regard to the ratings available from rating sources. Following that, evaluate the raters’ scores to see which of them comes closest to your own assessment. Once you have established which rater is most consonant with your own tastes, you can take advantage of the extensive wine tastings made by the rating sources, and then use those ratings to inform your future wine purchase decisions.

For the hospitality industry. Our findings have interesting implications for the hospitality industry, particularly for restaurants where wine is a prominent aspect of the customer experience. We believe that it is key to understand the objective of one’s customers with respect to wine. If those customers are out to impress their friends or colleagues, a sommelier’s pitch might be based on the traditional 1855 Classification, since “first-growth” certainly sounds more impressive than “fourth-growth,” for example. However, if a restaurant’s customer is perhaps more knowledgeable about wine and recognizes that quality does not correspond perfectly with price, the sommelier’s pitch may focus on informing the customer of a “secret,” by identifying wine values (those wines offering better-than-expected quality for their price) and steering the customer away from wines that may offer lower value.

For the wine industry. Our findings regarding the accuracy of the 1855 Classification argue for reconsidering that classification. Indeed, if the 1855 Classification were to be fully reviewed, it certainly would be appropriate to broaden the set of wines beyond the set available 150 years ago. Including, for example, the well-regarded wines of the Pomerol and St. Emilion would broaden the usefulness of an updated classification.

Conclusions

Limitations. We see four noteworthy limitations to our study. First, we used ratings from only three rating services. Second, we only examined 399 combinations of château and

vintage from a total of 2,196 possible combinations. That said, our data set is more complete for 1995 onwards, where we have 346 combinations from a possible set of 671, representing more than half of the complete population of château and vintage combinations. Since we limited our study to those wines that had ratings from all three sources, we consider this to be a respectably sized sample that would yield good insight into the most recent decade of released vintages. Nevertheless, a more complete data set might yield different findings. We leave this to future research.

Third, since we limited our study to only those château and vintage combinations that had ratings from all three sources, our data set was limited to forty-four of sixty-one classified growths. As such, we do not recommend that our “2008 Classification” be considered definitive, but should be used instead to highlight the changes in the 1855 Classification.

Fourth, when a particular wine was rated multiple times by the same rating source, we selected the highest rating for our analyses. The rationale for doing so would be that that score would represent the wine at its peak. We note, though, that the results could well differ had we chosen to use the average rating or the most recent rating for each wine.

Future studies. A number of future studies are suggested by our findings. First, it would be interesting to repeat the analysis using the average or most-recent rating of each wine for each rater, to see if the results hold. Second, as we noted above, the study could be expanded to include wines that have ratings available from any of the rating sources. Third, the study could be replicated using additional rating sources. Fourth, it could be insightful to repeat the study for other wine-growing areas, for example California or Australia. Fifth, many of the wines we examined received several ratings from each rater. This commonly occurs with stellar vintages, where a wine’s development is followed through samples over time. It would be interesting to examine the evolution of those ratings over time—to see, for example, whether the ratings increase, decrease, remain stable, or have some recognizable pattern (such as an inverted U). ■

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