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Freemark Abbey Winery

In September 1976 William Jaeger, a member of the partnership that owned Freemark Abbey Winery, had to make a decision: should he harvest the Riesling grapes immediately, or leave them on the vines despite the approaching storm? A storm just before the harvest is usually detrimental, often ruining the crop. A warm, light rain, however, will sometimes cause a beneficial mold, *botrytis cinerea*, to form on the grape skins. The result is a luscious, complex sweet wine, highly valued by connoisseurs.

The Winery

Freemark Abbey was located in St. Helena, California, in the northern Napa Valley. The winery produced only premium wines from the best grape varieties. Of the 25,000 cases of wine bottled each year (about the same as Chateau Lafite-Rothschild), most were Cabernet Sauvignon and Chardonnay. About 1,000 cases of Riesling and 500 cases of Petite Syrah were also bottled. (A case contains 12 bottles of wine.)

The Napa Valley extends for 30 miles, from Calistoga in the north to Napa in the south. The average temperature decreases as one moves south, closer to San Francisco Bay and the cold ocean waters. Freemark Abbey's grapes came from an ideal climate in the central and southern parts of the valley.

Winemaking

Wine is produced when the fruit sugar, which is naturally present in the juice of grapes, is converted by yeast, through fermentation, into approximately equal molecular quantities of alcohol and carbon dioxide. Sparkling wines excepted, the carbon dioxide is allowed to bubble up and dissipate. The wine then ages in barrels for one or more years until it is ready for bottling.

By various decisions during vinification—for example, the type of wooden barrel used for aging—the winemaker influences the style of wine produced. The style adopted by a particular winery depends mainly on the owners' preferences, though it is influenced by marketing considerations. Usually, as the grapes ripen, the sugar levels increase and the acidity levels

Professor William Krasker prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

decrease. The winemaker tries to harvest the grapes when they have achieved the proper balance of sugar and acidity for the style of wine sought. The ripening process is variable, however, and if the weather is not favorable, the proper balance might never occur.

Several different styles of Riesling (more accurately, Johannisberg Riesling) are on the market. If the grapes are harvested at 20% sugar, the wine is fermented "dry" (all the sugar is converted to alcohol and carbon dioxide) or "near dry." The resulting wine, at about 10% alcohol, is light bodied. If the grapes are harvested at 25% sugar, the winemaker can produce a wine with the same 10% alcohol but with 5% residual sugar; this wine is sweet and relatively full bodied.

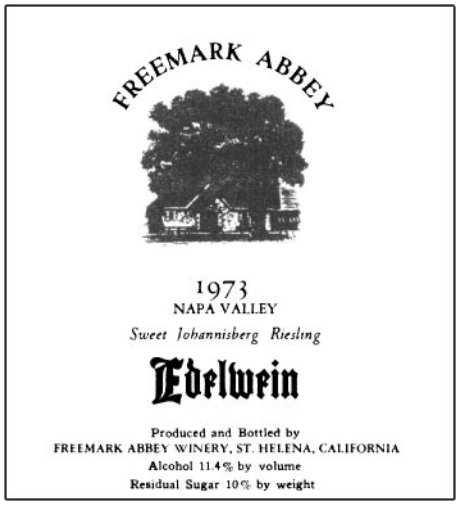
A third and rare style results when almost-ripe Riesling grapes are attacked by the *botrytis* mold. The skins of the grapes become porous, allowing water to evaporate while the sugar remains. Thus, the sugar concentration increases greatly, sometimes to 35% or more. The resulting wine, with about 11% alcohol and 13% residual sugar, has extraordinary concentration, and the *botrytis* itself adds to the wine's complexity. Freemark Abbey had already produced a *botrytised* Riesling from its 1973 vintage.

Jaeger's Decision Problem

From the weather reports, Jaeger concluded that there was a fifty-fifty chance that the rainstorm would hit the Napa Valley. Since the storm had originated over the warm waters off Mexico, he thought there was a 40% chance that, if the storm did strike, it would lead to the development of the *botrytis* mold. If the *botrytis* did not form, however, the rainwater, which would be absorbed into the grapes through the roots of the vines, would merely swell the berries by 5-10%, decreasing their concentration. This would yield a thin wine that would sell wholesale for only about $2.00 per bottle, about $0.85 less than Jaeger could obtain by harvesting the not-quite-ripe grapes immediately and eliminating the risk. Freemark Abbey always had the option of not bottling a wine that was not up to standards. It could sell the wine in bulk, or it could sell the grapes directly. These options would bring only half as much revenue, but would at least avoid damaging the winery's reputation, which would be risked by bottling an inferior product.

If Jaeger decided not to harvest the grapes immediately in anticipation of the storm, and the storm did not strike, Jaeger would probably leave the grapes to ripen more fully. With luck, the grapes would reach 25% sugar, resulting in a wine selling for around $3.50 wholesale. Even with less favorable weather, the sugar levels would probably top 20%, yielding a lighter wine selling at around $3.00. Jaeger thought these possibilities were equally likely. In the past, sugar levels occasionally failed to rise above 19%. Moreover, while waiting for sugar levels to rise, the acidity levels must also be monitored. When the acidity drops below about 0.7%, the grapes must be harvested whatever the sugar level. If this happened, the wine would be priced at only about $2.50. Jaeger felt that this event had only about .2 probability.

The wholesale price for a *botrytised* Riesling would be about $8.00 per bottle. Unfortunately, the same process that resulted in increased sugar concentration also caused a 30% reduction in the total juice. The higher price was therefore partly offset by a reduction in quantity. Although fewer bottles would be produced, there would be essentially no savings in vinification costs. The costs to the winery were about the same for each of the possible styles of wine and were small relative to the wholesale price.



Winery Label