A WINE ESTATE ON KEUKA LAKE:
PRIVATE TEACHING AND PUBLIC TOURING

by

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This thesis proposes a large wine estate on the shores of one of New York's Finger Lakes. The estate's prominent location on Bluff Point demands an architecture that reinforces the vineyard's highly visible regional presence. Not only a winery, this estate includes a teaching center for viticulture, allowing continual vineyard experimentation. The public is encouraged to tour the estate, and is courted with a restaurant and tasting facility.

Over a five year period, 50 acres of vineyards on the 200 acre property would be phased in, producing 10,000 cases yearly. Further expansion is anticipated in ten years.

The traditional rituals of the wine harvest provide the ideas behind the architecture of the estate. The project explores transformations as a way to honor these traditions, extending outward on the site to redefine the vineyard as massive terraces. Inside the winery, the transformation of grapes to wine is sequenced from one level to another, allowing the architecture to reinforce the theme of procession that already is established on the site.
The choice of a wine estate as a thesis project provides a rich metaphorical opportunity to explore transformations in architecture and to show how the site and its architecture are bound together in a dialogue.

The winemaking process is a natural vehicle for these issues. The transformation of grapes into wine has a long tradition in agriculture, society, and architecture. It is both a technical and somehow magical process that requires a sequencing of events and spaces, places of intense activity and places of absolute repose, and a strong connection to its source, the vineyard.

The site of the proposed wine estate is Bluff Point, on Keuka Lake, one of the Finger Lakes of New York, a region with a wine tradition but suffering under an "outdated" reputation. My intention is to build vineyards and winery with an architectural presence strong enough to own the site, and carry well beyond to the neighboring vineyards on the surrounding shorelines. As a dominant presence, visible miles down the lake, together with its research facilities, co-operative ventures among growers, and a public touring facility, this wine estate has the potential to become a regional symbol for the renaissance of the wine industry in upstate New York.

Furthermore, by including the construction of the vineyards in the architectural whole, I intend to emphasize the crucial role of the vineyard and its fruit in the transformation process, something less than fully recognized among many local wineries.
The architectural idea germinating from these concerns, and suggested by the site, may be put in a statement of transformation: Sloping vineyard becomes terraced vineyard becomes terraced winery cellars. The form that carries the idea is a series of stone retaining walls, parallel and terracing the hillside, culminating in a long wall that stretches the full length of the vineyard, spanning a small creek at one end, and at the other, generating the enclosure of the winery. Behind this last wall one finds a smaller-scale but more complex sequence of terraced spaces, where the magical transformations following the harvest take place.

The sequence of winemaking together with a sloping site makes a natural opportunity to design in section. Three levels within the winery work in sequence, and with the help of gravity, take the wine through its metamorphosis with virtually no harmful pumping.

A theme that develops from this approach is one of "procession," suggested first by the linearity of the winemaking process, but reinforced by the outward reaching aspects of the sloping promontory of Bluff Point. As the project developed, the ritual of "procession" insinuated itself throughout the site. Visitors descend for a tour. The harvest is carried upward by railway gondola, stopping at each terrace walls. Crushed juice flows down to ferment and become wine.

The wine's metaphorical procession takes it downward from the public domain of arrival and harvest, through the craftsman's realm of work and ritual, to the private sanctum of the cellars.

Similarly, it becomes natural to imagine the procession extended beyond the site: a grower, leaving Hammondsport with a barge full of the day's harvest, approaches Bluff Point, offloads his fruit at the wharf and sends it up the railway that services the terraced hillside.

Area Map
While standing on the winery site and taking in the view to the east, west, and south, one becomes conscious of the larger physical reality in which the promontory sits. The peninsula of Bluff Point commands a former glacial valley that has become a Y-shaped lake.

The outward reaching nature of the site suggests an extroverted approach to the estate's design, encouraging an architecture that participates forcefully with the grandeur of lake and point.

A prominent outcropping when seen from afar, the winery is situated about halfway up the slope between lake and ridge-top. Conversely, when approached along the ridge drive, it appears as a large platform of earth and architecture, defined by converging stone walls, below which a series of long vineyard terraces steps down toward Keuka Lake. The uppermost terrace encompasses workyard, parking, gardens, and the vaults of the winery.

The vineyard terraces reflect the overall slope of Bluff Point, and deliberately have a southeastern exposure, an orientation highly prized throughout the great vineyards of the northern hemisphere. Vines are warmed by a morning sun, minimizing mold development, and sheltered to the right degree from the hotter afternoon sun. The thick stone terrace walls are designed to enhance this natural advantage by retaining extra warmth for slow ripening in the shorter, cooler days that are so crucial at the end of the growing season.

The terracing of the vineyards into large architectural elements that modulate the site is the beginning of a dialogue between the man-made and the natural. The dominant slope proposes the layering response of the terraces and buildings: the great enclosing walls of the vineyard redefine the slope as it falls to the lake.

A narrow-gauge railway runs perpendicular to the terraces straight down to the wharf, which provides access to other lakeshore vineyards and to visitors approaching by boat.
At harvest time, local growers can barge their grapes to the wharf and then transfer their gondolas of fruit to the railway, which runs up to the harvest porch of the winery. Similarly, fruit harvested on each of the terraces can be sent up by gondola, gently and quickly. This will minimize damage and rot that often accompanies truck hauling.

During the summer season, winery-operated excursion boats will ferry visitors from town docks to the Bluff Point wharf, where they will disembark and ride the railway up through the vineyard terraces to tour the property. Along the way, they will be able to view lakeshore vineyards and will spot the long stone terraces of the estate from several miles away.

This processional approach will serve to emphasize for both the growers and the public, the outward reaching nature of the project as it gains momentum as a regional center for the Finger Lakes wine industry. In addition, the lakeshore approach, with its view of neighboring vineyards and arrival through the vineyard terraces, underscores the important role of the vine as the force behind good wine.
The house at the end of the wall is the formal counterpoint to the mass of the winery and tower at the opposite end. The structure echoes in lesser proportion the larger building's rhythmic columns and vaults that rise from their shared stone base.

Having ascended by rail, and later descended along footpaths, a thoughtful visitor might recognize the high stone walls, each with its own rows of vines, as spatial events within the site that symbolize the sequencing of temporal events marking the transformation of the harvest. Architecture and ritual will reinforce one another.

The large-scale rhythm of walls and vineyard is the primary rhythm of the site. This dominant voice will be counterpointed by the more detailed rhythm of the crossing winery vaults, which help define the smaller world of interior work. Nature's transformations in the vineyard become the background for man's manipulations behind the walls.
Every attempt is made to connect the visitor's experience to the landscape and vineyards in addition to the working facility of the winery. Experimental vineyard areas adjacent to the facility are carefully terraced to accommodate visitors and are designed to lead guests through a sequence of pleasurable vistas and intimate garden stairs. Ending at the vineyard manager's residence, the uppermost wall retains a promenade of shade trees that takes guests to a bridge overlooking a waterfall.

The terrace walls are parallel in plan, but in elevation gently undulate with the terrain, feathering out to join the hillside. A path through the vineyards takes the visitor through a sequence of recessed stairways in the terrace walls, guiding one toward a forested path to the wharf.

In addition to their architectural role, the vineyard terraces perform a valuable scientific function that makes use of the extensive modulation of the landscape. Each terrace is filled in with different proportions of natural materials, such as sand, clay, marlstone, limestone (chalk), heavy gravel, and even imported volcanic ash. Next, each terrace is planted with two or three varieties of grapes that are known to thrive in that particular soil. Given an equal orientation and microclimate, and having control over the mix of fruit and soil, researchers could then within a few years determine the right conditions for certain wines they want to make. Conversely, researchers could determine the best grapes to grow given specific soil conditions.

The terraces are between 500 and 1000 feet in length, a good distance for tractors traversing the vine rows, which are spaced at twelve feet to allow passage for cultivation, spraying, and picking.
WINERY DESIGN

The architectural transformations explored within the limits of the walls are intended to honor the metamorphosis of grapes to wine.

Within the winery, "procession" is emphasized by the transitions of the structure as it rises from the stone walls to become the airy, steel-trussed vaults set out across the matrix of thick stone walls.

The stone walls that form the connection to the vineyard provide the base for both the overhead structure of steel-trussed vaults and the enclosure of glass and ceramic panels. The structure of light steel columns spring from the stone at one of two reference lines that denote the floor levels. This steel system orders the open plan of the upper level both at the cafe and the harvest platform. The mechanical and electrical systems are housed within the trusses between the vaults. In plan, the open structure of the upper level and ceiling is a refinement of the baser rhythms of the stone walls and vineyard terraces below.

The enclosure of the space also springs from the stone walls, but is independent of the structure. The transformation of the heavy stone wall into a light, glass and panel system relies on a rhythmic exchange with the structure, chiefly read in elevation. The proportion of glass to ceramic panel depends on the use of the area adjacent to the enclosure, but takes its pattern from the rhythm of the vaults.
A primary axis of public approach begins along the promenade, takes visitors from the entrance, through the cafe to a balcony overlooking the three-tiered winery operation. Having viewed the heart of the facility from above, the visitor on a tour would be led from the reception area down a narrow staircase, contained within the thick exterior stone wall, to the laboratory level, and finally, to the cellars.
The upper level is the public domain, quite open in plan. It contains two distinct areas separated by an administrative office area. The cafe is located at the public entrance along the promenade and can serve as a dining, entertaining, and winetasting area for activities independent of the work at the winery. The design does, however, encourage the visitor to observe and tour the working facility.

The second major area of the upper level is the crushing platform, which connects to the harvest porch through the large overhead doors.

The harvest arrives by truck or tram at the porch, where the fruit is de-stemmed. Next, the fruit is crushed inside on the platform level. The juice is fed by tube to the mezzanine level where fermentation takes place.
The mezzanine level is the craftman’s realm of work and ritual. Located here are lab and teaching areas, high-tech equipment, and offices for the winemakers and vineyard manager. After fermentation and any testing have been completed, the new wine will once again flow downstairs to be aged in casks, or directly bottled. Cased wine is later shipped from this cellar level.

**Mezzanine Level Plan**

1. Fermentation tank
2. Shop
3. Lab
4. Offices
5. Dormitory
6. Bath
7. Toilets
8. Equipment Storage
9. Mechanical
10. Electrical
11. Railway motor room
12. Porch
Beneath the two working levels are the cellars, dug out from the rock, with massive volumes left between them, and covered over with pre-cast concrete vaults and the earth fill of the garden above. The stone walls of the cellars reflect the repose of aging in the winemaking process, and embody an endpoint to the procession.
Ceiling Plan, showing structural, mechanical, and lighting systems.

1. Lighting
2. Mechanical chase
3. Overhead trolley
The high spaces created by the terracing back of each level allow for large tanks, catwalks, and overhead trolleys. Steel catwalks and stairs provide access to tanks on lower levels. These catwalks are hung by cable from the trusswork between the vaults, allowing them to be raised for any rearrangement of the large tanks and tall equipment below. Overhead trolleys provide hanging winches to move heavy equipment and serve as support for the various hoses that carry the wine from one level to another.

The cellars, where the finished wine ages in barrels or bottles, look inward, away from man and action. Rather than built space, they are subtracted space, subtracted from the rock. The cellar is the private sanctum of the building, cool, quiet, and dark within the earth.
APPENDIX: VITICULTURE AND ENOLOGY

VINEYARDS

Vine rows are planted perpendicular to the general slope of the vineyard to prevent erosion and to facilitate movement of machinery. Each vine is usually spaced about 6 feet from the next, depending on soil and climate.

Two styles of planting are currently practiced in most vineyards. In the older method, the vine stands independently in rows to suit the varieties that develop heavy dense clusters. The second technique employs variations on trellis, the attachment of youthful shoots to wires that run the length of the row.

VINIES

Grapes from the same vine will yield dramatically different wines as the same age. Because of the long maturation process that they typically follow, grapevines tend to yield increasingly complex wine as they age. At three to four years, grapevines have only just begun to produce their first grapes in limited numbers. The crop increases each year until the vines are seven or eight years old, at which point the crop levels off. From eight to 12 years, the vines establish the proper balance between quantity and quality of fruit. From about 12 years on, the vines move into their prime productive years.

By the fiftieth year, otherwise healthy vines may need replacing because accumulated pruning scars keep them from performing efficiently. In almost every region, however, one can find vines between 50 and 100 years old that are still in their golden years.

At fermentation's end, both red and white wine require clarification, a process known as racking, which is pouring or piping wine from tank to tank, leaving sediment behind. Further clarification is accomplished by fining, dropping fine clay or egg whites to precipitate suspended sediment particles. This fining is sometimes done with filters or centrifuges in modern, large-scale operations.

HARVEST

Grapes mature and become ready for picking from late August through October, depending on the variety and the vineyard locale. Readiness is determined by the grapes' sugar content. Once the sugar level reaches the optimum levels of 19-24%, the grapes should be promptly harvested.

Great wine can only come from great grapes, but the harvesting process is still important. With average fruit, the process can make the difference between an acceptable and an unpalatable product. All fruit must be handled carefully during picking and transportation. If the containers are too large, the weight of the load bursts some of the fruit before it arrives at the winery. The presence of broken fruit, rotted fruit, or foreign matter will affect the taste of the wine.

FERMENTATION

The grapes are crushed. The juice, or must, is treated with a small amount of sulphur dioxide, which prevents oxidation and wild yeast fermentation.

For red wine, the crushed grapes along with the seeds and skins are sent to the fermentation tanks. These tanks can be enormous, sometimes holding 50,000 gallons, constructed of stainless steel, and jacketed like a refrigerator to regulate the fluctuating temperatures created during the fermentation process. The contact of the grape juice with the red grape skins extracts color and flavor from the skins, imparting them to the wine. The fermentation takes from a week to ten days, occasionally longer. The wine can then be drained from the tank, yielding free-run wine. Sending the skins and seeds, known as lees, through a press reclaims a significant amount of press wine.

For white wine, the must goes straight to the press from the stemmer-crusher, where the juice is separated immediately from the skins. After settling for up to thirty-six hours in a tank, the juice is piped to fermentation tanks, where it ferments at controlled low temperatures for ten days to six weeks.

CELLARING

White wines do not require aging beyond a year. Red wines are held in some form of cooperage for no less than a year, typically in oak barrels, or barriques, of varying sizes for the preferred effect on the finished wine.

The winery relies on experienced tasters, and often laboratory tests, to choreograph the final outcome, whether it be a cuvee (blend) or the product of a single vineyard. When deemed ready, the wine is filtered, bottled, corked, labelled, warehoused, and shipped to buyers. In the case of the best red wines, the bottled wine is stored in the cellar for one or two years for further aging, alongside the younger wine in casks.

REFERENCES


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