A Report On

A BREWERY AND BEER GARDEN

By

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Dean William Emerson
Chairman of Thesis Committee
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Dear Sir:

As a partial fulfillment of the requirements for the Degree of Bachelor of Architecture at the Massachusetts Institute of Technology, I herewith submit this thesis entitled A BREWERY AND BEER GARDEN.

Respectfully,

Signature redacted

Gordon Bunshaft
HISTORY AND GENERAL DISCUSSION

Beer, that most ancient and honorable alcoholic beverage of man, has returned to our country as a legal drink. With its return, the art of brewing resumes its interrupted development in the United States.

Fundamentally, the brewing of beer consists in the mixing of malted barley, hops, and water. It was these basic elements that were used in the making of beer by the Teutonic race when they first appeared in history. At that time it was a domestic process and it continued as such until the twelfth century when the monasteries took over this growing art. With the development of towns, the art of brewing became a commercial enterprise. As late as the eighteenth century however owing to the fact that the process was still comparatively simple, a great many wealthy people brewed their own beer. In the nineteenth century the process became too complicated for home brewing and thus it was soon evident that brewing was to be on a large scale. In addition, there was also an ever increasing demand for beer and the difficulty of operating on a small scale.
Thus we find that this industry was growing rapidly along with the others. Brewing had become a highly technical and elaborate process, requiring fine equipment and sanitary buildings. Unfortunately however, not all the breweries yet fulfilled these requirements and plans were being projected in order to make for improvement. But this advancement was not to be in this country. The sale of beer was made illegal; brewing on a large scale was stopped and naturally, any chances of development were destroyed. A return to domestic brewing took place, and bathtub-bootleg beer became the national beverage.

Of course during the grand alcoholic experiment of the United States, Europe was making great strides in the art of brewing and especially in the designing of breweries. Obviously then it will be necessary for the United States to turn to Europe for its information concerning the general layout of a modern brewery.

In the past, the primary aim in the production of beer had been the quality of it. Due to great economic changes, the brewery of today is concerned not only with the quality of its beer
but also with the necessity of having a plant lay-
out that is as economical as possible. During
this thirteen year vacation of the brewing indus-
try, great changes have taken place in all indus-
trial plants. They have all become aware of the
great sums that can be saved by the construction
of buildings that have been designed with special
attention to the specific needs of an industry
and to the possibilities of expansion. With these
two factors to work with and because of all the
latest machinery that can be used in a brewery,
such as electric refrigeration, air conditioners,
and electric appurtenances, the modern brewery
will hardly resemble its old prototype which was a
poorly laid out plant with a conglomeration of
buildings and departments scattered here and there,
a thoroughly disorganized unit which greatly
hampered effective operation.
GENERAL REQUIREMENTS OF SITE

The first and one of the most important problems in the building of a brewery is the selection of a site. Briefly, this selection is governed by two main considerations; water supply and shipping facilities.

Water is of prime importance because it is used in large quantities and because, as an ingredient, its chemical characteristics influence the quality of the beer. It serves three main purposes; (1) generating steam and power. (2) a certain type of cooling and (3) as an ingredient of beer. In many breweries well-water is used for the beer, and city water or filtered river or lake water for all other purposes. Due to the advancement made in commercial chemistry, the quality of the water to be used in the beer can be so fixed as to have the desired type regardless of its previous condition.

Good shipping facilities are desirable in breweries as in any other plants. When breweries can be placed near railroad sidings or on water fronts they will be in an advantageous location. The shipping of full and empty bottles, barrels,
hops, malt, cereals, soda and other supplies will be thus facilitated. With the developing of long distant hauling by trucks, it would be helpful if the plant were near some main highway or in a location easily accessible to large trucks. Location of a plant in relation to the local centers of consumption should also play an important part in the selection of a site.
From a business point of view the first concern in considering the location of a plant is the possibility of the demand for the product and the magnitude of the demand. Of course as far as beer in concerned, the demand is great but this demand varies in different localities. For example, in cities where there is a high percentage of people who are of German and Irish descent, the demand is greater than in cities with a smaller percentage. Thus in selecting the city of Buffalo, New York in which to build this brewery I was influenced by two factors: (1) the high percentage of German and Irish people, and (2) the knowledge of the inadequate breweries in that city.

Governed by the basic principles of the ideal site for a brewery I finally selected a strip of land on the shore of Lake Erie, about one mile from the city line. This strip of land is bounded by the shore on one of its long sides and by a national highway on the other. The highway is the only one leading to the west. On the other side of the highway is the main railroad tracks from which a siding could easily be constructed.
The site has all the requirements for a brewery. It has ample water supply for generating steam, power and cooling. As this water is used to supply the city, the brewery could use it in the beer after filtering and treating as desired.

As to transportation facilities, it has a railroad nearby, a national highway for long-distance truck hauling and is close enough to Buffalo and to its neighboring towns to be considered as being in the center of the consuming area.

Malted barley and hops are the two important grains used in making beer. As both of these come from the plains of the west, and as shipping by boat is cheaper than by train, most of the grain from the west comes east through the Lakes. In fact, Buffalo is one of the great grain centers of the United States. Thus, by erecting the brewery on the Lake shore it is possible to get the desired grain directly from grain boats from the west, reducing without a doubt, the cost of the grain. The finished product, beer, could also be shipped by water to cities along the shores of all the Lakes, thus reducing costs of transportation again. Shipping by water is only good where there
is no rush to get the product to its destination.

In addition to a brewery there is to be an indoor and outdoor beer garden. The necessity of finding the proper location for such gardens was also considered. As the people use the shore farther down the lake for swimming and for boating the gardens are in a position to cater to these people inasmuch as the gardens are close to the main highway and on the water.

The land at this point is a narrow strip about 20 ft. above water level. Because the lake is rather deep here it is possible to build a wharf easily. Due to these conditions, the land is extremely cheap and thus desirable for an industrial layout.

By building this brewery outside the city it is possible to spread it out in order to get a simple direct layout. Breweries in the past have been built right in the city where land is expensive and where it is difficult to obtain large tracts. As a result the building was vertical in mass, thus a conglomerated and disorderly layout was inevitable. Perhaps the slowness and other limitations of the horse necessitated a very close connection with the consuming area. Today this is not necessary due to
the speed of our modern trucks.
PROCESS OF BREWING

In order to understand better the problem of designing a brewery it is advisable to study the manufacture of beer which involves two processes, malting and brewing.

"Malt is made by causing barley to germinate or sprout. Even the largest brewers find it more economical to buy prepared malt. Malting thus becomes a separate industry and does not form part of the problem of brewery planning."

The process of brewing consists in the mixing of rice or corn, depending upon which is the more economical, with malt. The mixture is crushed and the starch separated in hot water. The starch is then changed by heat into maltose and dextrine. This mixture is drawn off and hops are added. The product is rapidly boiled and "wort" (beer before fermentation) is the result. This process takes place in the brew house which is one of the units in a brewery layout.

The wort is then cooled and pumped into fermenting tanks and yeast is added. During this fermentation which lasts about two weeks, the yeast multiplies, attacks the sugar and liberates
carbonic acid gas and alcohol. The gas is taken off and used later to carbonate the finished beer. The small percentage of alcohol in beer results from this natural fermentation.

After this period of fermentation most of the yeast is separated from the liquor, which is pumped into aging tanks. There a very mild and slow fermentation continues. This aging takes from two to three months depending upon the system used by the "braumeister" who has charge of the brewing. This second or fermenting stage takes place in the stock house.

After this aging period the beer is either kegged or sent to the government cellars to await bottling. The kegging unit is in the stock house. The government cellars are in the bottling house where the beer is bottled and stored.
GENERAL PRINCIPLES OF INDUSTRIAL PLANNING

The design of a brewery is controlled by certain general principles of efficient production which are the same as those in any other industry whether it be that of motor cars, sewing machines, food supplies or beverages. These general principles are few and simple in their application although they seemed to have been overlooked in a great many breweries. There are four principles. They are as follows:

FIRST: All materials in the course of manufacture should be transported the least possible distance with the least amount of handling and rehandling. This tends to lower the cost and to increase the speed of production. While this principle, as previously stated, is applicable to all types of manufacture, it is especially applicable in the brewery where excessive length of flow through piping necessitates extra cleaning and offers opportunity for infection.

SECOND: Raw materials should come into the plant at one end of the production line and the finished product should leave at the other end, the line of production being as simple and straight
forward as possible. Departments for successive operations should be properly located to prevent any crossing in the line of production which would cause confusion and congestion at that point: and to prevent any retracing of that line which would unnecessarily increase production costs. Where possible, departments for successive operation should be placed over each other to permit the fullest advantage of gravity flow and to eliminate pumping.

THIRD: All departments should be properly correlated with regard to their relative sizes. If any department is too small, it will form a "bottleneck" to the plant, thus retarding output; while on the other hand, any department which is too large will increase cost of production due to excessive overhead and maintenance charges.

FOURTH: All departments should be so arranged that they can be easily expanded as the industry grows without disarranging the systematic scheme of operation or the need of moving existing equipment. This principle, for some unknown reason, was generally overlooked in the design of breweries built hitherto with no preconceived plan for future expansion.
I. AREAS

Before beginning the actual design of a brewery, it is essential to know what is desired in the way of annual output. The annual output, of course, is determined by the hoped for demand for the product. Owing to the great demand for beer in Buffalo and the tendency toward large scale production, a brewery with an annual output of 500,000 barrels was decided upon.

The annual output decided upon, the next step is to calculate the sizes of each division in the brewery, these divisions being determined by the manufacturing processes. They are briefly: (1) Boiler Room and Power Plant. (2) The Brew House. (3) The Stock House. (4) The Bottling Department and storage, and (5) The Offices.

With the aid of the firm of Badgley and Wood, New York architects who are building at present a brewery with an annual capacity of 250,000 barrels, sufficient information was obtained to make possible close calculations of the areas required in each division.

The size of the power plant is about 100' x
55' x 50'. These figures were given to me by Badgley and Wood, who had received them from power plant engineers. It would be impossible to determine the size of this plant unless one knew the relative sizes of boilers, generators, and refrigerating machines required by a plant of this size. With the kind help of the engineers of Badgley and Wood, I was able to get the size of the power unit without becoming a Steam Engineer.

The determination of the size of the brew house is a different problem. Knowing the sizes of the various standard large kettles and cookers, it is possible to determine the number of kettles needed in order to have the required annual output. This process of brewing requires about eight hours. Thus with this fact set, we can determine the number of brews by dividing the total number of hours the plant is operating by eight hours. Knowing the capacity of each kettle and the number of brews required per year, it is then possible to settle upon the required number of kettles. In the case of this brewery it was decided to have two large kettle "Setups."
The size of the kettles being known, it was easy to get the desired floor area which is 65' x 60'. The process in this unit is a straightforward one and so it was decided to use the gravity system here in order to eliminate all sorts of pumping and unnecessary piping. Thus the brew house consists of five stories. This was determined by studying the various stages in the brewing of beer. The floor heights were settled with the assistance of Badgely and Wood.

The stock house consists of six stories and is 192' x 96'. The size was determined primarily by the amount of beer to be stored in this unit. It is in this division that the beer is allowed to ferment and age. This process takes about two or three months. Thus, by dividing 500,000 barrels by 4, we get the required capacity of the storage tanks which is 125,000 barrels. With this fact settled and the other minor requirements of various units in the stock taken into consideration, the size of the stock house was fixed.

The bottling house is 120' x 96'. This size was set upon by determining the number of bottling setups required to bottle fifty per cent of the
total output of the brewery. Four setups are required. Knowing their size the floor area is easily settled. The floors above the main story are used for storage. Because many empty and full cases are stored in slack seasons it was necessary to have four floors for storage space.
II. "PARTI"

With a definite strip of land, with definite areas of each unit and with definite principles of good industrial planning, it is now possible to decide on a "parti." The fact that the site is a narrow strip greatly aided in arriving at a layout that was simple and straightforward.

The grain silos for malt and rice were placed on the water front in order that they might be easily filled from a boat or train. The grain is used in the brew house, which was placed in direct connection with the silos. The malt is delivered to the brew house on the top floor where it goes through the cleaning or polishing machine, then to a mill where it is cut or crushed into small particles. From the mill it is conveyed into mash tubs. In the mash tubs the malt is mixed with a quantity of hot water. At this point rice or some other desired cereal is mixed with the malt in the mash tub. The rice is preboiled in a cooker before being added to the mash. Also at this point oats or various syrups can be added to obtain special flavor.
The mash then is filtered and drained into brew kettles where it is boiled for concentration and purification, and for other chemical and physical reasons. Hops are added to the mixture in the brew kettle. The liquid which is now called "wort" is strained in hop strainers where the spent hops are removed. The dried hops are removed from the building by pipes leading to the exterior where trucks receive this waste. As the process in this unit is on the gravity system the "wort" after being strained has arrived at the first floor.

The next steps in the process of beer-making take place in the stock house which has been located in direct connection with the brew house. The "wort" is pumped from the brew house to the top floor of the stock house where it is cooled in a new type of enclosed cooler. From the coolers it is placed in fermenting tanks where yeast is added. The yeast culture room is on this floor in close connection with the fermenting tanks. After a period of two weeks of fermentation, the yeast and other undesirable materials are removed from the fermenting tanks which are especially designed for this purpose. The brew
is then sent to the storage tanks on the floors below where the beer is stored for a period of two or three months. From these tanks the beer is either sent to the bottling department or the racking room where the beer is barrelled. This racking room is on the first floor of the stock house and can receive or send barrels on one side by trucks and on the other by boat or train. In addition to the racking room there is the keg washing and storage room, the cooperage room, the pitching room and a work room. These rooms are used for washing and repairing the empty kegs.

The beer which is to be bottled has to be sent to the bottling department which has been placed in direct line with the stock house. Because of the kind of taxation on bottled beer, the government requires a cellar where all beer that is to be bottled is placed in tanks which have official gages on them in order to determine the quantity of beer bottled. These tanks are placed in the basement of the bottling department. Thus the beer from the storage tanks in the upper floors of the stock house is sent to government cellars from where, in addition to being gaged, the beer is carbonated and then sent to the
bottling machines on the first floor.

As this unit is accessible to trucks on two of its sides and to boats or trains on its third side, it is easily seen that it can ship or receive cases without congestion. After the beer has been bottled and placed in cases, it is either sent to waiting trucks, trains and boats, or it is sent upstairs where it is stored until needed.

The conveyor system is used throughout the bottling department. The problem of laying out the actual course of the conveyors has not been gone into. The layout of the conveyors is usually done by the concern that is to install them in the plant.

Below is a sketch of the sectional layout of the bottling department of brewery that is being done by Badgely and Wood.
This arrangement is very simple and direct and could be used in the bottling department of this brewery.

The entire process of brewing in this layout is in one simple direct line, taking advantage, as much as possible, of gravity and requiring a pump at only one point.

The problem of the accessibility of the various units for transportation has been carefully considered and it can be seen from the drawings that there is ample space for all types of transportation.

The question of expansion has also been considered. The brew house has been designed on the basis of an 8-hour day. In order to increase production in this unit, a night shift could be added, thus doubling the production. This same theory applies to the racking room and bottling department. The storage tanks have been designed for a 3-months storage period. This could be cut to two months which would increase the storage space. Also a unit of storage tanks could easily be constructed in the basement of the stock house owing to the type of storage tanks used. As to
the fermenting tanks, another floor or two floors of these could be added to the stock house. This same principle applies to the bottling department where it would be possible to increase the storage space of empty and full cases by adding several floors to the unit.

Breweries like wineries and food producing industries are visited by a great many people who are interested in how the product is manufactured. These people naturally come to the office of the concern in order to be allowed to inspect the plant. In the case of a brewery the part that interests the public most is the brewing process in the brew house. At least that is the only part that can be shown to the public without interfering with work in the plant. For this reason and others, the offices of the brewery were placed in direct connection with the brew house. It was best also to have the offices at one end of the plant so that they would be away from the noise of the machinery and trucks.

On the first floor of the office unit, there is the public entrance with information office.
From the ample-sized lobby one has accessibility to the stair and elevator hall or to small bar at end of the lobby where one can taste the quality of the beer. In the rear part of the office unit on the first floor is a lunch room with a small bar. This is designed on the assumption that the help will bring their own lunch although there is a small kitchen where sandwiches etc. could be made and sold.

On the second floor the main offices are to be located. The private offices are also on this floor. There is a small museum in connection with the waiting room, from which people can be taken into the most interesting floor of the brew house where they can see the "wort" in the large brass brewing kettles.

On the third floor there is a locker room, showers and toilets for the employees. This is reached by the employees' stairs and elevator.

In studying this office unit great care has been taken to separate the public portion of the unit from the employees section. Each part has separate entrances and each has separate stairs and elevators.
The only remaining unit to be placed is the power plant. This had to be placed as close as possible to the brew house and still not too close to the offices which would be bothered by the noise of the machinery in the power plant. The power plant should be close to the brew house because a great deal of the steam developed in the plant is used in the brew house. It has been placed in this position in order to take advantage of the railroad siding and the wharf to facilitate the delivery of fuel and parts for the machine shop in the unit.

The power plant contains steam generating boilers which use oil and are run on a forced draft system thus eliminating a smoke stack which would make it difficult to keep the plant clean. Any smoke or fumes from the oil burners would be forced into the water of the lake. There are also electric generators in the unit, because in a plant of this size it is advisable to generate its own electricity. The refrigerating machinery as well as the machine shop are in this unit. The refrigeration plays a very important part in the functioning of a brewery so ample space has been left for it in the power plant.
Let us now consider some of the details of the plan of this brewery. The question of controlling the employees and the inflow and outflow of raw and finished materials in each unit was an important one. It was finally thought best, because of the size of the plant and the fact that each unit was so different from the other, to have a small office in all units in order to control the employees and check materials that arrived and left. These small offices would of course be controlled by the main office. In the brew house the "braumeister" has a small office and laboratory on the third floor. From this floor he is in a position to control the whole process of brewing. In the stock house there is a small office for the superintendent in the center of the racking room on the first floor. In the bottling department there are two offices, one for the superintendent and one for the shipping foreman.

Owing to the fact that each unit has different floor heights there are a set of stairs in each unit. A set of stairs and an elevator are accessible to both the brew house and the
employees' unit of the office section. There are stairs and an elevator for the public in the office section. There is no need of a connection between the upper floors of the bottling department and the upper floors of stock house. Therefore the stairs of both of these units have been placed back to back in order to facilitate construction.

Toilets and storage space have been placed throughout the building. Most of the storage space is needed in the brew house where chemicals for cleaning and tools for repairing are often used.
CONSTRUCTION

DISCUSSION

The most difficult problem in the designing of a brewery is the question of the type of structural layout that will be able to sustain the tremendous live loads that flow through this building. In the old fashioned type, steel and brick were used but in the modern, steel and concrete are used. As for the walls, they are merely a thin concrete slab. It is in the floor that reinforced concrete can be used to advantage in the brewery of today, thus cutting down the number of small steel beams formerly required.

Owing to the excessive live loads and the great variations of the live loads in each unit of the brewery, it was decided by Mr. Gelotte and myself to design the steel layout of each unit separately and without regard for adjoining units.

The question of foundations and their sizes had to be omitted because of a lack of knowledge of the soil and rock below.

I. POWER HOUSE.

This unit is a simple steel frame structure with thin concrete walls. The roof is held by
long girders on which are attached short beams. On this network of steel a reinforced concrete roof is constructed. Large steel framed windows are used in order to make the plant as bright and as airy as possible.

II. THE OFFICE UNIT.

This unit is like the power plant in that it is constructed with a light steel layout, all walls being nothing more than curtain walls of concrete. This light construction is possible because the live load is only about 100 lbs. per sq. ft. In the lunch room and offices above, it was thought best to have a column layout in order to eliminate unnecessarily long girders and in an effort to economize. Steel casement windows are used. In this unit as in the power plant much light is desired so that most of exterior walls are occupied with windows. The floors are reinforced concrete slab construction with some type of rubber composition for a floor surface. The doors in this unit are of metal construction with some simple applied decoration. The walls are painted with a neutral color, perhaps having a few simple bands of chromium as decoration.
III. BREW HOUSE.

The live loads in this unit vary from 800 lbs. to 1000 lbs. per sq. ft. From this it can be seen that large girders are needed to hold each floor. Because a great deal of work space is needed around the various cookers and kettles it was thought best not to place any free standing columns in the unit. As a result it was decided to have three huge girders to hold up each floor. This long span girder construction is rather expensive but it is necessary if the unit is to operate correctly. The girders rest on columns in the wall. Between these girders run heavy steel beams on which reinforced concrete floors are placed. The floors are surfaced with some waterproof coating. Of course, all the steel is cased in concrete, and, in order to eliminate dripping from the ceiling a hung ceiling is attached to the beams. Owing to the great depth of girder, it is not advisable to hang the ceiling from them as this would lower the ceiling height too much.

The front wall is cantilevered as is the front and back portions of the floors from the end girders. The front wall was cantilevered in order that a huge steel framed window might be installed.
This window lights the five floors. There are two reasons for such a large window; first, the desire to have as much light as possible in the unit in order to be able to keep it clean and airy. Cleanliness is the keynote of any brewery and especially in the brew house. Second, it is desirable to expose to the public as much as possible the elaborate machine layout in the brew house for the purpose of advertising. In other words the whole front of the brew house is a display window.

The silos behind the brew house are constructed of reinforced concrete.

IV. THE STOCK HOUSE.

This unit is constructed with a steel layout on the first, fifth and sixth floors, and the second, third and fourth floors are of concrete construction. The unusual type of storage tanks causes this.

In order to understand this construction it is best to start with the top floor and work down. On the fifth and sixth floors are the fermenting tanks which have a live load of about 400 lbs. per sq. ft. A steel column layout is used on the sixth floor to hold the roof. This
same layout continues down to the fifth floor where the columns hold up the sixth floor which is constructed of a small girder layout with short beams in between and reinforced concrete slab flooring. From the fifth floor the steel columns go directly to the girders on the first floor. They go through the concrete tanks on the second, third and fourth floors.

One of the newest features of this brewery as compared with other American breweries is its storage tanks. In all of the breweries in this country the tanks consist either of metal or wooden sealed vats which are lined with glass or some other fine waterproof material. These tanks are placed in rooms which have to be insulated because the beer, during this aging, has to be kept at a freezing temperature. This insulation is costly and the tanks are not of a permanent nature because the glass lining often breaks. Another weakness of this system is the fact that a great deal of space is wasted.

The tanks used in this brewery are made by the German concern, Rostock and Baerlocher. These tanks are made of concrete and are lined with a special preparation invented and patented by this
concern. These tanks are built directly in the building and one floor of them can be placed upon another and they will sustain the unit above. Each tank has a refrigerating coil in it so that the beer comes in direct contact with it. This eliminates the necessity of insulating the walls which can be of light concrete construction. Another advantage is the assurance of a uniform type of beer. There is no wasted space except for narrow aisles which are used by the beer testers. The three stories of these tanks can be considered as one large tank with small cells within.

These tanks and the columns from the floors above come down on heavy short spanned girders which in turn rest on short heavy columns. Owing to the unusual spacing of the girders a very large steel cap had to be placed on the column in order to bring the loads down to it. The loads from the tanks on the second floor come down on a tin-pan reinforced concrete construction which is attached to the network of girders.

On the fifth and sixth floors the ceiling will be hung in order to eliminate unnecessary dripping. The floors on these levels as well as
on the first floor will be surfaced with some waterproof material.

Owing to the fact that it is necessary to keep the stock house cold there are no windows in this unit because windows are conductors for heat. All doors and stairs are of steel construction. All exterior doors on the first floor are rolling steel doors which are a very simple and handy type of door to use in a shipping department.

V. THE BOTTLING DEPARTMENT.

The live loads in the bottling department vary between 200 and 300 lbs. per sq. ft. Thus an ordinary steel column arrangement is possible. The floors are reinforced concrete, laid on small steel beams which rest on larger beams which in turn rest on the column. All ceilings are hung from the beams for the purpose of cleanliness. The walls are thin concrete slabs interrupted by steel framed windows which are on the second, third and fourth floors, for the purpose of ventilation and cleanliness.

The same type of rolling steel door is used in this department as in the stock house.

The roofs of the brewery are reinforced concrete slab construction with sufficient pitch to
take care of the rain and snow. The concrete slabs are covered with some type of waterproof roofing material.
EXTERIOR DESIGN

The exterior of this brewery was kept as simple as possible in an effort to get a clean, strong looking building. It expresses exactly what the plans require. Where windows were needed they were placed regardless of the effect upon the design. Where windows were not needed the surfaces were left untouched.

A simple electric sign and the huge window in the brew house are sufficient for the purpose of advertizing.
THE BEER GARDENS

These beer gardens were designed in close connection with the brewery in order to use them in advertising the beer. As the crowd frequenting the beaches along this highway are sure to be large it is safe to assume that the gardens will be constantly visited.

Because the people like to drink beer in winter as well as in summer it was thought best to have an indoor and an outdoor garden. The indoor garden is in close connection with the brewery thus eliminating the problem of sending the beer in pipes of great length. Also by having the indoor garden in close connection to the bottling department it is possible for the food delivery trucks to the kitchen to use the same driveway as do the beer trucks of the bottling department.

The indoor beer garden is a simple building with the kitchen at one end and a serving pantry for the outdoor beer garden on an adjacent side. The other two sides open to the terraces which overlook the Lake and the outdoor garden. The entrance to the indoor garden is at one end of the
dining floor. From the entrance lobby of this building it is possible to go up stairs to the offices or the public toilets.

The dining floor has a seating capacity of 150 people. It also has a dance floor and a place for an orchestra. In that the indoor garden is to be used in the winter as well as in the summer it was decided to have a good sized kitchen so that full-course dinners might be served with the beer.

The design of the interior as well as the exterior has been kept simple with a great deal of window area on the Lake side of the dining floor in order to get the full benefit of the Lake breezes in the summertime. The entrance has been treated with a large electric sign which advertizes the product featured and completes the composition of the building.

This building is of steel construction with thick concrete wall slabs.

The outdoor garden has been placed on a lower level owing to the desire to have it as far away from the highway as possible and to force the attention of the people toward the Lake. This garden
is reached by three sets of stairs; one set close to the indoor garden, another connecting the parking space with the garden and the third set leading from the garden to the boat landing and boat house.

The garden is in the form of a square, with a dance area in the center, a band stand at one end and staircases on the other three sides. Trees, shrubs and four fountains give the garden a restful atmosphere.

The outdoor garden is serviced from the pantry in the indoor garden and from a pantry under the terrace. The beer for the garden comes from the pantry under the terrace. This pantry would open onto the corridor going up to the pantry in the indoor garden. This latter pantry is used to service the outdoor garden with light luncheons.

Under this terrace are also placed public toilets.

The boat house is a simple shed for housing canoes and rowboats and has a double purpose. One is that people who are out boating could stop at the gardens for a "stein" or two. The other use of the boat house is that people in the
garden can go boating if they so desire.

The general effort has been to give to these gardens a spirit of cleanliness and quiet repose.
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