The development of an idea in sculpture
by Lyndon Fayne Pomeroy

A THESIS Submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of Master of Applied Art
Montana State University

Abstract:
This thesis is a narration of the development of a Memorial-Reservoir-Sculptural unit as a project on the campus at Northern Montana College at Havre. The project is in partial fulfillment of the requirements for the degree of Master of Applied Art at Montana State College at Bozeman, Montana.

The memorial is to Max P. Ruhr, civic leader, lawyer, and member of the Northern Montana College . executive board, who was. killed in.an.automobile,accident near Havre. His family and many friends established a fund to be used to .enhance the campus. This fund was used to develop the memorial.

The reservoir functions as a storage unit for water pumped from the deep wells on campus for irrigation purposes. Size was dictated by volume requirements for irrigation, while retaining depth not. exceeding safety margins for children. The shape of the reservoir-pool developed out of the existing form of the land on which it was placed.

The total project evolved as a unit which embodies the theme of the."Watering Hole, " through the sculptural development of indigenous forms of the region. A fountain symbolically conveys the growth and use factors of. water in this, region while functioning as an outlet for the water from the wells. A free standing wall with abutments functions as the base for sculpture while housing the valve .and pumping equipment necessary for irrigation. . The indigenous animal forms developed in sheet, steel surmount the wall and abutments.

Included in this thesis are photographs of the area, the wall, the fountain, the pool-reservoir, the animal forms, and models of the project.

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Bozeman, Montana
January, 1960

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Dr. L. O. Brockmann

The Max P. Kuhr family

Harold Babcock

Ernie Bruffy

My Wife

CHAPTER I

INTRODUCTION

The process of developing the campus at Northern Montana College at Havre, Montana, posed many problems related to irrigation. Changes in the landscape necessitated by construction of the College facilities had destroyed the native grasses and accelerated erosion until the soil was being washed into the center of the town of Havre. To lessen this unnatural rate of erosion the clay hills on which the campus is being developed were planted with crested wheat and crested rye grasses. The grasses quickly became rooted, adding beauty of a type to the campus. These types of grasses required a greater amount of water for survival than was afforded by natural rainfall. This necessitated irrigation. As the number of acres being planted increased, something had to be done to lessen the burden upon the already over-taxed municipal water system.

Harold Babcock, Superintendent of Buildings and Grounds at Northern Montana College, suggested re-opening some of the old wells around the first building constructed on the campus. Two of the two hundred foot deep wells were opened and with the use of modern jet-type pumps, it was possible to return to production these wells which the city had abandoned many years before.

After the wells had been put into operation, the water was pumped directly into a sprinkling system with the well pumps. The volume of water needed by the subsequent enlargement of the water requirements, forced consideration of some other method of producing the necessary volume. Someone then suggested that a steel tank be placed at the upper end of the campus into which the water might be pumped directly and stored. The campus could then be irrigated from the tank. This idea of using a tank was abandoned as the cost would have been prohibitive. A less expensive method utilizing an open reservoir was suggested.

This region of northern Montana had lost one of its outstanding citizens when Max P. Kuhr was killed in an automobile accident. Civic leader, lawyer, and member of the executive board, he had been a real friend to Northern Montana College. His family and many friends established a Max P. Kuhr Memorial Fund. This fund was to be used in reflecting Mr. Kuhr's life-long interest and support of the College through enhancement of the campus in some manner.

At this point the author of this paper asked permission of Dr. L. O. Brockmann, President of Northern Montana College, to design a sculptural unit which would be a fitting memorial to Max P. Kuhr. This sculptural unit while including the needed reservoir would embody a symbolism significant of the region. After consultation with Mr. Cyril

Conrad, Head of the Art Department at Montana State College, Bozeman, it was decided the problem was of sufficient merit to warrant pursuance as a partial requirement for the Master of Applied Arts Degree.

Dr. Brockmann referred to the Kuhr family a request that the completed reservoir-sculptural unit might become a memorial to Max P. Kuhr. The family readily consented and the memorial unit was begun.

CHAPTER II

THE REGION

The peculiarly significant characteristics of the Great Plains region were examined in an effort to create the symbolism necessary for a fitting memorial to Max P. Kuhr. The region of the Great Plains which is the home of Northern Montana College, has been termed a part of the Great American Desert extending from Texas northward through Canada. The area immediately adjacent to Havre extends from the Rocky Mountains through the flat lands of the Dakotas. It includes many rivers and streams which ultimately empty into the Missouri River. The topography stretches from the rolling hills, arbitrarily cut by the fence marking the boundary between our country and Canada, and across the Milk River where it meets two mountain ranges, the Bears Paw and the Little Rockies. In between we find rolling grass lands, bad lands, river bottoms, hills which are the remains of igneous extrusions, coal and scoria deposits. The hills to the north were sculptured by the many glaciers which moved over this land and left deposits of rocks and silt. Additional formation has taken place under the waters which have fallen, moving the soil ever down hill to cut the coulees and create the bad lands. This water leached out the minerals, depositing them on the low-lands as alkali flats. The result of ancient and less ancient volcanic activity left huge piles of rocks as mementos in the form of mountains and hills. Soils which were developed by the combination of factors in the region supported a growth of grasses, ample forage for the tremendous numbers of game animals of the immediate past. This soil was first grazed, later plowed, and with the development of farming practices commensurate with the region, has developed into a farming land where wheat has become the major crop.

Animals inhabiting this area in great numbers were, buffalo, deer, elk, antelope, bear, goats, and sheep. Many species of prairie chickens, grouse, duck, geese, and lesser birds in vast numbers also made their home in this region. To maintain a balance there was the wolf, the coyote, the eagle, the hawk, and the owl. With the coming of the trappers, trader, and eventually the homesteader, most of these either changed their habitat or were exterminated. In this region we now find many of these animals surviving only in mountainous regions. Some, such as the antelope and various species of grouse, survived in isolated pockets. With the advent of game laws, these have been allowed to multiply in sufficient numbers to be hunted again. In recent years, with varying success, attempts have been made to replant the larger game animals back in their original habitat. Plantings have been made of elk, rocky mountain goat, and bighorn sheep. In areas where pressures by people have not been great, these animals have increased rapidly.

The human population in this region has always been small. The Indian moved in larger numbers into the area after he acquired the horse and the rifle. As he became nomadic this land became a favored hunting ground. When the Indian population increased, they moved into this area and established winter camps in the Cyprus hills to the north in Canada, in the Bears Paw and the Little Rockies. These winter camps gave him access to the vast herds of game which roamed the prairies. As the white man made his way west and north, this area became the last surviving stronghold of the way of life which was the Indian's. For this reason, much of the land has been designated as Reservation and is still populated by the remnants of the tribes. Fort Assiniboine was built to control the last of these peoples.

When homesteads of one-half section each were allowed for the privilege of "proving up," the region was immediately populated by people with no concept of the limiting factors imposed by the lack of water in the region. They, their livestock, their plants, and their farming practices, either adjusted immediately to the aridity of the region or they returned to their former climate where this type of adjustment was unnecessary.

Most of the people who did make the adjustment and remained to develop the region, failed to develop sensitivity to the unusual type of beauty the Great Plains offered. They did not know, or feel, the rhythmic movements in the contours of the land, the rock forms, the grasses in the wind, the drifting snow, the litheness of the herds of antelope, or deer, or elk; nor did they sense the colors, the distances, the freedom.

The purpose of this project has been to develop an order not only suggestive of these factors, but imbued with them to the extent that it symbolizes the significance of the region as it has developed from the past eras into the present.

CHAPTER III

THE POOL

The first step in the development of the problem was the selection of a site for the pool-reservoir-memorial. Factors which had to be given consideration were the relationship of the entire unit to the total campus topography with its present and proposed structures, the function of efficiently irrigating the developing areas of lawn, the limitation of a maximum depth of three feet for the pool (this depth established for the safety of children.) A further limitation was that the pool must be of such size that the water level would not be lowered more than one foot after the water had been pumped for eight hours through twenty-four hoses three-fourths of an inch in diameter. That this was also to be a memorial and must therefor be in a position of dominance over its immediate surroundings while retaining a unity with the total campus had also to be taken into consideration.

The first location examined was immediately north of the administration building. A long narrow shape with the major axis of the pool at right angles to the prevailing wind was designed for this location. This shape would have minimized wind-caused evaporation. This site and shape would have required excessive earth moving, and the shape would have been artificial when related to the topography of the region and the intended philosophy of symbolism. It also would not have had the required volume of water to satisfy the irrigation requirements without being of a depth in excess of the safety demands for children.

To the east of the first proposed area, it was found that a pool of the diameter needed to give the shallow depth and retain the required volume could be built at much less cost and with a minimum of earth moving. A free-form shape in this area seemed to be in closer harmony with the intended philosophy of the development of the pool-reservoir-memorial. This area was also at an optimum elevation for maximum efficiency of the well pumps.

A survey of the selected area was made giving elevations on a ten foot grid. From this, with the help of Oswald Berg, Architect for the College, the tentative size and shape for the pool were developed. A contour map made with the aid of this survey helped in determining the exact position. The pool is immediately north of the Women's Residence Hall, between the main college drive and the road to Highland Park, a suburb of Havre. Before the pool was started, it was necessary to remove part of a straight row of caragana and russian olive trees that were growing in the area selected for the pool. A bull-dozer was then used to begin the excavation by following the natural slope of the ground on the upper side of the area selected. The slope was continued by a cut to the depth of one foot and the earth removed was deposited on the lower side of what was to become the pool. This was built up to a depth of three feet. This deposit was made in a long sweeping curve relating to the natural curve of the landscape. Constant supervision of the equipment operators was necessary to insure development of the forms as conceived.

The inside of the shallow bowl-like shape was defined with a motor patrol. This was then raked by hand to finish and refine the pool. The outside of the pool on the down hill side was also finished in this manner. Grass was planted on the areas that had been disturbed by the change. The finished pool was 133 feet long, by 95 feet wide at its widest place, and contained approximately 10,700 square feet. (Figure 1.)

The plastic pipe from the wells to the pool and within the pool itself was laid. Footings for the intake pipe were poured. A concrete sidewalk five feet wide was built at the edge of the pool completely surrounding it. The floor surface of the pool was covered with bentonite and a layer of gravel four inches in depth was laid over this. This gravel coming to the edge of the walk was to forestall any erosion caused by moving of the water in the wind as much as to add an element of naturalness. This completed the pool-reservoir (figure 2.)

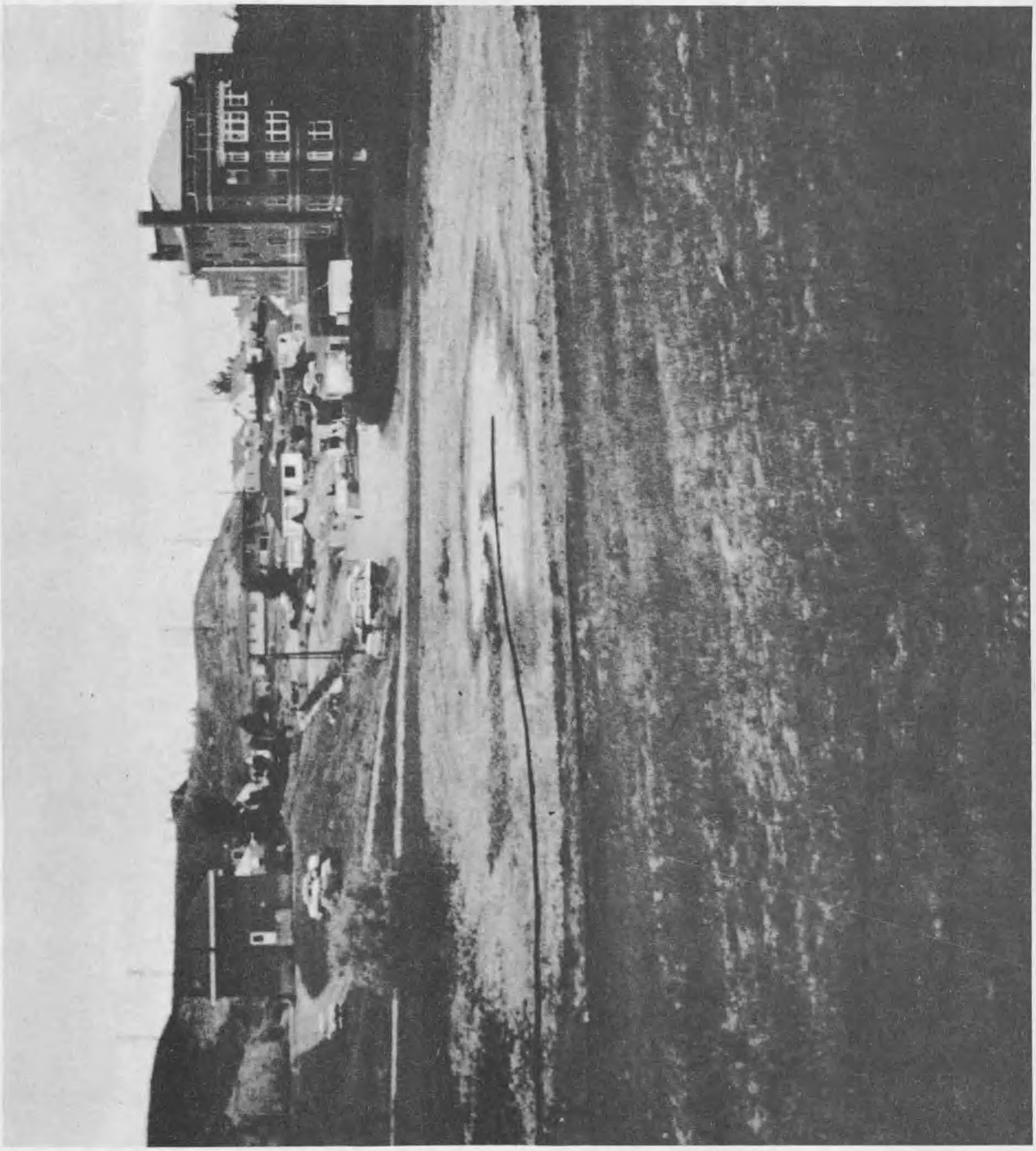

Figure 1. Looking north. Showing developing shape of pool.

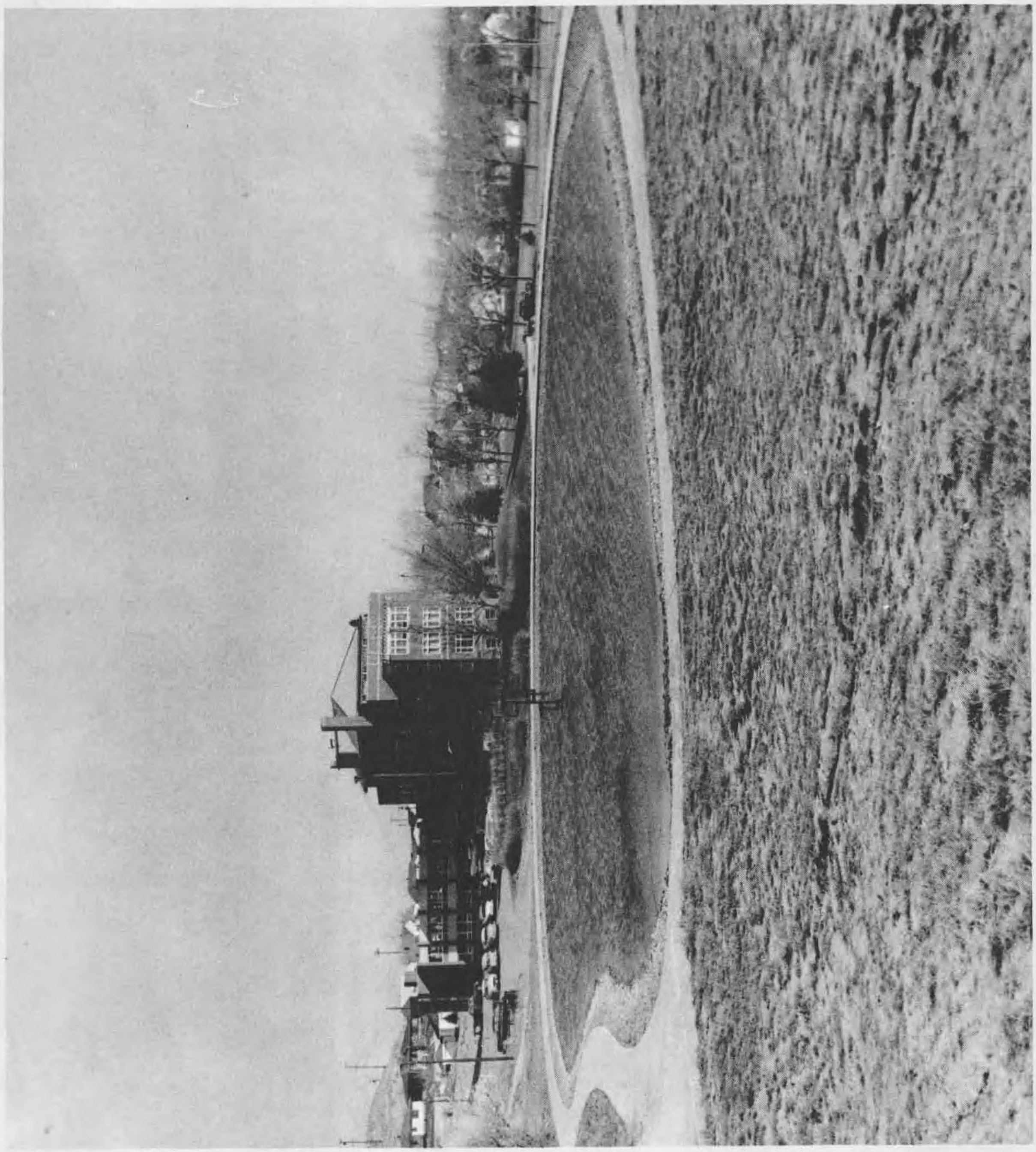

Figure 2. Final shape of pool enclosed with sidewalk.

It had seemed natural that the form of the pool should as nearly as possible conform to the existing landscape. The topography of the campus had suggested that the form of the pool should be a free-form rather than a geometric shape, since the area selected for the pool was not oriented rectalinearly. The free-form outline of the concrete sidewalk in its constantly changing curves was symbolic of the rock forms created by the movement of the many glaciers which had once moved over this land. Contrasting with this was the free-bowl like shape of the pool bottom, made to suggest the assymetric openness of naturally eroded water holes, buffalo wallows and alkali licks prevalent in the region. As the water level fluctuates from irrigation use, it develops constantly changing relationships between the edge of the water and the edge of the confining sidewalk.

CHAPTER IV

THE FOUNTAIN

Another major concern was with the function of the water as a structural element in the design. The logical outgrowth of this idea was to plan the use of a fountain. Limiting factors in the design of this unit, which were the inlet for the water from the wells, had to have a minimum of restriction on the flow, and the effect of wind on the pattern of the water as it spilled into the pool from the fountain had also to be considered.

The first factor in developing the fountain was an evaluation of the symbolic nature of water as it related to the region. This included the growth factor inherent in water from the point of view of the forms caused by its actions and reactions; also the use to which it was put for the benefit of man as a farmer, stockman, and hunter.

It was decided that iron pipe, built as tree and plant forms, with each section attached to the other as plants grow in the spring when the rains come, would best symbolize growth.

The first fountain was a scale model with many pipes and holes creating streams of water supplemental to the basic form. These water forms did not seem to relate in any way to the region as there was no direct counterpart in water movement. The use of smooth sheets of water falling from the fountain would best indicate water patterns of this region. The wind could then play with these sheets of water and produce ever changing patterns. This water form could only be produced by using flat trays where the water might spill over the edge.

The next fountain model was an attempt to produce these sheets of water by forming shapes in sheet metal. The problem of cupping the metal was solved by pressing the sheets between one-way plow discs in a hydraulic press. This developed the water patterns desired, but indicated that it was impossible to predict the water patterns of a full size fountain from the small scale model.

The first full size fountain constructed was twelve feet in height from the bottom to the top of the uppermost tray (figure 3.). The bottom pipe was screwed into the intake from the wells. The intake pipe set in concrete was strong enough to support the weight of the fountain and anything that might crawl upon it. The upright pipes starting with a four inch pipe at the bottom, were reduced in size until the uppermost pipe was two inches in diameter. These pipes were arc welded together in a branch-like structure. The trays in this fountain were used one-way plow discs twenty-one inches in diameter having a two and one-half inch depth. These discs were used as they tied in with the agriculture of the region. They also suggested the bottoms of the cumulo-nimbus clouds which pour down the summer rains, creating

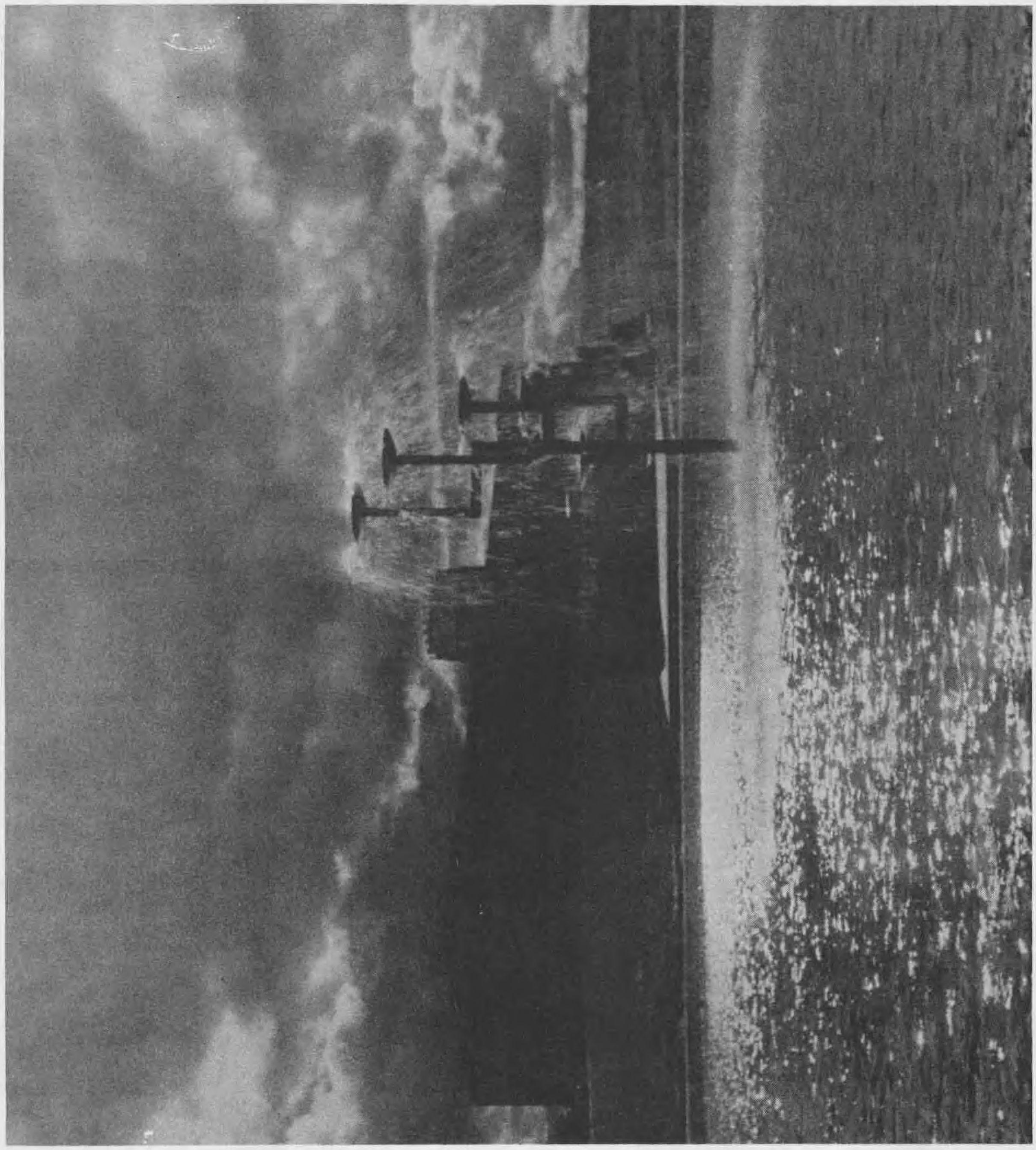

Figure 3. First full sized fountain, showing water action which was not acceptable.

a dual relationship with the bottom curve of the pool.

This fountain showed the behavior of the water as it was forced upward and out of the trays. Each tray had its individual intake which had to be restricted in order to force the water to the top-most tray. This caused excessive pressure, spraying water horizontally out of the trays. To counteract this, a ring was placed around each intake to break the spray. The water in the lower trays boiled and the resultant water form did not have the desired effect. After seeing the full size fountain, the positional relationships of the trays seemed to lack unity with the pipe forms and adjustment was necessary in the final fountain.

The final fountain was made two feet lower in height than the original full size one (figure 4.). This produced a greater volume of water which in flowing over the discs made a more interesting pattern. Twenty-six inch diameter discs with a four inch depth were used. The volume of water held by these trays was enough to handle the pressure and the boiling ceased. The positional relationships of the trays were adjusted to achieve a greater unity in the total form of fountain, water and pool (figure 5.)

A cluster of three underwater lights was installed at the base of the pipe. These threw light on the bottoms of the trays, into the falling water, and created a glow in the surrounding pool. The