Limestone and Algae Control At Bill Bryant Lake

by **ROBERT P. GAYLORD**
Industry Hills, California

ON ROLLING HILLS that overlook the San Gabriel Valley and in view of snow covered mountains farther to the north, the City of Industry, California, created a convention and recreation center about five years ago. It is called, appropriately enough, Industry Hills. This 600-acre complex includes not only a large convention center and golf clubhouse, but also 36 holes of golf, 17 tennis courts, Olympic-size swimming and warmup pools, gardens, an equestrian center leading to seven miles of bridle trails, a number of other associated facilities, and a 300-room hotel with many restaurants. My story centers on a relatively small, conspicuous, ornamental lake at the base of the 14-story hotel, next to a practice putting green. This lake has recently been renamed the Bill Bryant Memorial Fountain and Lake. Bill was the first general manager of this huge complex.

The lake has a serpentine shape, 110 feet long with a maximum width of 55 feet. The depth varies from 0 to 26 inches, with an average depth of 14 inches. The water volume is 100,000 gallons. The lake bottom is concrete and large, 3-inch varicolored stones were set in shallow areas for artistic effect.

Limestone Buildup

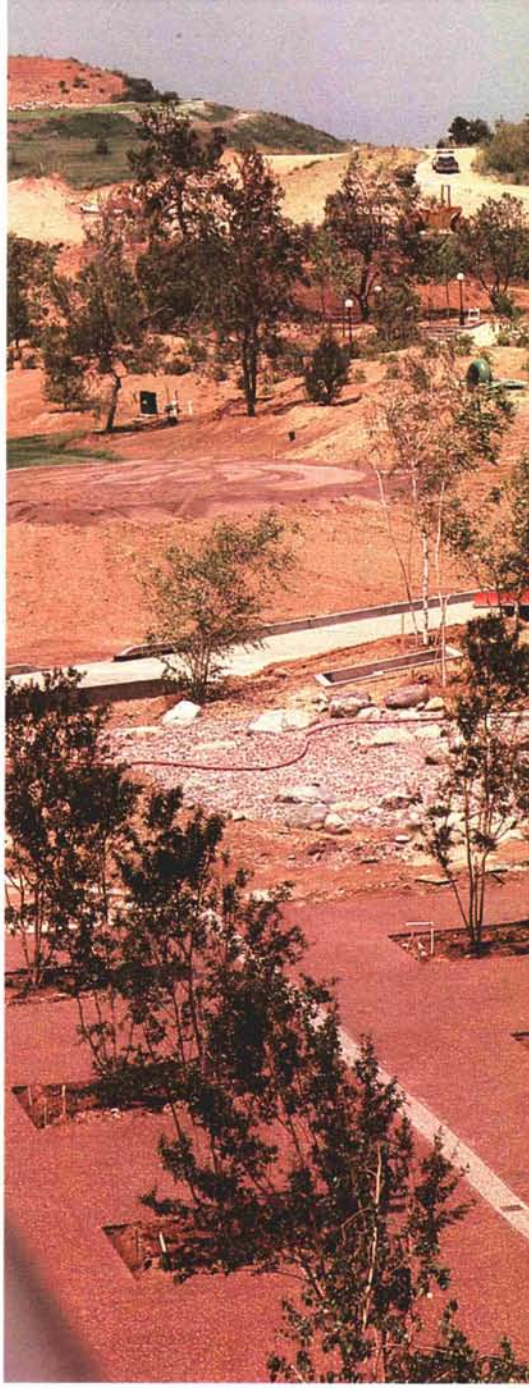
One of my first problems at the memorial lake was a buildup of calcium deposits on the decorative stones and lake bottom. Our water has a high calcium content, and it is, therefore, very hard. The gradual accumulation of calcium dulled the finish of the stones, cancelled much of their original effect, and actually turned an attractive idea into a not-so-attractive scene.

After a number of unsuccessful efforts and periodic scrubbing of the stones and lake bottom with heavy fiber brooms, we discovered a new technique that was said to eliminate calcium deposits in irrigation lines. While we were dubious of it at first, we found this technique effective in earlier tests on several of our irrigation pump screens and valves. The technique calls for installation of a series of magnets manufactured for this specific purpose by a local company. The proper magnets were fitted to all pumps and fill lines associated with the lake. Within a short period of time, the limestone problem disappeared. It has been completely controlled ever since by the use of magnets. They have been very effective under our conditions in all our irrigation operations.

The Algae Problem

The size of the lake, its shallow depth, and our warm climate created my next problem. Conditions were ideal for algae development, and this single-celled plant took full advantage. Algae control problems were made more difficult by landscape plantings around the lake — a grove of white birch trees that clustered by one shore, star jasmine, hebe, *Viburnum tinus,* and other shrubbery including hundreds of daffodils along the shoreline.

The water in the lake was originally designed to be treated as if it were in a swimming pool. The machinery and equipment consists of a 20 HP pump circulating 300 gallons per minute at a maximum head of 65 feet. Water is pumped through three large filters taking suction from six skimmers and also from the bottom of the lake. A 50 HP turbine pump is located in a separate pump room. This pump delivers 3,000 gpm at a maximum head of 50 feet to a multiple jet serpentine fountain that sprays water upward to a height of 15 to 20 feet.



The original intention was to treat the water with liquid chlorine by means of an injection pump in the filter pump room. This room, however, was also designed to house all electrical controls for the lake operation. Needless to say, the electrical components were soon adversely affected by the chlorine fumes. Furthermore, the spray from the lake fountain occasionally drifted into the trees and shrubbery around the lake. This set up the fear, later realized, of adverse effects to the surrounding greenery.

It was agreed that the chlorine concentration should be limited to two percent. The concentration is checked daily. In order to eliminate the electrical

(Above) The lake nearing completion.

(Left) Filamentous Algae blooms in the sunlight and warm temperatures.

problems, we decided to use chlorine tablets in the skimmers, and this kept the algae under control for several weeks. As the weather warmed, however, the algae bloomed and soon took over.

Our next step was manually to add liquid chlorine to the lake daily while still limiting the concentration to two percent. The algae gradually and eventually took over again. After every such takeover, the lake was drained, scrubbed, cleaned, and the bottom treated with Diquat.

Finally, we tried combining the chlorine treatment with commercial algicides. We selected Cutrine, which had helped us earlier in our irrigation lakes, and Endothall. As a start, we injected one quart of Cutrine (2.5 ppm) every other day and one-third pint Endothall (0.4 ppm) on alternate days. First tried in the heat of mid-summer, this method solved our algae problem. As cooler weather arrived, we were able to lower the concentration of both chlorine and algicides.

After several months we began to suspect that the Endothall was affecting the nearby birch tree leaves, and so we settled on a daily program using the commercial algicide and eliminating the Endothall. As of now, we have had eight months of clear, pretty water. The lake that is a memorial to Bill Bryant is now an attraction rather than the grey-green eyesore it once was.

The lake at night.