GRAU *from page 10*

supply. In addition to providing water it can also provide, with each acre-inch applied, two to four pounds of N, one to two pounds of P, and three to four pounds of K. Use of sewage waste water for irrigation also serves as an anti-pollution measure for our streams and lakes, particularly with respect to the eutrophication hazard. The principal obstacles to its more extensive use are the sanitary or health aspects and the resistance of the public from a psychological or aesthetic standpoint. Departments of health of some states permit use of chlorinated, pond polished or secondary treated effluent for areas subject to human traffic. Other states do not permit such use or have no stated policy, but consider each request on its own merits. With proper chlorination of a secondary effluent, it should not be difficult to reduce maximum total coliform numbers below 5,000 per 100 ml. and maximum fecal coli below 1,000 per 100 ml., two indices which have been recommended for water used primarily for irrigation. Examination of chlorinated secondary effluent applied to plots at Penn State indicated a monthly average over a six month period of 680 coliforms per ml."

The article in Grounds Maintenance, cited previously, is particularly intriguing. The Desert Inn started the system in 1952. The water costs $.05 for 1,000 gallons compared to $.06 to $.09 for pumped water and $.16 for purchased water. Other courses using reclaimed water include Paradise Valley CC and Winterwood CC, both in the Las Vegas Valley. There is much more.

Anyone who comtemplates using effluent water for turf would do well to obtain a copy of the article, "Sewage Effluent, A Coming Answer to Irrigation Problems?" from Grounds Maintenance, 1014 Wyandotte St., Kansas City, Mo. 64105, attention: Joe Clough.

As long as there are people, there will be sewage and water to carry it away. Golf courses generally are near residential areas, so that in the future, there need not be a real shortage of available irrigation water.

Q—*The lakes and water storage areas on our golf course has become impure with algae. We have fish in the ponds and they do not seem to be thriving. We don't want to use chemicals if there is another way. Have you any other suggestions or alternatives? (Ohio)*

A—I have been reading about the system of releasing tiny bubbles from aeration lines laid in the bottom of the lake. Bill Lyons at Canal Fulton, Ohio, has used the system effectively. Valved aeration lines release the bubbles, which, in rising, circulate the water and equalize temperature differentials between top and bottom layers. By introducing oxygen, the productivity of the water for fish is greatly increased. Aerobic conditions help to break down impurities and conditions are improved for snails, worms, crayfish and mayfly nymphs. The only system that has come to my attention, thus far, is that developed by the Hinde Engineering Company, Highland Park, Ill. □