

glance at the table shows the situation clearly.

Better to use a minimum size of two-inch pipe for all terminals, laterals, and risers. Two-inch pipe will carry 35 gallons per minute with a loss of only two pounds per hundred feet — hence two-inch pipe can be used for two outlets in runs up to 500 feet, or even more, under booster pumping.

### Mains

The minimum size acceptable for the principal main is three-inch and the four-inch size is much better. Four-inch pipe will carry 150 gallons per minute with a friction loss of only one pound per 100 feet of pipe, whereas with three-inch pipe the loss is nearly five pounds per 100 feet. Where the principal main branches, the branch lines should be two and one-half inches in size. If readers will examine the following table carefully, they will readily understand the question of pipe sizes.

### Friction in Pipes

Friction caused by the passage of water through pipes is little understood by both laymen and designers who are not engineers. Pipe friction is an insidious enemy which works unseen and unappreciated, something considered to be a mysterious technicality raised to complicate an otherwise simple matter. Yet there is nothing more certain and definite than friction in water pipes in connection with the carrying capacity.

We ask each reader to look at the above table, and notice the sharp increase in friction loss in the smaller sizes of pipe as the flow is increased from 20 gallons (one sprinkler) to 40 gallons (two sprinklers), and to 75 gallons (three sprinklers). With the foregoing table in mind, it is easy to understand how the friction losses in long runs of small pipe nullify the initial pressure, and handicap the greenkeeper.

### Friction Tables

Exhaustive investigation of friction losses in the last few years have resulted in a revision of the old tables of friction losses. Designers are advised to be certain that the tables they are using correspond to the foregoing table, which is taken from the standards of the Hydraulic Society and converted into pounds by the following: (1 foot of elevation = .433 pounds pressure). The new tables are much higher than the old tables. Some of the sprinkler manufacturers are still dis-

tributing the old tables which are now known to be very misleading.

### Pipe

There are three ordinary classes of pipe — steel, wrought iron, and cast iron. *Wrought iron and cast iron* pipe have a life of 75 to 100 years, or more. Steel pipe is made in plain (black) and galvanized finishes. Black steel pipe lasts from eight to 15, or even 20 years; galvanized steel pipe lasts longer than the black pipe. Clubs installing steel pipe do so in the certain knowledge of replacements within eight years to 20 years, according to water and soil conditions.

In the 3" size and larger, cast iron pipe is cheaper than wrought iron, both are equally satisfactory. In the 4" size and larger, steel pipe is more costly than cast iron, and awkward to handle. The following table illustrates the difference in the cost of different kinds and sizes of pipe:

## Chickweed and Plantain Control in New England

**Q**UES.—What method other than iron sulfate is effective in controlling chickweed and plantain? What strength?

Ans.—Enough iron sulfate to kill chickweed and plantain will kill the grass.

Spraying with arsenate of lead will do a good job on plantain. This is not so successful on plantain as on dandelion. Use about four pounds per 1,000 square feet.

Sulfate is not satisfactory because it kills everything. The chickweed came back.

On pearlwort, three pounds of sulfate per gallon applied with a paint brush gave good results in hot weather.

Arsenate of lead put on dry and washed in killed chickweed and not grass. This is due to the fact that the chickweed leaves being wider, hold the arsenate of lead while the grass doesn't. This was on the U. S. D. A. plots. Also used dry—dusted on the chickweed—gave good results.

Loosening the soil drives our plantain sometimes.

Plantain may be driven out by applications of poultry manure or by other fertilizer.—*N. E. Newsletter.*

Here's some indication of American ingenuity. George Klewer, a Chicago golfer, has a collection of 447 different golf tees, many of them being picked up at a Chicago public course.