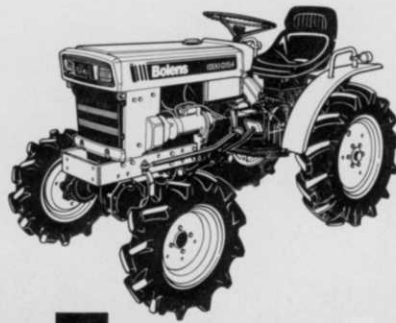


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tree storage, and 475,000 cubic feet of cold storage for seedling and tree storage.

Nearly all irrigation is done by sprinklers, the Rainbird type. The nursery has eleven wells and three ponds. Normally in the area, trees will consume 3/10 of an inch of moisture per day. The nursery has a system of moisture plugs which electronically monitor the moisture content of the soil at various depths. The moisture plugs indicate when to irrigate and how much water to sprinkle on the field to keep the moisture content above 50 percent of field capacity.

Generally, four herbicides are used for special purposes. Simazine, enide and paraquat are used to maintain control of weeds down the rows. Roundup is used to clean a field before replanting. A wide variety of insecticides is used depending upon the type of insect that is being combatted.

Western Oregon soil is acid. Before planting, approximately every five years, up to three tons of lime must be worked into the soil one year before, to give it time to react.

In our climate, trees do not do well unless they have at least 100 pounds of each of the three major elements per acre. There is no standard fertilization practice in the sense that all fertilizing is done based upon either soil or tissue analysis. Fertilization is done just before planting a field followed by both ground and air applications according to season, the variety of the trees, and soil and tissue analysis. Aerial spraying is necessary in late winter when the fields are too wet for standard ground equipment.

Between crops, soil is built by one year of green cropping to develop humus in the soil and one year of summer fallow to clean the field of any weeds. Weeds are a concern not for the competition that they might

give to the trees, but the fact that they become hosts to various types of insects.

Advertising is done in two major horticultural publications in the United States and one major publication in Canada. A second source of advertising is attendance and display at the major trade shows and conventions throughout the sales area. The company attends ten such shows each year. Schmidt has many visitors and at those times when there are special meetings in this area an effort is made to bring visitors to the nursery. For instance, during the A.A.N. Convention in Seattle last year, visitors were brought from Seattle to Portland and given a tour of the nursery's fields and facilities.

The company also publishes a monthly newsletter to inform the customer about various factors of weather, cultural practices, and the outcome for the upcoming crop. Further, it serves to acquaint the



A specialized blower used to weed between the trees and to remove soil build-up around the stems of the seedlings in preparation for the budders.

prospective customer with the company. Beginning in September, a stock available list is published once each month, until January when two stock available lists are published each month until late spring.

Until recently visiting customers was done by staff members from the home office periodically through the summer. Now regional sales representatives are being contracted who will visit each customer periodically.

There has been a gradual evolution from complete use of rail car to tractor-trailer truck. This has permitted more rapid transportation, the customer to get last minute needs, to-the-door delivery, and less of handling the trees. All shipping is done by temperature-controlled trucks contracted with independent carriers through a shipping brokerage firm.

There are several problems, or challenges, to be overcome to keep a healthy shade and flowering tree industry. Labor costs, both direct and indirect, plus inflation are causing sharp rises in the cost of production which must be passed on to the wholesale customer and eventually to the consumer. The minimum wage law is not only effecting the lower portion of the wage scale, but all the way up the line. Indirect costs such as workman's compensation insurance and now the Oregon agriculture unemployment tax have increased our labor costs between 15 and 20%. Furthermore, the agriculture labor supply appears to be dropping as we are expanding.

Absenteeism and turnover are resulting in the need for more supervisory personnel and training time. This fact, coupled with the lack of equipment engineered for the nursery industry, makes us very dependent on a large labor supply. Therefore, a second problem, or challenge, is the development of equipment, either by the manufacturers or by the nurseries themselves.

The third challenge is the need for continuous study to select new cultivars for asexual propagation. There are presently several standard plant materials with undesirable qualities such as disease tendencies and undesirable growth characteristics. Continuous study should go on to provide a wider selection of deciduous plant materials.

The consumer is awakening to his broad range of plant needs. Much time and effort must be expended

to provide the consumer with reliable information about the many cultivars that are presently being produced. There is need for a broad range study throughout the United States to observe the cultivars which have now been planted under various climatic conditions. To date, standard manuals have not been published containing this information. Studies by Dr. Phillip Kozel at Ohio State University, are recording the desirability of many cultivars now on the market for street and home planting. Similar studies need to be made in many areas. Another important study is the one being carried out by Dr. Lester Nichols at Pennsylvania State University. This one has a broad spectrum of observation of Crabapple trees and their resistance or susceptibility to the five major diseases that effect this group of trees. Observation is going on in many locations. Yearly results on over 600 varieties and cultivars are being summarized by use of a computer. This type of study will establish credibility for the B & B grower to buy and to produce a wider selection of materials. Likewise better credibility will be established for the garden center to stock, sell, and educate the consumer. The same would apply for the landscape contractor and the landscape architect. The next challenge is the need for a forum between the landscape architect and contractors and the growers of tree materials. Future tree needs need to be discussed since it is nearly five years from the time a root stock is developed before a finished bare root tree is ready for sale, or eight years or more before that tree becomes available as a specimen B&B tree for landscape purposes. There is a need for consumer research as basic information for all the various elements of the nursery.

There is a definite trend in demand for higher quality shade and flowering plant materials. The demand and the willingness to pay a higher price for well-grown nursery stock is strongly evident. The consumer is also looking for a wider range of tree characteristics; blossom and color, growth habit, size and general form.

The consumer is probably more open to education now that he has ever been. Efforts are being made for consumer education. It is quite evident that the garden center operators and the landscapers are all beefing up this process in their individual businesses. **WTT**

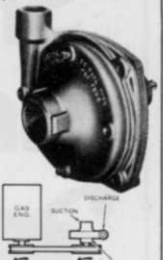
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Wight Nurseries, located near Cairo, Georgia, grows 250 acres of container grown stock and 125 acres of field grown stock. "Containers make up the vast majority of our stock, we have over five million," says John Wight Jr., president of the company. "You get 30,000 plants per acre in cans while you only get about four or five thousand in the field."

Wight is a wholesale nursery, specializing in evergreens. About 60 percent is broadleaf evergreens while the remaining 40 percent is coniferous.

The nursery requires approximately 225 full time employees. Because they are far enough south, seasonal turnover is quite small, not over 10 percent.

Sixty-five tractors and 14 pick-up trucks are included in the equipment inventory. Most of the tractors are under 35 hp and about 55 of them

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With as well as a Gravelly is built, you probably won't have to.

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are used for pulling wagons. Four hundred wagons are used for moving the container stock around. Each wagon holds 361 cans and the wagons are usually pulled in tandem, two to a tractor. Equipment replacement includes about five pick-ups and 10 to 15 tractors a year.

Most of the irrigation system is permanent set, except for some in the field, according to Wight. "It is in



Acres of plants are grown under plastic.

beds 100 ft. wide and there's a row every 100 ft. We've probably got 50 miles of rows," he estimates. Water comes from eight lakes on the property and three deep wells that give 700 gallons per minute. All of the containers are irrigated with an inch of water every other day.

Equipment maintenance at the nursery is limited. The heavier jobs are sent to shops. "Equipment quality is good," says Wight, "The price has just gone up, up, up. We're buying all American-made tractors now and they are about 150 percent up from what we were buying them for six or eight years ago."

Most of the chemicals necessary are purchased near the beginning of the year. "In some instance we get bids on large quantities and base it on a year's supply," Wight says. "Lesser quantities we just buy when needed."

Containers are probably the major expense at Wight Nurseries. "We're using primarily one supplier," according to Wight, "and are spending a great deal with them, probably over half a million dollars."

Ninety-five percent of the plants are shipped by refrigerated semi. They are mainly shipped east of the Mississippi River, with occasional shipments into Arkansas and Texas. March and April are the nurseries' biggest months for shipping. We probably ship 40 percent then, says Wight. November through February, we have very little going into the North, but we also ship into Tampa and Jacksonville, Florida, New Orleans and other areas where there's no frost." About forty percent of the northern shipments go in August and September.

"We don't own our own trucks," Wight says, "and we have to compete with Florida produce. If they have a perishable item, they'll outbid you for trucks and then you get into a hell of a problem."

Advertising is done on the back page of "Nursery Business" and a couple of other trade papers with full page ads on occasion.

As far as trends in the nursery business, Wright predicts: "The big ones are going to get bigger. It's getting much more competitive and will continue to do so." **WTT**

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OPERATION AND CONTROL OF SPRINKLER SYSTEMS

By James A. Watkins, Director of Training, Telsco Industries

Part Two: Sprinkler Equipment

Control, or operation, of system zone valves may be manual or automatic.

MANUAL CONTROL

Manually controlled turf sprinkler systems use standard commercial globe valves. Globe valves of either the straight or angle type are acceptable. Angle valves are most commonly used because there is much less pressure loss through this type.

Never use gate valves for zone operating valves. They are not intended for continual use and will soon leak if subjected to such use.

Globe valves with swivel disc holders and soft rubber discs for cold water service should be specified in order to avoid an abnormal amount of maintenance. Brass-to-brass seats inevitably leak under continuous use. Stems should be heavy enough to support key operation without breaking. Stem packing should be generous. Ports through the valves should be full-size to minimize pressure loss.

Manual control valves may be decentralized for economy or manifolded at a central point for control convenience. The latter is more costly, especially on large installations. However, it is accepted practice on residential lawn systems. In any case, manually operated zone control valves should be located so the operator will not get wet, even with wind.

When the valves are manifolded, one group, controlling front yard zones, is usually installed near the front entrance. A second group for the back yard zones is manifolded next to a patio or rear entrance. The two manifolds are then connected by a single supply line from the meter or other source of water supply. See Figure 11.

AUTOMATIC OPERATION

Automatic turf sprinkler systems have a great advantage over manual control. They offer complete independence from watering chores, release time for leisure, provide continuity of the watering schedule during periods of owner absence, save water, and save the cost of labor on larger

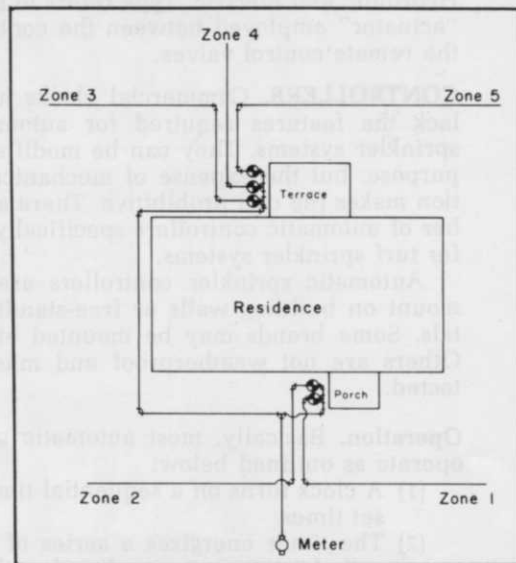


Figure 11: System using standard commercial globe valves.

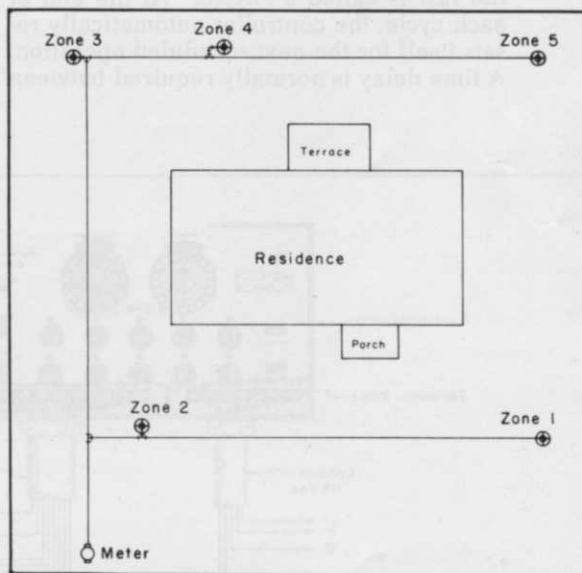


Figure 12: System using remote control valves.

properties. Automatic systems now comprise a majority of the new installation market. The cost over manual control amounts to only a few dollars annually when the added cost is amortized over a twenty year life. These small sums can be recovered in water savings alone!

Automatic control consists of a conveniently located "controller" which operates "remote control valves." One valve is required for each watering zone.

The remote control valves are dispersed throughout the system, thereby saving considerable quantities of piping. See Figure 12. The valves are usually installed at the side entrance to a zone or at the center of a zone, depending on how the main supply pipe is routed. Thus, they are also

The following article is an excerpt from the Sprinkler Equipment chapter of the TURF IRRIGATION MANUAL by James A. Watkins and is reprinted with permission of the author and the publisher, Telsco Industries. Other chapters of the TURF IRRIGATION MANUAL include Piping, Hydraulics, Water Hammer, Cross-Connection Control, Pumps, Clean Water, Sprinkler Performance, Plot Plans, Head Layout, Pipe Sizing and Zoning, Rotary System Design, Golf Course System Design and Electrical. In addition, the book has 60 pages of design reference tables.

The author, James A. Watkins, is presently director of training for the Weather-matic Division of Telsco Industries and has more than 40 years involvement with turf irrigation. Copies of the TURF IRRIGATION MANUAL are available for \$19.50 each plus \$1.25 shipping and handling (U.S.) from Telsco Industries, P.O. Box 18205, Dallas, TX 75218.

more efficient and conserve pressure lost in the longer pipe runs of globe valve systems.

There are two types of automatic system: *Hydraulic* and *Electric*. Type refers to the kind of "actuator" employed between the controller and the remote control valves.

CONTROLLERS. Commercial clocks and timers lack the features required for automating turf sprinkler systems. They can be modified for this purpose, but the expense of mechanical renovation makes the cost prohibitive. There are a number of automatic controllers specifically designed for turf sprinkler systems.

Automatic sprinkler controllers are made to mount on building walls or free-standing pedestals. Some brands may be mounted either way. Others are not weatherproof and must be protected.

Operation. Basically, most automatic controllers operate as outlined below:

- (1) A clock turns on a sequential timer at pre-set times.
- (2) The timer energizes a series of terminals called "stations," one after the other and in sequence. The entire automatic progression of energizing stations from the first to the last is called a "cycle." At the end of each cycle, the controller automatically re-sets itself for the next scheduled operation. A time delay is normally required between

the ending of one cycle and the clock start of another.

- (3) Each zone valve is connected to one of the stations in a pre-selected watering sequence. When a station is energized, the remote control valve is actuated and sprinkling occurs in that zone for a pre-set period of time.

Standard Controller Features. Good automatics will have these features:

- (1) An easily adjusted clock monitor for starting the watering cycle at any hour of the day or night.
- (2) A calendar dial for programming automatic water cycles on any day or days on a repeating 14-day period.
- (3) Sequence timer with variable time that can be easily adjusted for a minimum time limit of not more than 5 minutes. Maximum water time should be not less than 30 minutes for spray systems and 60 minutes for rotary systems. Timing should be independently variable for each station.
- (4) Semi-automatic performance, so that the automatic progression cycle can be started manually without disturbing the clock setting. Control should automatically shut off at the end of the manually initiated cycle and re-set for the next scheduled operation.
- (5) Manual operation of each station, at ran-

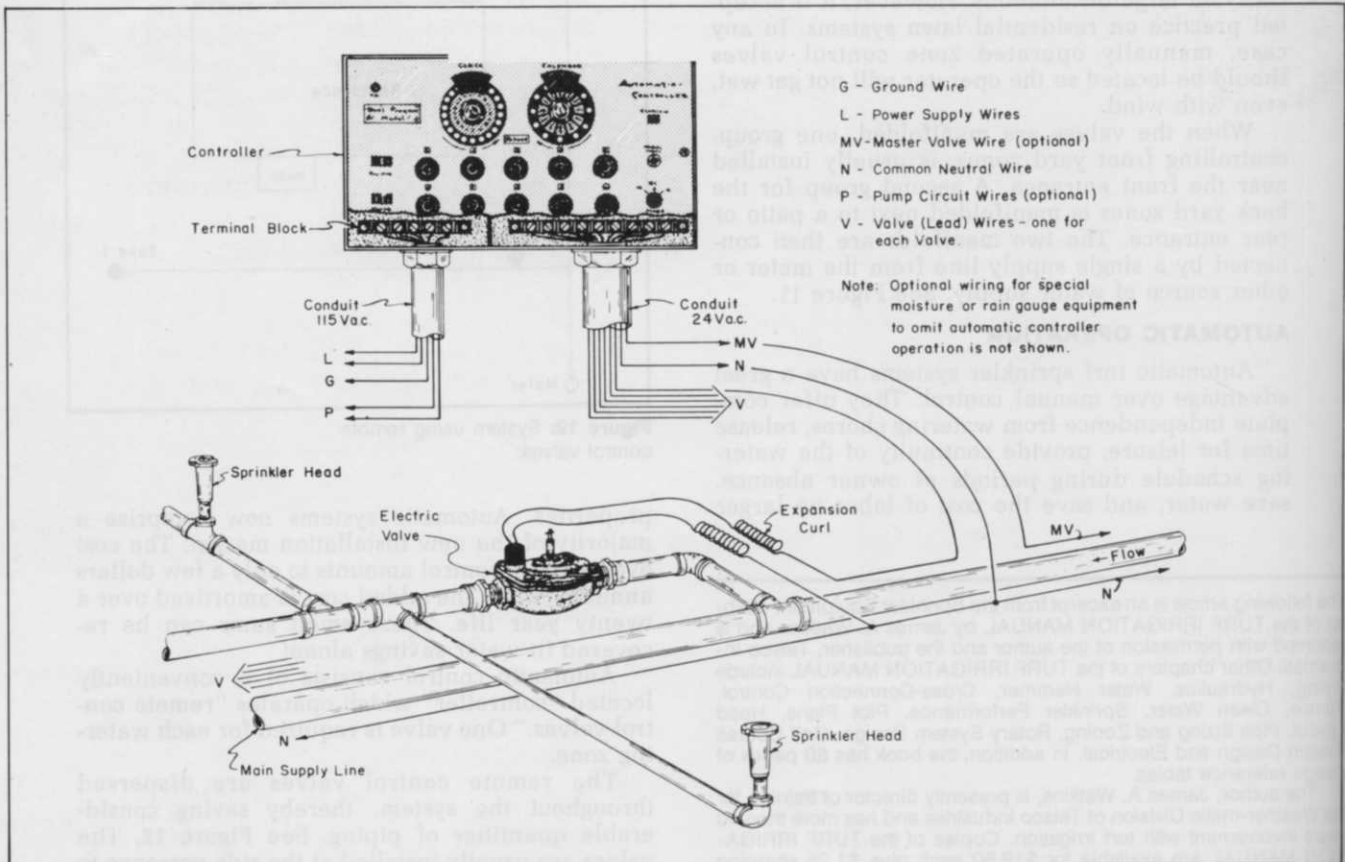


Figure 13: Typical wiring connections for electric controllers.