

J. O. J. NOER

SUMMARY OF PROCEEDINGS
ANNUAL CONFERENCE OF THE
MID-ATLANTIC ASSOCIATION OF GOLF COURSE SUPERINTENDENTS

Under the Auspices
of the
Extension Service - University of Maryland

Holiday Inn-Downtown
Howard and Lombard Streets
Baltimore, Maryland
January 11 and 12, 1971

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HOLIDAY INN-DOWNTOWN, BALTIMORE, MARYLAND
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Summary

The 1971 Annual Conference of the Mid-Atlantic Association of Golf Course Superintendents opened at 10:00 A.M., January 11, with more than 200 in attendance. The Conference was called to order by Dr. George S. Langford, State Entomologist, University of Maryland. George B. Thompson, Program Chairman, then introduced Dr. Elwyn Deal, Assistant Director, Maryland Extension Service, who welcomed the group on behalf of the University of Maryland.

Following Dr. Deal's welcome, Russell Kerns, the Association President gave his presidential message. He thanked the Superintendents for their support through the year and commended the program committee for its work in arranging the conference and the development of a comprehensive and balanced program.

The toastmaster at the banquet was Angelo Cammarota and the principal speaker was John A. Stupalsky, Information Specialist, Maryland State Board of Agriculture, University of Maryland. Mr. Stupalsky's address entitled, "Your Image and You", was inspirational, dynamic and practical. He talked about needs and requirements, as well as guidelines for image and good public relations. He then outlined some of the necessary procedures for accomplishment.

Featured at the banquet were scholarship awards to four young men who are students at the University of Maryland, and who have a special interest in turf. They were Jerry Gould, Michael Larsen, Carl Rasnic and Harvey Wilson. The presentations were made by Richard Blake, Vice President of GCSAA.

Toastmaster Angelo Cammarota announced that Ed Dembnicki was the recipient of the Association's "Superintendent of the Year Award". Unfortunately Mr. Dembnicki could not be present to accept it at the banquet. Mr. Cammarota briefly outlined Mr. Dembnicki's many contributions to the Mid-Atlantic Association, as well as to golf. A former superintendent of the Indian Spring Country Club, Mr. Dembnicki is now superintendent of the Country Club of North Carolina, Southern Pines.

Another highlight at the banquet was the recognition given to Dr. George S. Langford, Maryland State Entomologist, who will retire April 1. He was given a television set by the Association in appreciation for the support and assistance he has given the Conference for many years. Robert Shields made the presentation. Dr. Langford has been attending the Conference since 1930. Since 1955 he has worked with the Program Committee in scheduling the Conference and preparing the program.

Except for three talks not readily adapted to transcription, a summary of the proceedings follow. The talks given, but not included in these proceeding were: Sub-Surface Irrigation by Dr. William Mitchell, University of Delaware, Newark, Del.; Environmental Control Through Pesticides, by Dr. H. B. Couch, Virginia Polytechnic Institute, Blacksburg, Va., and Equipment Modification by George Cleaver, Chestnut Ridge Country Club, Lutherville, Md.

SECOND EFFORT
JAMES F. GILLIGAN

My talk this morning is to introduce and outline the film that you will be seeing in a few moments. The film is called "Second Effort", and it features the late Vince Lombardi, when he was coach and general manager of the Green Bay Packers. The film is a 16 mm sound motion picture in full color.

In preparing this introduction, I have viewed the film a number of times and I know it offers sound, practical ideas that we can use and that have proved successful before. I know that each of you will gain some benefit from the film and the ideas that it expresses.

The film was made primarily as a sales training incentive, but we can take from its underlying theme of motivation and apply it to our profession and job. Motivation is a great force, but who motivates us? We must be our own motivators. By listening and watching, Lombardi will outline his ideas of motivation in the film.

Before we actually proceed into the viewing of the film, I would like to take the time and outline his basic rules of motivation and apply them to our position as golf course superintendents.

Lombardi's first motivator is: FATIGUE MAKES COWARDS OF US ALL.

We know that our schedule is a seasonal one. We know we are on the job almost daily for a period of 9-10 months of the year, and we know there aren't many days off during this time. Who knows better than the superintendent of this area how the hot humid days of the summer can take their toll physically. Being in good physical condition can be an asset during these days. When you are tired physically, you are tired mentally; you lack the drive and aggressiveness that is needed.

His next and I believe the most important of the five motivators is called: MENTAL TOUGHNESS IS ESSENTIAL TO SUCCESS.

Success in anything in this world is at least 75% mental. It is the positive mental attitude that creates the will to succeed. With mental toughness, you concentrate on every small detail of your job with a determination to have your best going for you at all times. Good physical condition contributes to good mental condition, but the major factor for mental toughness is self-confidence. And how can you, as a superintendent, acquire the confidence you want? You get it by overcoming the difficult situations; possibly a disagreement with a greens committee, criticism from the golfing public, (a very sensitive area), adverse weather conditions, labor problems, or any of the many obstacles that present themselves in our profession.

Confidence can be acquired by completing difficult jobs, by studying your failures and by going back and correcting them. In short, you acquire confidence by doing, or even failing to do. As you progress, you begin to realize that your managing ability is improving. You notice that problems which might have thrown you for a loop in the past, no longer bother you. You become aware of having answers for questions that you once found extremely difficult to handle.

You begin to think of yourself as a dedicated, determined superintendent. You like the classification and you are determined to keep it and to make others aware of it. You're in condition to be a successful superintendent and you make up your mind to keep that fine edge of managing skill.

Once you build that kind of confidence, your mental toughness may take an occasional jolt, but it's never going to be seriously injured. Supporting your unshakable attitude is the next of Lombardi's motivators, borrowing a common phrase in football:

CONTROL THE BALL

Controlling the ball in our situation means that we must have full control of our responsibilities. We must be prepared, have a game plan, as in our case a budget. Not just figures, but facts to back them up. We must have a working plan to follow, to show progress, to be heard. We have got to have discipline, to keep control, especially with ourselves and our labor force. To keep control, we've got to show our members that we are continually doing the job to the best of our ability.

To keep control we must know our job, keep abreast of current trends, improve our knowledge of turfgrass research and development.

Confidence comes with ball control and confidence is contagious. Almost as contagious as lack of confidence.

The fourth rule in Lombardi's winning formula is: OPERATE ON LOMBARDI TIME

To quote Jerry Kramer, former Green Bay Packer, "There is regular time and Lombardi time. With Lombardi time, if you're ten minutes early for practice, you're still late".

Time spent on a job for which you are unprepared isn't Lombardi time. Time spent sitting and waiting isn't Lombardi time. Lombardi time is time used to its maximum effectiveness.

But even when you make every minute count, when you control the ball, when you're physically fresh and mentally tough, there is one factor that separates the men from the boys in business as well as in football. It is the fifth and final rule of the winning Lombardi formula: "MAKE THAT SECOND EFFORT".

The successful man is the man who makes his second effort pay off. He is the man who makes a commitment to a career and then puts everything into it - mind, body, heart and soul.

The second effort men are the ones with the will to win - the dedicated, determined competitors who won't be beaten because they refuse to accept defeat. They offer inspiration, certainly; but much more than that, they offer hard practical proof of what total commitment can accomplish.

It should prove that a man can be as great as he wants to be; that if you believe in yourself, if you have the determination, the courage, the dedication, if you're willing to sacrifice the little things in life for great accomplishments, it can be done.

It may sound intangible perhaps when you hear the merits of physical fitness, mental toughness, ball control, proper use of time and the second effort extolled, but Lombardi's five basic rules have passed the test of practical use and there is nothing intangible about the results they have achieved. These results

are as real and solid as anything can be, and the success and pride these five rules can bring to the man who follows them are well worth the effort, yes, even second effort.

I ask you now to place yourself as a superintendent in the position of the man Lombardi talks with during the film. Ask yourself how you would react to a motivating force such as Vince Lombardi. I think after seeing and hearing what he has to say, we will know that his ideas do apply to us and I know if we put them into practice, we can achieve a greater success in our field than possibly we already have.

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THE IRRIGATION SYSTEM AT MOUNT PLEASANT
RICHARD BLAKE

During the past ten years, there have been more articles written on irrigation than on any other phase of the turf industry. This topic has been discussed in various degrees at National Turf Conferences, regional and local seminars and numerous publications have been prepared and distributed to golf course superintendents and club officials. The Universities offering turf management courses have offered special courses in irrigation. The manufacturers of irrigation materials and supplies have provided special courses and qualified engineers to meet with club officials and superintendents and contractors when a club has requested this service.

Gentlemen - The factual information is available - often free of charge - Use it and Evaluate.

The first step for those contemplating the installation of an irrigation system is PLANNING. Gathering factual information, talking with qualified engineers and contractors, and visiting with superintendents who have or are now installing automatic systems. This will take time and effort but will be well worth it. If possible take a club official with you.

Read and make yourself familiar with the information available. I would suggest reading in detail the 1968 & 1970 Conference Proceedings pertaining to irrigation, published by GCSAA. I would also suggest that you read the book entitled "The Economics of Large Scale Turf Irrigation", and the book entitled "System Design for Golf Course Irrigation", published by Edward Pira, Ag. Engineering Dept. U. of Mass.

Your conclusion after reading these books should be that although you are very well informed and knowledgeable, you are still not an irrigation expert or a hydraulics engineer. Unfortunately, however, neither are some of the people in the irrigation business who sell and design systems. Neither is the club official who often makes the decision as to what system shall be purchased. In too many cases the only consideration of a plan or proposal is the initial cost. How many clubs do we know of that have installed two or more irrigation systems in the past few years. We don't know the actual costs, but we do know that if one good system - Well Planned, Properly Designed by a qualified engineer and properly installed by a reputable irrigation contractor had been correctly installed the first time, the cost would have been considerably less than two poorly designed and installed systems, to say nothing of the aggravation and inconvenience to the golfing membership.

Evaluate the true costs of materials and professional services.

Work with the U.S. Department of Agriculture and the Soil Conservation Service, they offer a service to the superintendent and golf course. They have the factual information and knowledge pertaining to soils, drainage, water sheds and sources that must be studied prior to installing a system.

Remember that an automatic irrigation system is a Tool, not a cure-all or a luxury. You must perform all the cultural practices required and necessary to maintain fine turf only more so after the installation of a system. Don't sell the system with the idea of saving labor or money. What you save in one area is more efficiently used in another.

Aggravation - you'll get your share. The same people (some of the membership) who took two years to talk about a system, who thought water just runs out of the faucet, will suddenly have become irrigation experts, and after deciding on a certain system and signing a contract will now expect the system to be installed and in operation as soon as possible without inconveniencing a single golfer. This is the time to keep your cool. Don't be rushed into taking short cuts. A water system is a long term investment.

Work with experts. Hire a qualified experienced and competent engineer to design the system. Require accurate and detailed plans. It's surprising how few clubs have up to date accurate detailed drawings of their golf course.

If bids are required, make sure they are on the same type of system and the smallest details are spelled out in writing. Have a contract and require a performance Bond. Determine before the contract is signed and the actual work starts, what your responsibilities are. Do you represent the owner. Keep accurate records on a daily basis.

Select a reliable contractor. One with experience and equipment capable of doing your installation.

Purchase the best equipment available, be it pipe, pipe fittings, wire, sprinklers and controls. Know your contractor and supplier, his reputation, his past performance. Know what is behind him, be sure it is assets and not the sheriff.

Experience - You'll know a lot more about irrigation after installing a system. You'll change your accepted ways and methods of irrigation. It will take you a year or two to program your automatic system to the best advantage of the turf and soil conditions. You'll wonder how you ever progressed as far as you did without an automatic system.

If you have poor soil conditions and drainage problems before installation of a system, these same problems will be increased.

In conclusion, briefly a few facts of interest. This system comprises: 114 Electric valves which operate 66 gear driven sprinklers that are located on greens, usually 4 per green, plus the turf nurseries, 129 Nelson #2 pop up sprinkler heads located on the tees, plus 312 thompson heads located throughout the fairways that are spaced at 60 ft. triangle intervals. In most instances 4 or 5 sprinkler heads are controlled by one electric valve. The valves are controlled from 13 electric clocks divided into 6 zones. (These clocks are located in the steel enclosed houses at #10 tee, #12 tee, #14 tee, #15 tee, #3 tee and #7 tee). Eventually one master control can be installed to control all six of the existing controllers. This will eliminate the constant need to shut off and re-time clocks at those 6 stations.

There has been installed over 10 miles of pipe from 1 1/4" up to 8" in diameter. The main lines are transite 3, 4, 6 and 8". The pipe with constant pressure on the line is galvanized and the remainder is PVC plastic and pressure is on the line only when the sprinklers are in operation.

A live snap valve is located at each tee and green for manual operation and so that proportioners may be used. There is over 22 miles of wire installed.

Advantages of an automatic system are:

1. Labor - Less labor is needed to operate the system. However, the labor hours saved on this operation are required for maintenance.

2. Quality Control - You can get more water when you want it, where you want it, and in the quantity required.

3. Turf grass management benefits:

1. More efficient use of water
2. Precise control
3. Water conservation
4. Minimum loss of turf grass
5. Easy to remove dew and frost
6. Less wear and tear on turf grass
7. Control over fertilizers and other chemicals

4. The superintendent is in complete control of the irrigation system and is not forced to depend upon others.

5. People benefits:

1. Golfer satisfaction
2. Less night duty
3. Smaller, more efficient, crew
4. Less vandalism
5. More favorable comments on condition of course and better playing conditions
6. Peace of mind for the superintendent

RADIO CONTROL AUTOMATION

MELVIN B. LUCAS, JR.

This subject which I have been asked to speak about is one that is about the easiest and uncomplicated irrigation systems on the market today either in understanding it, installation and maintenance, plus the ease of selling to the members and the versatility of it.

I became Superintendent of the club in May of 1966 and undertook a three phase program to automate the greens, tees and center row quick coupler system that had been installed in 1958 at a cost of \$55,000. We installed a loop system around each green with four pop-ups and a manual operated (Bleeder) electric valve. The cost of this system was \$5,231.36 and was finished in two and one-half weeks. The conversion of tees started in the fall of "67" and was finished in the fall of "69" at a cost of \$2,342.58. The trend so far was in the direction of an electric system.

The 1969 season brought forth a new concept of automation in the usage of Radio Rain installed at Piping Rock Club, my father's club. This was the proto-type and there was much to be remedied during the season. The changes made throughout that season brought this device into being, one that meets all needs for any course and with this the potential was realized. Thus, I approached the club with the possibility of our installing it and with some skepticism the members approved.

The installation of this system began the 26th of September 1969 and in 29 work days it was totally finished by my men and myself. The total cost for sprinklers, valves, hydraulic tubing, sheathing, drains, cement, cases, metal and galvanized fittings came to \$10,605.30. The Radio Rain components came to \$10,175.00. The labor of installation was \$4,101.75. Thus a total cost for fairway automation was \$24,882.05. The comparison cost of doing the same job with an electrical system would have been upwards of \$75,000. to \$80,000. This fall I was given the go ahead to automate the greens and tees by use of this system and figures have it that this will go for \$12,420.00. In a final summary of costs for complete automation over this five year span, it will have cost us \$44,655.99.

We all know the necessity of water, using it properly at short morning intervals for disease and dispersement of gutated water, syringing of turf during stress periods. The proper management of these factors only lies with an automatic system, no matter what kind of system, and how you use it so as not to compound your problems by excess. My arrival at this club showed me what unmanaged water had done as to species of grass, soil compaction, weeds, disease and breakdown of nutrients less available to the plants. I have cut down over a period of years to 12,000,000 gallons opposed to the 55,000,000 per year used up till 1966. I might add that much renovation was done during this process and I feel that it would have been wiser to have automated the system first, before renovation.

The present day situation of tight money has certainly hurt many clubs from having an automatic system and we are all faced with the fact that our men, or more than likely we, will have to water the course ourselves. All I can say is, with labor demands so strong, everyone having more free time, our lives during the summer become so restricted that we should do ourselves a favor, plus helping the golf course, and live up to the Superintendent status that we label ourselves with. This system is only one way that will aid in producing what we all aim for.

WINTER TROUBLES WITH BERMUDAGRASS
HOLMAN M. GRIFFIN

According to many authorities who should know and my own recollection of the past ten years in turf, bermudagrass has suffered only two widespread kills during the winter in the past 30 years. Of course another way to put it is that both these disasters have occurred within the last 7 years.

Many of you may remember the winter of 1962-63 when not only bermuda, but cool season turf was lost and certainly most of us will long remember this past winter on bermuda.

The State Climatologist in Athens, Georgia recorded the longest prolonged period of freezing temperatures since 1898 this past winter and other states set similar records. As a result of these conditions, bermudagrass was lost from the northernmost regions where it is adaptable down into the lower portions of most southern states.

Now let us examine some of the reasons for bermuda loss. Some killing occurred on bermudagrass at the time of freezing if the turf was over succulent due to excess fertilizer late in the season. Such plants have a high proportion of water in their cellular structure. When rapid freezing occurs, ice crystals form within the cell and disorganize the cell protoplasm, which is the vital part of the cell. This kind of ice formation almost always causes severe damage or death.

Normally a plant is hardened by the gradual onset of cold weather and goes through a slowing down process whereby the cells lose much of their free water and the cell sap becomes more concentrated. Biochemical and biophysical changes take place which cause the vital part of the cell to become hydrated with water in a "bound" or unfreezable form and damage is much less likely to occur during the winter.

Turf may also die at the time of thawing if the plant is not in a healthy hardened condition. When frozen, water is pulled out of the cells and the protoplasm becomes balled up. If the protoplasm is not supplied with the "bound" or unfreezable water during this period it may become brittle. When thawing occurs, water rushes back in and the protoplasm is subjected to sheer forces sufficient to destroy it, thereby killing the plant.

Another problem associated with the winterkill of bermuda is lack of a balanced fertilizer program. Nitrogen alone does not seem to have a major direct influence on cold tolerance as we have long thought, but it does have a great influence on the assimilation of phosphorus and potash and the ratio of these three elements to each other is a key factor. Generally speaking, high nitrogen content of plant tissue increases the assimilation of phosphorus and potash and when these elements are out of balance in the soil they may unbalance the plants cold protection system.

The effects of nitrogen and phosphorus are both offset by potassium and this element probably has the greatest influence of all on cold tolerance. Turf consumption of these elements is thought to be in an approximate 4-1-2 or 5-2-3 ratio, but apparently there is much less need for phosphorus (except in new plantings) and a much greater need for potash applications than was previously thought.

Disease may also be a factor in the loss of bermuda during cold weather. Although the snowmolds are rarely recognized on bermuda, they have been reported from time to time. Spring deadspot is one of our worst problems at this time and although

little positive information on this disease has been discovered to date, the problem is being researched at several stations. Research at Athens, Georgia has uncovered several possible causal organisms and has given us a little more information about the nature and treatment of this disease.

There are many cool season fungi which attack cool season grasses and although dormant bermuda seems immune to most fungi, it may be that we are just not aware that they are causing problems.

Another one of the worst causes of winterkill is traffic. Unprotected bermuda or that which has not been overseeded to provide a cushion of live turf is especially subject to winter kill when trafficked. Concentrated traffic is also especially damaging and produces poor soil structure and sometimes rutting, both of which are quite often troublesome throughout the following year. Damage from traffic is usually visible on tees, cart trails and the favorite pen setting area in greens.

Now it may seem that I have advocated a cushion of live turf as the answer to winter traffic but actually the overseeding itself is a source of problems in the spring of the year and quite often contributes to bermuda loss.

If the overseeding is too dense or allowed to stay on the bermuda too long into the spring, damage will result. This is especially true of common ryegrass. And, even with overseeding, there are times during adverse weather when permanent greens should be closed.

Height of cut of the bermuda has been proven many times to exert an influence on winterkill. During our two bad winters we saw many closecut fairways damaged or totally killed right up to the rough line where the grass was a half inch or more higher and where no injury occurred. When the grass is allowed to grow a little longer in the fall, say to 3/4 inches in the fairway, bermuda is able to store up more food reserves in the stolons and rhizomes and the extra height in itself gives some insulation against cold weather.

In the spring, all excess material and a great deal of the thatch should be removed to allow faster soil warming by the sun and the plant parts will get the benefit of the soils radiate heat to initiate new growth. Thatch not only harbors disease but acts as an insulator against soil warming.

Another factor which keeps the soil cold in the winter and spring is shade. Many times we have seen bermuda killed in the exact shade pattern cast by a large evergreen or a heavily branched deciduous tree. The effects are usually more pronounced if the turf is shaded from the morning sun. Another way of establishing the effect of soil warming and shade is to examine a southwestern exposure as opposed to turf exposed to the northeast. Any turf does better in the winter when exposed to the direct rays of the sun on a warm southwestern slope.

Last of all, soil aeration is a big factor. Poorly drained soils are cold soils and bermuda needs all the warmth it can get. Mechanical aeration and spiking during the early spring when the weather begins to warm up are two good ways of helping to warm the soil and get bermuda off to a good start. We have seen countless examples where soil aeration made the difference between live and dead turf in the spring. In our disaster years, few if any greens less than five years old were damaged and in many cases turf areas sodded the year prior to a bad winter were left untouched to the exact line of the new sod with dead turf all around. The difference was soil aeration.

Some of the measures which can be taken to overcome winter injury are:

- (1) Adequate protection against diseases with good fungicides.
- (2) Mulching or covering greens with protective materials.
- (3) Soil warming cables are being investigated and may offer future help.
- (4) Adequate moisture when needed to prevent desiccation.
- (5) Alternate greens and tees.
- (6) Close the course during periods of adverse weather.
- (7) Strive to maintain good soil aeration.
- (8) A balanced nutritional program.
- (9) Selection of winter hardy species
- (10) Replant as soon as damage is evident to get the course back into play as quickly as possible.

AQUATIC WEED AND ALGAE CONTROL IN GOLF COURSE PONDS

JOHN MURNIGHAN

A golf course pond choked with aquatic weeds and algae not only detracts from the aesthetic features of the course, but also can restrict the water holding capacity of the pond as much as one-third. Aquatic weeds can also clog irrigation pumps, lines, and sprinkler heads, resulting in costly downtime and repairs.

There is often a tendency to ignore the problem of weeds and algae in golf course ponds, not because it seems unimportant, but because solutions may not be known, or thought to be complicated, unsafe, or very expensive. Millions of research dollars have been spent to find the best methods and products for controlling aquatic vegetation and providing the safest, most effective means for solving and preventing its reoccurrence. Mechanical, biological, and chemical methods have all been developed and applied with varying degrees of success.

MECHANICAL CONTROL

This method of control includes hand pulling, cutting, or raking, and is usually confined to areas of limited size. For larger areas, automatic underwater cutting machines have been used to cut weeds with limited success for the amount of time and effort involved. The cost for this operation is extremely high and the equipment is expensive.

BIOLOGICAL CONTROL

The biological control of aquatic weeds and algae includes the use of plant and algae eating fish and other animals. These methods to date have very limited possibilities for control of aquatic vegetation in the Northeast.

Another control method that may be considered biological in nature, is the application of fertilizers in the early spring and throughout the season. The theory behind the use of fertilizers is that they will produce an algae bloom which will in turn, shade out the rooted submerged aquatic vegetation. There is the danger that fertilizers will create a greater aquatic problem than existed before, so this method of control is generally not recommended.

CHEMICAL CONTROL

The use of chemicals to control aquatic weeds and algae is the most effective, practical, and economical method available. There are several aquatic herbicides available on the market today, produced by various companies including Chevron, Dow, Pennwalt, and AmChem.

Some of the most widely used aquatic herbicides are Aquathol, 2,4-D, copper sulphate, Diquat, Dalapon, Silvex and Hydrothol.

AQUATHOL

Aquathol products are manufactured by Pennwalt Corporation and have been widely used. They are fast acting and highly effective on a large number of common water weeds.

Aquathol products are available in liquid or granular forms and treated water can be used to irrigate greens and fairways immediately after application of these materials.

2,4-D

This chemical is available in both granular and liquid formulations and is manufactured by several companies. It is one of the more economical herbicides and effective against a large number of broadleaf water weeds. 2,4-D products should be treated with extra caution because it is a hormone type herbicide that can harm shrubbery if the treated water is used for irrigation, also if it drifts it can be dangerous to trees or plants near the golf course pond.

SILVEX

Silvex, another growth regulator compound like 2,4-D, has been effective in controlling waterlilies, spatterdock, bladderwort, milfoil, and other aquatic weeds. Water treated with silvex should not be used for irrigation of shrubbery, unless an adequate waiting period is observed.

DIQUAT

Diquat is a relatively nonselective, nonvolatile, compound and is effective in floating and submersed weeds. Diquat kills waterweeds quickly by interfering with the plant photosynthetic process. Water treated with Diquat should not be used for irrigation for ten days. Diquat should not be applied to muddy water because it is absorbed in clay particles suspended in the water or on the sediments and is inactivated thereby decreasing its effectiveness.

DALAPON

Dalapon is effective on emergent grasslike plants such as cattails and reeds, but not broadleaved plants. Water that is used for irrigation should not be treated with Dalapon. Caution should be used in spraying Dalapon because it is a specific grass-control material.

COPPER SULPHATE

Copper sulphate is commonly used for the control of algae, but is not generally effective on leafy waterweeds. Copper sulphate is available in several different crystal sizes, as well as a powder or liquid. Water treated with copper sulphate may be used for irrigation of turf when used at the proper dosage.

HYDROTHOL

Hydrothol manufactured by Pennwalt Corporation is effective on algae and also a broad range of aquatic weeds. Hydrothol is available in either a granular liquid form, and treated water can be used immediately for turf irrigation.

TREATMENT TECHNIQUES AND SAFETY TIPS

Aquatic herbicides should be applied in late spring or early summer when plants are young and actively growing.

Before using any aquatic herbicide read the label and follow the manufacturers directions. This is important not only for safety, but also to insure that the proper chemical and dosage are used for the particular weed or algae problem.

Many states require that a permit be obtained before commencing chemical aquatic weed control treatment. Check with local and state agencies to determine what regulations must be followed.

SUMMARY

Aquatic herbicides are the most effective, economical, and relatively easy for controlling unwanted weeds and algae in golf course ponds. Once you have your weed or algae problems under control, keep it that way through a periodic aquatic chemical maintenance program.

BASIC SPRINKLER COMPONENTS

DAVID M. BARCLAY

There are 33 manufacturers and suppliers of Sprinkler Irrigation Components and Systems listed in the December 1970 issue of GROUND MAINTENANCE. There are lots more. Why didn't your program committee select one or two of their capable representatives to speak to you today on "Basic Sprinkler Components"? I think I know why, and I will do my best to explain how I see it after eleven years in the ditch-digging business.

Our company has sold and installed products from twelve of the aforementioned manufacturers, plus a couple of dozen others not listed in that magazine. We are authorized distributors for five of them. We have learned the hard way that in this business a distributor cannot afford to put all his eggs in one basket. We and our customers have been "guinea pigs" for too many pipe, sprinkler and other equipment manufacturers. We have learned a lot thereby and we've made many mistakes, but somehow we have survived and even prospered. When a superintendent wants something or has a problem, he needs help immediately, TODAY, even if it's Saturday P.M. and I'm on my way out. I almost lost my job and a good friend because I declined to fix a break in a newly installed system early in my career. I learned real fast that among golf course superintendents, the word gets around. But when you do provide GOOD service and a VARIETY of good products, you also are in demand and can earn your way in this highly competitive market place.

BASIC SPRINKLER COMPONENTS:

Too many automatic systems cannot be left unattended: for this reason a convenient valve box is a must, and frequently a repair coupling or even the telephone to call your installer or sprinkler service man is required. Unfortunately these are Basic Sprinkler Components!

I hope you all know the difference between an impact and a gear drive sprinkler, or a hydraulic, pneumatic and electric solenoid valve. If you don't, there are plenty of good books on Sprinkler Irrigation where you can study the basic components, plus design and installation techniques. The Sprinkler Irrigation Association has just published a completely new edition of its HANDBOOK which is widely used by Universities as a textbook. I can also recommend a book

by Chet Sarsfield called the ABC's of Lawn Sprinkler Systems.

Chet Sarsfield is the Sprinkler Consultant for GROUNDS MAINTENANCE and editor of several technical manuals in our field. He gave a talk at the University of California to the 8th Annual Turfgrass Sprinkler Irrigation Conference entitled "What's ahead in irrigation". I could get my entire talk from this article and it would probably be more interesting, but I will try to be more specific to our topic, Basic Sprinkler Components.

There are five components which are not so well known and which I feel are essential to any modern golf course irrigation system:

1. The first of these is a central programmer or master-satellite control station. Until recently this feature was considered "gingerbread" which no thrifty club could afford. Due to technical improvements, design efficiencies and the great demands on the superintendent's time, it is no longer a luxury. Any automatic system can and should have central control. It will activate field controllers or satellites remotely by a timer or by a moisture sensing device. Some of the more sophisticated ones will even provide individual station selection and resetting capabilities. A central programmer can control syringing for frost and dew removal or cooling in the heat of the day. Most importantly, it will shut off a preset schedule at any time in case of rain without interrupting that schedule. The "arm-chair" approach to watering is not just another labor saving device. Better control, better flexibility, is what we need to grow better grass and to do so at the least expense. Isn't this the superintendents job and shouldn't he have the best available tools to accomplish that job?

2. Given the control and flexibility of a reliable centrally programmed system, a superintendent can utilize his pumps, pipe and sprinklers for all kinds of heretofore impossible tasks. Chemical injection and distribution throughout the piping system is now feasible. Better uniformity of sprinkler precipitation and new pump control circuits which maintain preset ratios make this possible. Poly Vinyl Chloride and Asbestos Cement pipe eliminate the corrosive deterioration of the pipe. Plastic sprinkler parts are rapidly becoming acceptable substitutes for what was formerly considered to be a brass monopoly. Fertilizer and other chemicals are being sprinkled on more efficiently and with increased benefits. It is up to the Chemical Manufacturers to help the Sprinkler Manufacturers in furthering the scientific use of this method. If and when they do, injectors and metering devices will become basic sprinkler system components.

3. Pressure regulation is a phenomenon that we really know very little about. What goes on inside a piping system operating at 150 PSI is hard to conceive. About the only way I know is to physically dig up a forty foot pipe section which has failed and follow the cracks, herringbones, and distortions that pressure surge and water hammer has caused. There is no pipe economically made that will withstand some of these forces. Every irrigation system should have modulating valves incorporated near the source and near the ends of the lines.

1. There are valves available to maintain constant downstream pressure regardless of fluctuations in demand.

2. There are valves available to reduce upstream pressure to tolerable levels automatically!

3. There are valves that open and close slowly to eliminate water hammer. In addition to avoiding breaks, these valves will appreciably increase the life expectancy of your piping system and save a lot of power.

Every time that pipe is subjected to extreme stress, it is wearing out a

little bit and the less stress the longer it will last. Don't think for a minute that the higher the pressure the better it works. Sprinklers are built to operate within a certain range. When this pressure range is exceeded, the distance of throw is reduced and the uniformity of the pattern is ruined, not to mention the increased wear and tear on the moving parts.

4. FILTRATION - Suction screens, trap-rock filters, porous wall pipe, sand extractors, well screens and other filtration devices are a must for any irrigation system. The debris which comes through to the last sprinkler is incredible without them. I have taken fish out of pump impellers, rocks, leaves, sticks, even coke bottles and dead rabbits out of the ends of lines. Sometimes they get in when breaks in pipes are being repaired. Sprinklers will not rotate or spray properly; automatic valves will not open or close reliably; pumps will not pump efficiently; and everything goes haywire when ever any debris or foreign matter gets into sprinkler systems.

5. Finally a word about another unknown force; LIGHTENING! Our foremen who have seen the horrible results say "there's one sure thing about lightening, and that is, that it is completely unpredictable"! We installed some of the first automatic systems in this area and everybody had trouble after thunderstorms with their controllers. It wasn't usually caused by feedback from the low voltage wires to the solenoid valves, but rather from incoming surges on the 110V power supply lines. They never had these problems in the West where this equipment was developed. So now we have tried everything; lightening arrestors, rectifiers, circuit breakers, fuses, grounding rods, you name it. Nothing is or ever will be foolproof.

But we think with a combination of all the above, plus experienced installation crews, we have finally overcome most of our problems. By eliminating the sheer volume of wire underground which attracts lightening, we can greatly reduce the chances of lightening feedback. The Binar electronic system reduces a maze of wiring into a "twin-wire" solid state component with no moving parts. The design simplicity constitutes real savings in both material and labor underground and the space-age controllers incorporate simple solid state construction which can be more positively protected against lightening. In fact, they are "guaranteed" which is really something!

In closing, just what good is that work I just used "GUARANTEED". You hear it used so often and just as often you find it to be meaningless. Webster's Dictionary defines Warranty as follows: a guarantee, a pledge, or an assurance by a seller to a purchaser that the goods or property is or shall be as represented and will be replaced if it does not meet specifications. When someone gives you a warranty you should ask him five questions; "The five good tools of writing men: WHO, WHAT, WHY WHERE, WHEN?"

1. Who will replace; the person who uses it
the person who installed it
the person who sold it
the person who made it
2. What will be replaced;
the component part which failed
the assembly or unit which failed
the system which failed

There are also these Secondary Liabilities which are never assumed but should be considered

the sod which died
the green which was ruined
the fairway which washed away

- 3. Why did it fail; improper use
- improper maintenance
- improper installation
- improper application
- faulty materials

- 4. Where will repairs be done;
 - on the spot
 - at distributors shop
 - at the factory - where's that, probably in California!

- 5. When will repairs be done;
 - today
 - tomorrow
 - next week
 - next month
 - 6 months
 - Never!

Be sure you know the answers before you buy, because after is too late! The only sprinkler components and systems to buy are those whose representatives satisfactorily answer the above questions. A guarantee is a contract. No contract is any better than the parties to it. Let's all try real hard in the coming years to make "our word as good as our bond".

Remember! A 15¢ part will shut down a \$150,000 system and burn up a Million Dollar Course. Bear down on warranty ideas. Ask five questions - WHO? WHAT? WHY? WHERE? WHEN?

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SOIL FERTILITY RESEARCH
DONALD V. WADDINGTON

Soil fertility research is one of several areas of turfgrass research conducted at Penn State. Our current projects include the evaluation of slow-release nitrogen sources on Penncross creeping bentgrass and Merion Kentucky bluegrass; a potassium source and rate study on Penncross bentgrass; phosphorus and potassium fertilization on Merion bluegrass; magnesium and potassium fertilization on Merion bluegrass and Pennlawn creeping red fescue; and the evaluation of fertilizers containing composted refuse on Pennstar Kentucky bluegrass. Results of several of these studies are reported in this paper.

Nitrogen Sources on Merion Kentucky Bluegrass

The eight nitrogen sources being used in this fertilizer test are as follows:

- 1) IBDU (30-0-0): isobutylidene diurea, a synthetic organic.
IBDU is a condensation product of urea and iso-butyraldehyde. It is slightly soluble in water, and nitrogen is released by dissolution.
- 2) Urex (29-0-0): extruded urea-paraffin matrix. An experimental product in which paraffin slows the rate at which urea goes into solution.
- 3) Uramite (38-0-0): ureaform
- 4) ADM (36-0-0): a coated urea
- 5) Milorganite (6-3-0): activated sewage sludge
- 6) Urea (45-0-0): a soluble source of nitrogen
- 7) 18-6-12 IBDU: a complete fertilizer in which 2/3 of the N is from IBDU and 1/3 from soluble sources
- 8) 18-6-12 UF: a complete fertilizer in which 2/3 of the N is from ureaform and 1/3 from soluble sources.

Beginning in the spring of 1966, these materials were applied at 3 or 5 pound rates of N/1000 ft² per season in one, two or three applications; except for urea, which was applied 9 times (every two weeks) at a rate of 1/3 lb N/1000 ft². Response to fertilization was measured by weekly determinations of clipping yields and color ratings.

Urex performed similarly to ADM, and response following application was quicker and greater than from Uramite, Milorganite, and IBDU. Performance of the 18-6-12 formulations was similar to that of the Urex and ADM. IBDU showed good controlled release characteristics, but response was slow after the initial fertilization. Residual effects of IBDU produced green color earlier in the spring than was obtained with the other treatments.

The urea treatment was included to obtain a treatment in which N availability was controlled by man. The frequent light applications gave a fairly uniform growth. Uniformity of growth over the season was also obtained from Uramite, Milorganite, and IBDU treatments.

During the first two years of this study, the clippings were dried and analyzed for nitrogen. Recovery of the applied nitrogen was calculated and values ranged from about 20% for Uramite to over 50% for ADM, Urex, and Urea. The following relationships in nitrogen recovery generally held true:

ADM = urea = Urex > Milorganite = Uramite

ADM = urea > IBDU

Urex > IBDU > Milorganite = Uramite

18-6-12 IBDU > 18-6-12 UF

Because yields and nitrogen recovery are highly correlated, the yield relationships were similar to those of nitrogen recovery. Over longer time periods changes in these relationships would be expected. Yield data for a five year period show that sources containing water insoluble nitrogen gave relatively low response the first year or two, but yields eventually approached or equalled those obtained from more soluble sources. This change with time is shown in the following table. Urea yields have been designated as 100, and the others are expressed relative to this value. Note, as an example, that the Uramite yield was only 61% of the urea yield in 1966 but 130% of it in 1970. Uramite yields were also considerably lower than yields from the more soluble Urex during 1966 and 1967, but they became almost equal in later years.

Relative Clipping Yields of Merion Kentucky Bluegrass

Material	lb N/1000 ft ² /season	No. Appl.	Relative Yield				
			1966	1967	1968	1969	1970
Urea	3	9	100	100	100	100	100
IBDU	3	1	77	86	88	87	96
IBDU	5	2	94	126	145	145	129
Uramite	5	2	61	71	105	122	130
Urex	5	2	135	114	130	143	135
Milorganite	5	3	91	91	111	119	113

Use of Composted Refuse in Turfgrass Fertilizers

A current problem in the United States is refuse disposal. It is most critical in urban areas where little land exists for sanitary landfill and where incineration of trash may lead to serious air pollution problems. An alternative disposal method is composting. The compost may then be used for various purposes such as a soil conditioner, fertilizer carrier, paper pulp, or in the manufacture of building materials. Ecology, Inc. of New York has utilized refuse compost in the manufacture of turfgrass fertilizers. Three of these are under evaluation in fertilizer tests at Penn State. Each has a 4-1-2 ratio, but they differ in the amount of water insoluble nitrogen. They have either 0, 25 or 50% of the total nitrogen in the insoluble form. Growth and color response compared closely to that obtained

on plots treated with other fertilizers containing similar amounts of water insoluble nitrogen. The compost carrier lessened the degree of fertilizer burn on turfgrass. We have made similar observations in other tests where fertilizers made with peat and vermiculite carriers caused less burning injury than regular chemical formulations.

Phosphorus and Potassium Fertilization of Merion Bluegrass

This study was started in the fall of 1969. Various levels of phosphorus were obtained by applying superphosphate in the seedbed at rates to obtain 0, 8, 16, and 32 lb P_2O_5 /1000 ft². Phosphorus stimulates early root growth and promotes rapid growth in young plants. This effect was very apparent with each increased increment of phosphorus in the seedbed. Potassium is being applied to the established turf at rates of 0, 1, 2, and 4 lb K_2O /1000 ft²/season. Turf performance under these treatments will be evaluated, and relationships between turfgrass performance, soil test levels, and fertilizer treatments will be investigated.

PEOPLE, THE ENVIRONMENT AND PESTICIDES
GEORGE S. LANGFORD, STATE ENTOMOLOGIST

Concern about the environment is a growing issue today. This concern has been building for some years now. And, without question, it has become one of the great political issues of the day. In this great "boil" we see a gurgling kettle of emotion about the adverse effect of pesticides on the environment.

These day to day concerns involving mixed and boiling emotions, come from the innermost feelings of people. And people are the pulse of the nation, and you and I believe in them.

Man needs pesticides and they are essential to his health and economy. But, no one can dispute that the pesticide question is going through a violent ferment as it relates to the environment. Regardless of the merits or demerits of this ferment, which at times is off balance and emotional, many of our needed pesticide tools are being lost. Others are suffering inappropriate criticism. There are changes underway, and some, without question are for the good. For these changes, good or bad, people are responsible. The extent of these changes will depend upon the understanding people have about pesticides. Therefore, it is important that people be given accurate appraisal of all facts about pesticides and their nitch in man's future. It is important that we get the message to people that the primary source of pollution is not pesticides or agriculture. The Agriculturists, the farmers of this nation are among its most dedicated conservationists.

We must resist ill founded rumors, and there are many. Involved in our pesticide controversy are problems and non-problems. Modern ecologists, as well as government agencies, probably cannot for long defend their every action. But it is well to remember they are taking many actions which are correct and proper and defensible in the eyes of many of the people whom they must serve.

Twenty-five years ago few people had heard of the word ecology. Today we are told that there are more than two hundred million people in this country and at times it would seem that most of them claim expertise in ecology. There are at least three ingredients with which man must cope in facing his environment. They are:

1. Natural phenomena
2. Pollution, which involves man made problems
3. Social affairs, which involves people

All of us can agree that there are inconsistencies in thought where people are involved. Popular understanding and fact are not always in balance. Too few people understand the natural phenomena that make up the universe. Few people understand the sequence of change or the relationship of the many facets which make the world and the universe with which it is associated. Every facet involves, shall we say, birth, growth, maturity, senility and what might be termed a reincarnation. Too few understand that when Mother earth was put together, the good Lord assembled it as a great physical chemical machine with all its parts geared one to another.

Lately some men have come to believe that they have a management ability that is destined to save Mother Earth. We hope so, but I question whether man will be able to do much to give long range stability to the destinies of natural phenomena. He can, however, do much to guide approaches for a better life and educate people.

Today I think it would be fair to say that where pesticides are involved it is not too difficult to have people problems. You and I, as producers, know that we have associated with this people problem a population explosion that will require an ever increasing effort to provide world food needs. At the same time we have, among people, growing concern about the harmful effects of pesticides, the very tools that we must have if we are to maintain a well balanced economy that man must have.

Food is one part of man's environment. It is just as essential as air or water. Agricultural chemicals must be available to farmers if they are to continue to produce food and fiber for our expanding populations. There is some merit to the accusation that the pesticides and chemical fertilizers that farmers use, may at times be involved in environmental contamination. And since these accusations are concerns of many people, especially those living in urban areas, we as agriculturists must work to improve the environment. This is now being done through law. We are all familiar with the pesticide laws being passed at both State and Federal levels. Agriculturists, for the most part, I think have accepted the fact that the use of certain hazardous pesticides should be restricted and supervised.

In recent years some of us feel we are involved in a period of storm and change. Things that we once felt were basic to our economy are now questioned. We are told youth is disturbed. They demonstrate their concerns about DDT and over what they feel is a deteriorating environment. Quality of life they say, and I agree, is more important than worldly possessions.

We all know that too many of our waters are polluted with sewage and eroding sediments. Junk and other wastes is destroying and contaminating our countryside. Air is being fouled by automobile exhaust, by our power plants and by the furnaces that heat our homes. We, as agriculturists, I believe, could agree that on occasion feedlot areas may, if not properly handled, pollute soil and water.

Environmental pollution is a fact of life, a documented fact, but the thesis that the nations primary pollutants are agricultural pesticides and plant nutrients must be challenged. There is a tendency for too many uninformed people to reach conclusions by associating some fact with rumor, then treating the whole as having been scientifically documented.

The American public should be concerned about human safety and a healthful environment. The people of this nation should know the truth about contamination and pollution and who and what is responsible. But they should not be fed rumor that creates growing suspicion that is out of balance with practical living. There are times when I feel that we are living in a period where many agronomic practices, especially pesticide usage, which are essential for the welfare of our people, are not appreciated or accepted. We need to do a better job of projecting the pesticide image in all its aspects. We need to separate falsehoods and innuendos from facts.

Last spring, there was rumor that some 86,000 birds died in Alaska from an oil slick. Later a government report stated that the loss had resulted from severe storms which prevented feeding and resulted in exhaustion, starvation and death.

Many of us have heard sensational stories about a potential depletion of oxygen in the atmosphere and the question of our suffocation arises as a result. Recently, Dr. Walter C. Broecker, Professor of Earth Science at Columbia University, stated in Science that the general depletion of atmospheric oxygen from the use of fossil fuel is not possible in the foreseeable future. He advocated that the press get rid of this one at once.

We all recognize the fact that DDT has been a valuable pesticide. It has served man well by controlling the malaria mosquito and other pests throughout the world. Millions of lives have been saved. It has also been an outstanding tool in increasing world food production. But we must not ignore that it is being found in our environment, as well as in our food. Some people believe that it, along with other chemicals, may constitute a long time threat to the environment. Others believe the contrary. We know that DDT can, and does, collect in animal tissue.

Before the advent of good pesticides, famine, on occasion, occurred as a result of ravages from crop pests. Most of us have heard of Irish potato famine in Ireland. It has been said it caused the death of more than one million people, and motivated another million to migrate to this country. The destruction of crops by grasshoppers has caused starvation in many parts of the world. Crop failure, due to disease and insects, occur even today. This year, corn wilt has been wide spread and in many areas the corn crop was said to be a failure.

We, as responsible people, have an obligation to see to it that the public gets the whole truth. It has been said that farmers who defend pesticides are protecting their own selfish interests. Farmers eat the same food, breathe the same air and enjoy the same good things of life as their urban neighbors. They are not interested in poisoning themselves or their families with persistent or hazardous chemicals.

The popularity of the pesticide question has reached the point where almost any unusual happening that involves fish, birds, or wild creatures in nature, is first blamed on pesticides. Proof to the contrary may come, but it is most difficult to rectify damage once it is done. A recent 1967 report by the Federal Water Pollution Administration shows that 71% of all fish kills were caused by industrial pollution. Less than 3% of the kills fell into the category referred to as an insecticide poison, etc. Some protestors of pesticides are, without question, sincere. But we must not unwittingly wreck the nation's economy through misapprehension and ignorance.

We have those and they have their supporters, who say nothing should be added to pure food. You and I know nature does not always adequately take care of its children. Iodine deficiency and the resulting goiter in many parts of our country is a typical example. In some areas it is important that salt be iodized. You and I know that both salt and iodine are poisonous and can kill if improperly used.

We will always have small groups of people who tend to refuse to accept anything that is not in accord with their beliefs. But most people, I believe, want facts. We need to find ways to give these people all sides of the pesticide story. We need to find ways to separate fact from fiction. News organizations too often publish rumor that tends to arouse emotion or provide attention drawing headlines that are somewhat less than accurate.

In years gone by the life span of man was hazardous and quite short. In the 14th century an epidemic plague swept the known Western world, killing probably 25 million people, or 1/4 of Europe's population. Poor sanitation in that period attracted rats, which hosted the fleas that transmitted Bubonic plague. This Bubonic plague organism still exists in rodents in many parts of the world. Thinking in terms of modern day health it is documented that in 1920 the average life span of man in the United States was only 51.1 years. Currently, 1968, 48 years later, the average life span is 70.2 years. Doctors and public health officials credit sanitation, drugs and insecticides as being responsible for this extra 16.1 years of additional life. People must be taught that we must use chemicals for food production, and for the protection of man, wildlife and the natural environment.

You and I as agriculturists face a difficult educational task. We know wise and safe use of chemicals is basic to the future of a healthy agriculture, but the ever dwindling political base in which agriculture is now involved makes the task more and more difficult. However, we live with the fact - pesticides are essential and are needed by everyone. It is important that we get this message to the people.

Before mentioning a few of the effective insecticides available to us I would like to leave these few thoughts.

1. Our differences must be resolved scientifically - not through politics or emotional lobbies. They must be judged and expedited by honest communication, accurate scientific interpretation and a reasonable meeting of minds.

2. In a discussion of pesticides or any other chemical it is well to remember "everything, if used at a high enough level is toxic and everything is safe when the level of exposure is low enough".

3. Try not to become involved in fantasy or irresponsible statements - we have had too much communication without biological facts.

4. Pesticides have accomplished much. Always remember they would not be used if they were not contributing to human welfare.

5. The fact that pesticides have been singled out for criticism in a world controversy signifies they are important.

6. Some may not approve the pesticide challenge, but also remember, some feel the environmental challenge is great. Good and honest management is called for. Stand up and be counted, but always take a well balanced position.

I have no answer that could fully satisfy the immediate dilemma in which agriculturists find themselves. Licensing has been suggested as a means for eliminating the accusation of irresponsibility and that has considerable merit. It is coming into general use in many states. But by the same token it has been suggested that it would be advantageous to require a license of those who oppose or lobby against pesticides. It has been said the public may need some protection from would be saviors.

STATUS OF PESTICIDES IN MARYLAND

We are all aware that the 1970 Maryland and General Assembly passed a pesticide applicators law and provided for its implementation. This law attempts to give meaningful standards for the application and use of certain pesticides that could be hazardous or have an adverse effect upon the environment.

Briefly, the law and the associated regulations do two things.

1. It provides for the annual licensing, by the Maryland State Board of Agriculture, of Custom Applicators and Pest Control Consultants.
2. It restricts the use of certain pesticides and requires a permit for their use.

The restricted pesticides are DDT, Chlordane, Dieldrin, Endrin, Aldrin, Heptachlor and BHC (Lindane). There are other materials of a hazardous nature whose use is prohibited around the home and which require a permit when applied for

hire. These include Methyl parathion, Parathion, Phosdrin, Sodium Arsenite.

Many folk when they read the provision of the law feel that they are being completely cut off from the tools they need to produce crops and control pests. This is not the intent of the law. The law deals principally with pesticides that accumulate in body tissue, pollute the environment or are extremely hazardous. The law allows for the use of these when there are no suitable substitutes. But pesticides of the type indicated are regulated and may be used only under permit. And when custom operators are involved, then they must demonstrate knowledge and be licensed.

We, as farmers, horticulturists and homeowners still have a host of unrestricted pesticides available for use. If we eliminate the so called hard pesticides and those termed "hot" or extremely hazardous, use is restricted.

It is true, that with proper caution, most agricultural pesticides can be used with safety. The Maryland law was developed to emphasize safety, to make custom applicators responsible and to provide guidelines for the selection of materials that when properly used, will have minimum toxicity for humans, pets and wildlife, but, at the same time will be toxic for insects and then rapidly disappear from the environment when the job is finished.

There are many pesticides that fit into this category. It would be difficult or at least time consuming for me to give appropriate discussion to all. Some with merit would undoubtedly go neglected. Maryland users, should generally look to spray calendars and associated literature provided by the Department of Entomology, the Cooperative Extension Service and the State Board of Agriculture at the University of Maryland for information.

A few insecticides that fit into home garden needs include Rotenone, Malathion, Sevin, Methoxchlor and Pyrethrum. There are many others that can be used to advantage. See your spray calendar and consult with your supplier.

STATES OF PESTICIDES IN MARYLAND

We are all aware that the 1970 Maryland and General Assembly passed a pesticide application law and provided for the legislator. This law attempts to give mandatory standards for the applicator and use of certain pesticides that could be hazardous or have an adverse effect upon the environment.

Initially, the law had the associated regulations do two things.

1. It provides for the annual licensing by the Maryland State Board of Agriculture of Custom Applicators and Field Control Operators.

2. It restricts the use of certain pesticides and requires a permit for their use.

The restricted pesticides are DDT, Chlordane, Dieldrin, Endrin, Heptachlor and BHC (lindane). There are other materials of a hazardous nature whose use is prohibited around the home and which require a permit when applied for.

CURRENT PROBLEMS AND TRENDS - A SUMMARY
DR. A. J. POWELL

One of our basic problems in the turf industry is awareness of what is going on around us and then being able to communicate. We are in a rapidly developing business as is quite evident when we read the industry magazines and see many new types of equipment and chemicals which can eventually aid our management programs. It is not so difficult to be aware and discuss these new developments. However, we are also in a rapidly developing society which we often try to ignore. Seldom do we ever do anything that does not affect someone else. We have to be prepared for the unexpected and certainly the new anti-pollution laws are catching us "unaware". We tend to sulk and gripe but do nothing constructive. We ignore "the-other-side" and are afraid to ask questions.

Directly relating to the turf industry, what are some of the needs? First, we must not be afraid to tell the truth and promote it. Turf as an anti-pollutant has scarcely been promoted. We know it purifies the air, adds beauty and contrast to our cities of concrete and steel and reduces air temperatures, soil erosion and noise pollution. From just the psychological standpoint, there is a definite need for open (natural) spaces in our cities, regardless of what our consumer advocate says. But, we are not telling our friends, politicians and colleagues about it. We are allowing them to pass laws that seriously threaten us in many cases. For example, a new grading law recently passed requires grading contours on 2 foot intervals at 1 inch to 200 feet, a permit at \$45/Acre and a bond at \$1350/Acre. Because of this increased expense, this law may eliminate new golf courses and parks in the area in which this law is effective. Why do we see such drastic controls? It certainly is not always the other person that causes the problems. In much of our own construction work we have paid no attention to sedimentation problems and have allowed our small ponds, lakes, and creeks to be filled with sediment long before construction is finished. We may all be at fault.

Pollution control experimentation is sadly needed, especially in the agriculture area. We must know how to construct our turf areas and be able to follow simple management programs that are not obvious contributors to the pollution problem. We often do not think of it as such, but just the development of better turf species and varieties is a step toward pollution control. Turf that is easily ~~managed~~, somewhat resistant to insect and disease pests, and well adapted to a particular area will not require an array of pesticides for survival. In one respect the management will be simpler because fewer pesticides will be needed, but in the other respect we may have to manage each species or variety completely differently and use them only on specific areas. This puts even a greater demand upon the ability of a professional turf grower.

I have only attempted to give a few examples of our own problems. We must look at our own operation and be aware of potential hazards. We must have enough initiative to ask questions, promote turf use and demand turf research.