Proceedings of the

Eighth Annual

NEW MEXICO TURFGRASS

CONFERENCE

Oct. 4 & 5, 1962

NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS

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New Mexico Turfgrass Association

EIGHTH ANNUAL NEW MEXICO TURFGRASS CONFERENCE

New Mexico State University
Patio Lounge, Milton Hall
University Park, New Mexico

October 4 - 5, 1962

October 4

8:00 . . . . . Registration

10:00 . . . . . Welcome
Dallas Rierson

10:15 . . . . . What a golf course means to a community
Dr. E. J. Workman

11:00 . . . . . People - how to get along with them
Jack Bowen

11:35 . . . . . Appointment of Committees
Ralph Calloway

11:45 . . . . . Lunch

1:30 . . . . . Concepts of turfgrass watering
Dr. James R. Watson

2:15 . . . . . Tour of N.M.S.U. Golf Course
Mr. Bob Sanders

4:15 . . . . . Golf Course Superintendents Association of America
Mr. Julian Serna

6:30 . . . . . Annual Banquet
Town & Country Restaurant

October 5

8:45 . . . . . Where do we go from here
Mr. Clarence E. Watson

9:15 . . . . . Aerification - principles and practices
Dr. Robert H. Wiley

10:00 . . . . . Coffee Break

10:30 . . . . . A vehicle to sound management
Mr. Donald M. Winslow

11:15 . . . . . Business meeting

11:45 . . . . . Lunch

1:30 . . . . . Personnel Management
Mr. Charles E. Stenicka

2:15 . . . . . Tips on safety and maintenance of equipment

BRIEF OUTLINE OF WELCOME REMARKS MADE AT
TURFGRASS CONFERENCE

Dallas Rierson 1/

Mr. Chairman, Ladies and Gentlemen, on behalf of President Corbett and the entire staff I wish to welcome you to New Mexico State University. This is your Land Grant University and of course we are happy to have you hold your meeting here and visit with us at any time.

This year the Land Grant University system throughout the United States is celebrating its Centennial Year. One hundred years ago, Abraham Lincoln signed the Morill Act establishing at least one Land Grant University or College in each state. This was a new type of educational unit and for the first time recognized the need for technical training, both in agriculture and engineering as well as other arts and sciences. Later, research was added to this new educational system, and, as research information became available, the extension service was made a part of the Land Grant University. New Mexico State University is unique, with only three other Land Grant Universities, in that the State Department of Agriculture is a part of New Mexico State University.

In addition to celebrating a Centennial, we are also very proud of the new Agriculture Building which is being completed at the present time. In fact, if you ask someone where a certain office is located they may have to hesitate and do some checking before answering your question. At the present time some of the offices have already moved into the new Agriculture Building and some are in the process of moving. I would like to take this opportunity to invite all of you to attend the dedication of the new Agriculture Building on October 27th at 10:00 A. M.

While you are here on the Campus we will be most happy to assist you in any way to make your meetings and stay most profitable and enjoyable. Do call on any member of the staff.

We hope you will have your meetings regularly on this Campus.

1/ Director, State Department of Agriculture, University Park, New Mexico

WHAT A GOLF COURSE MEANS TO A COMMUNITY
(Summary)

Dr. E. J. Workman 1/

You must offer employees more than a good job-- they take jobs because the community offers a good life. (In reference to some very good reasons for having a golf course)

Effects of golf course on community:

1. Someone (plural) is going to learn something.
2. A golf course is a nice thing (why do they put them so far from town?) Space chiefly. Close to town there will evolve the most beautiful residential section. Here you need something green. They picnic - they sleep. Babies are brought here because they see and feel the grass, water and ducks. There are 45 golf courses in New Mexico--- the difference it will make will be a variety at each town. To a village and small town a golf course is almost essential for survival (almost).
   It requires a lot more than turf. A turf has got to be done with real Men not boys.
3. Opportunity for youth-- playing golf teaches -honor, discipline, and dress.
4. Golf is a game of self competition- you can play golf from 10 to 70.
5. Can train people to hold skilled jobs.
6. Family adventure, a good way for a family to get together on a Sunday afternoon.

After you get the grass what you do with it will determine what effect it has upon the town.

PEOPLE - HOW TO GET ALONG WITH THEM

Jack Bowen 1/

Just for the record let me say before I start, I'm no public relations expert. In fact, a break-down of my responsibilitites would show public relations as a minor part. Now, when you have an organization such as ours here in the southern end of New Mexico which considers everyone of the 50,000 people in Dona Ana County, part of Sierra County, and military bases in Otero as our customer, a substantial portion of my time directly or indirectly involves public relations.

We insist that our key employees belong to service clubs, civic organizations, etc. and participate actively. We encourage them to own their homes, take part in church work, parent-teachers and the like. All for the purpose of understanding people, working with people, like and be liked by people. We have approximately 60 employees here in Las Cruces. I daresay 50% of the people in town know one or more of our employees.

1/ President, N. M. Institute of Mining & Technology, Socorro, New Mexico.

2/ El Paso Electric Company, Las Cruces, New Mexico.

We use every opportunity to appear before groups to tell our company's story, or discuss civic causes in effort to better our community. All in effort to be a good citizen and along the way create a good public image of our company. These 60,000 people judge our organization by our employees with whom they have personal contact. We stress public relations in our training; use telephone film.

Misunderstanding is cause of most of problems between a good company and its customers. Most people are reasonable when they understand your problem. They may not necessarily agree with you, but at least they are reasonable.

Always give courteous reception to an irate customer. Many a time I have listened to a person sitting in my office and blowing his top - and sometime later have him leave in pleasant frame of mind.

There are a few exceptions where they are unreasonable to the point of absurdity. Going beyond reasonable concession to deal with such people does not earn their respect. If you like people, it shows in your face, in your manner - and they respond to it.

In rare cases we may have to temporarily interrupt customers' power. We then make personal contact - explain. In storms or other emergency, after power is restored, we call back on every report received from customers. Sometime it takes hours, 100 to 200 calls. People remember. It pays dividends. They like the people who call them and the organization they represent.

Occasionally people take the time to call or write about something good about one of our employees. We always reply to the customer promptly and let that employee know all about it.

Don't ask your employees to take abuse. Teach them how to deal with unreasonable people up to the point where the customer becomes abusive; then hang up the phone.

I think if I were in charge of a golf course, a park or the like, I would look for a chance to tell my story before civic groups - other groups. Tell of our aims, some of our problems. I would want a board for posting notices, when temporarily closing a green or other area, briefly explaining in friendly manner asking for cooperation.

I would constantly be searching for ways of creating a better understanding with people or individuals.

When people perform some service for you or your organization, acknowledge it promptly.

When a particularly tough problem is to be untangled with a person, don't depend on the phone; go out where you can look him in the eye, where your sincerity will show through.

I would be careful about making promises of things I would do. But once made, I would see that it was kept to the letter and make a point to let them know. It creates respect.

CONCEPTS OF TURFGRASS WATERING

Dr. James R. Watson 1/

An understanding of several basic concepts is necessary in order to properly water turfgrass areas. To the casual observer, and often to the man actually doing the job, watering of turfgrass may appear to be a simple routine task, but the man planning and directing the watering program (the Golf Course Superintendent) recognizes that his simplified directions of "Water No. 10 approach for one hour tonight" are the result of balancing and adjusting many complex factors. The Superintendent's concept of the proper use of water on turfgrass areas is based on an efficient program designed to meet the physiological and use requirements of the grass as modified by the climatic and soil environments.

Water and Plant Growth

Water is an essential component in all phases of growth and activity and is involved either directly or indirectly in all operations pertaining to care and management of turfgrass. Water is necessary for germination, for cellular development, for tissue growth and for food manufacture (photosynthesis). It acts as a solvent and carrier of plant food materials. Nutrients are dissolved in the soil, taken in through the roots and then carried to all parts of the grass plant. Food manufactured in the leaves is translocated throughout the plant body in water. Water transpired by the leaves serves as a temperature regulator for the plant. The amount of water within the cells of the grass leaves plays a major role in counteracting the effects of traffic. When the plant cells are filled with water, they are said to be turgid. Such a condition helps the leaves to resist traffic (foot and vehicular); hence, adequate water within the cells helps avoid the damage which may result when pressure (traffic) is applied to grass in a state of wilting. Wilt is a condition that exists when the cells do not contain enough water. Such cells are said to be flaccid. For all these functions very large quantities of water are required and they, as well as other considerations, must be kept in mind when developing a concept of turfgrass watering.

Water and Choice of Grass

There are wide differences in water requirements, drought resistance and tolerance among grasses. For the most part, however, selection of a particular grass for golf course turf is dictated by factors which do not always permit the Superintendent to take advantage of these inherent differences. Nevertheless, when an opportunity to choose a new grass arises, it is important to keep in mind that even within species there are strains of turfgrasses available for use which may contribute to a better water use. For example, a dense, tight-growing strain would be preferred over a more open type, as would a strain potentially capable

1/ Director, Agronomy Division, Toro Manufacturing Corp., Minneapolis, Minn.

of producing a deeper root system. A more dense strain would be less likely, generally speaking, to be invaded by weeds--which rob moisture--and a deeper root system would permit foraging through a larger volume of soil for moisture; hence, extending the interval between irrigations. The proper use of water, then, includes setting up a watering program to take full advantage of these and other inherent capabilities of those grasses best adapted for use on the golf course. Such will definitely register an improvement in water use.

Water and Environment

Environment--both climatic and soil--exerts a marked effect on water use. Adjusting watering practices to suit the demands of climate and to meet the needs of a given soil and grass actually are basic to the proper use of water; hence, important in development of concepts of turfgrass watering.

Climatic factors--temperature, rainfall, sunlight, wind and humidity--necessitate adjustment in the watering program through their influence on the choice of grass; growth activity, including transpiration; replenishment of soil moisture; and removal of excess soil moisture--drainage. Regional adaptation of turfgrass species is determined almost entirely by climate, more particularly by one climatic factor--temperature. Thus, generally speaking, bermuda and other "warm" season grasses are adapted in the southern part of our continent, while bent and other "cool" season grasses are adapted in the northern areas. In addition to the large scale influence, local climate directly affects the growth rate of turfgrasses; and when grasses are growing rapidly, they require greater quantities of water. In areas of intense sunlight with attendant high temperatures, along with low rainfall and humidity (arid and semi-arid regions), water use rates are much higher than in cool, humid areas.

Soil as the medium for turfgrass growth must provide support for the plant, serve as a storehouse for nutrients, supply oxygen and act as a reservoir for moisture. The testure (size of soil particle, structure (arrangement of soil particles), and porosity (percentage of soil volume not occupied by solid particles) of a soil are the basic physical factors which control the movement of water into the soil (infiltration), through the soil (percolation) and out of the soil (drainage). These factors (texture, structure and porosity) along with organic matter content determine the water-holding capacity and control the air-water relationships of the soil.

Texture is a most important characteristic of soils because it describes, in part, the physical qualities of soils with respect to porosity, coarseness or fineness of the soil, soil aeration, speed of water movement in the soil, moisture storage capacity and, in a general way, the inherent fertility of the soil. Sandy soils are often loose, porous, droughty and low in fertility, whereas clay soils may be hard when dry or plastic when wet, poorly aerated, but high in moisture retention and possibly high in fertility.

Structure, which refers to the arrangement or grouping of the individual particles into units called aggregates, plays an important role in developing a concept of turfgrass watering. The structural aggregation of soil is greatly influenced by the amount of colloidal organic matter present. The end product of decay or organic matter--humus--is an integral part of soil aggregates and is sometimes referred to as the cementing of binding agent in aggregates. Stability of aggregates is directly dependent upon the amount of organic matter and the degree of biological activity obtaining. The structural aggregation of soil determines, to a large extent, the porosity, permeability and water capacity of soils of like texture.

Total porosity of a soil is made up of the sum of the small (capillary) and large (non-capillary) pores. The small pores hold water by capillarity and are responsible for the water-holding capacity of soils. The sum of the volumes of the small pores is called "capillary porosity". The large pores will not hold water against the force of gravity, they are normally filled with air and are responsible for aeration and drainage. The sum of the volumes of the large pores is called "non-capillary porosity".

The total porosity of a soil is not as important as the relative distribution of the pore size. Total porosity is inversely related to the size of the particles and increases with their irregularity of form. Porosity also varies directly with the amount of organic matter present in the soil. Clays, for example, have a higher total porosity than sands. Clays have a large number of small pores which contribute to a high water-holding capacity and slow drainage. Sands, on the other hand, have a small number of small pores which are responsible for a low water-holding capacity and rapid drainage.

If traffic were not a consideration the ideal soil for plant growth, in general, should have about fifty percent total porosity equally divided between small and large pores or, in other words, contain twenty-five percent water space and twenty-five percent air space. On areas where traffic becomes an over-riding consideration (golf greens) then the total porosity of the soil is of less importance than ability to resist pressure (traffic). This is evidenced by results of studies sponsored by the USGA Green Section and conducted at Texas A & M. These studies have shown a requirement for a minimum total pore space of thirty-three percent. Significantly, the small and large pore space is approximately equally divided--twelve to eighteen percent for large pore space and fifteen to twenty-one percent for the small. The air or purpose of using high sand percentages is textural stability of pore space. In respect to porosity, the basic factor controlling water movement, it should be noted that wetting agents do not alter or effect the distribution of large or small pores. However, because these materials (surfactants) do reduce the forces of adhesion and cohesion, they will improve the movement of water through the soil profile, providing impermeable layers do not exist.

Compaction of soil refers to condition in which aggregation is reduced or absent; hence, the soil is dense--or the number of large pores reduced. Degree of compaction at or near the surface is of especial importance, insofar as infiltration of water is concerned. It has been shown experimentally that a very thin layer of compacted soil will materially reduce the rate of infiltration. It has also been established that most of the compaction on turfgrass areas occurs within the upper two inch layer of soil. Unless alleviated (by cultivation) a compacted layer will have an important bearing on the rate of water application; hence, on the overall watering program.

Modification of soil to improve physical and chemical properties with resultant efficiencies in water use is paramount to success in new construction, rebuilding and renovation programs.

Soil water may be classified as available, unavailable and excess. From the standpoint of utilization by plants, soil water above the wilting point and below field capacity is considered available. Moisture below the wilting point is held too tightly to be extracted by plants and is classified as unavailable. Water above field capacity is subject to removal by the pull of gravity and is said to be excess. Excess water is that which replaces air in the large pores. When all air is replaced--when the large and small pores are filled with water--the soil becomes saturated. Soils maintained at or near the saturation point are most detrimental to turfgrass growth.

One may become familiar with the various levels of soil moisture by making periodic observations of a wide range of conditions--study soil cores taken immediately following a soaking rain or thorough irrigation and periodically until the soil appears dry and the grass begins to wilt. After practice, one soon becomes able to examine the soil and determine from a practical standpoint the amount of soil moisture present.

Drainage, or the removal of excess water from a soil, is of two types--surface and internal. Surface drainage is accomplished through grading and contouring of surface areas. Internal drainage is a function of physical soil properties and may be of far greater importance than some of the other factors mentioned--for example, water-holding capacity of soil in golf greens. On most turfgrass areas one is usually able to apply water if soil moisture becomes limiting, but in too many cases during periods of heavy rainfall, rapid percolation, with subsequent removal of the excess water, does not take place. This is particularly true of many green and tee areas. Unless soils are adequately drained, many problems associated with saturated soils will arise.

For new and existing turfgrass areas, a determination of soil physical properties for each golf course soil, coupled with a knowledge of how each independently and collectively affect water use, is basic to the proper use of water.

Watering Practices

Once the physiological requirements of the grass and the influence of climate and soil properties are understood, the proper use of water from a practical standpoint may be resolved by answering three questions: How often to apply water? How much to apply? How to apply it? There are no simple answers to these questions, rather the answers are a matter of judgment--judgment based on knowledge and understanding of the particular set of conditions existing on each golf course. The limitations imposed by frequency and amount of play, the capacity of a given irrigation system, the availability of personnel and the prevailing weather conditions all have important bearing on specific watering practices.

How often? Supplemental irrigation is always necessary if turfgrass areas are expected to remain green throughout the growing season. The frequency of irrigation is governed by the water-holding capacity of the soil and the rate at which the available water is depleted. For the most vigorous and healthy growth, watering should begin when approximately forty to sixty percent of the available water has been depleted. Most plants show a marked growth response when soil moisture is maintained between this level and field capacity. Assuming equal depth of rooting, sandy type soils will have to be watered more frequency than will loams or clays. Climatic conditions such as high wind movement, intense sunlight, low humidity and temperatures all contribute to high water use rates. Such conditions dictate more frequent watering than the reverse set of conditions.

Frequent watering of poorly drained soils tends to keep the upper layers of the root zone near the saturation point most of the time. This encourages shallow rooting and promotes weak turf which is susceptible to weed invasions, disease and insect attacks as well as damage from traffic--soil compacts more severely when wet. Frequent, shallow watering of well-drained soils may not, in itself, be too serious but such practices are not economical--they cause excessive leaching of nutrients, require more manpower, use more water than necessary and produce more wear and tear on equipment and facilities.

How much? The amount of water to apply at any one time will depend upon how much water is present in the soil when irrigation is started, the water-holding capacity and the drainage characteristics of the soil. The amount to apply also will, to a certain extent, depend on local weather conditions--it would not be wise to satisfy the water-holding capacity of a soil just prior to showers or a rainstorm, if such could be avoided.

Generally, one should apply enough water to replenish that portion of the available water in the root zone which had been used by plants since the last irrigation; or, ideally, about fifty percent of the available water--assuming the system can be set in operation when approximately fifty percent of the available water is exhausted. In actual practice it is seldom possible to control water programs accurately

enough to accomplish this--local differences in soil, terrain, grade, etc. would preclude such a degree of accuracy even if sufficient control of irrigation facilities and enough competent personnel were available. Nevertheless, through careful study of the soil characteristics, one can adjust the watering program to conform closely to the ideal amount of water needed.

Enough water should be applied to insure that the entire root zone will be wetted. Too, on natural soils (as opposed to those modified for intensive use) sufficient water should be applied to bring about contact with sub-soil moisture. Continuous contact between the upper and lower levels of moisture will avoid a dry layer through which roots cannot penetrate. Application of too much water at one time is serious only if the soil is poorly drained and the excess cannot be removed within a reasonable period of time.

How to? Water should never be applied at a rate faster than it can be absorbed by the soil. Sprinklers that do not adequately disperse water, as well as sprinklers that deliver a large volume of water within a concentrated area, tend to cause surface runoff. Whenever water is applied at a rate faster than it can be absorbed by a given soil, the water is being wasted. The sound watering program, then, would call for sprinklers that apply moisture slowly enough to permit ready absorption. When surface conditions such as compaction exists, it should be corrected by aeration (cultivation) or spiking. Such will materially improve the infiltration rate of water.

Once surface runoff is evident, the sprinklers should be turned off. If the soil has not been wet to the desired depth--this may be determined by probing and examining the depth of penetration--then the sprinklers may be turned on again at the end of thirty minutes to an hour, depending on the permeability of the soil.

Adequate equipment and facilities, obviously, are basic to the successful performance of watering practices. When either or both are lacking, their replacement with well-engineered layouts and modern sprinklers should be planned on a long range basis. Serious consideration should be given to installation of semi-automatic and possibly completely automatic systems when replacement is necessary or in new construction.

Other Implications

Concepts of turfgrass watering based on the proper use of water has implications beyond the immediate production of high quality golf course turfgrass. Water is unquestionably our most important natural resource. It is not, as we are often prone to think, inexhaustible. The search for new sources of potable water, the study of methods to conserve present supplies and to reclaim polluted waters is being carried on continually. The importance of these as well as other projects concerned with the study of water resources is evident when one realizes the projected population increases for the next fifteen years add up to an additional

fifty million persons (by 1975). Some say that as a result of this and attendant demands that it is possible over-all water use may increase as much as seventy percent by 1975. The impact of such an increase in water needs could have, for many regions, some rather serious implications.

In addition to the long range implications, the expenses involved in irrigating is another important concept of water management not directly related to the production of high quality turfgrass. Water for turfgrass is costly, whether the source is from municipal systems or whether the course installs its own pumping plant and utilizes water from deep wells, natural or man-made lakes or streams. Costs are involved in the installation of watering systems and for the equipment needed to apply water to turf areas. Expenses do not stop once the initial investment in the irrigation system has been written off. Each time the pumps are started it costs a few cents for the power to run them and, of course, there are substantial labor costs involved in the application of the water.

The saving of only a few gallons of water daily, whether by the judicious use of water, or by efficient operating procedures, could mean a sizable saving in funds on an annual basis.

Summary

In summary, concepts of turfgrass watering embodies many factors which individually and collectively affect water and its proper use. To use water properly requires an understanding of the fundamental role water plays in plant growth; of the effects climate and weather have on growth rates, how they influence water use rates and choice of grass. Good water management demands a knowledge of the basic physical and chemical soil properties, how they effect water absorption storage and drainage as well as the frequency, rate and manner in which water must be applied. Further, proper use of water means correlating all this basic information with the requirements for play and programming a watering schedule to fit the existing irrigation facilities so as to make the most efficient use of them and the available labor force. Good water management implies planning, on a long range basis, for replacement of inadequate systems and out-dated equipment with well engineered layouts and modern equipment. By so doing, economies in operation and conservation of water will be affected. Finally, the proper use of water is an art--skillfully performed by the turfgrass Superintendent who has acquired his knowledge through study, observation and experience.

WHERE DO WE GO FROM HERE

Clarence E. Watson

What does the future hold for turf? This question is asked repeatedly in one form or another. Students at N. M. S. U. majoring in Agronomy and Horticulture want to know what opportunities exist in the turf field now and in the future. Perhaps we have failed to clarify this point, if such is possible.

To answer this question it becomes necessary to review the past in turf. I doubt that anyone knows when man first became interested in grass for recreation. We do know however that the boom in turf for all uses is a very recent thing. In the U. S. the big increase in the turf field has occurred since World War II. A major portion of the turf research carried on by Experimental Stations and private industry has been done since 1950. Practically every state in the Union today carries on some turf research, although a few states are still carrying the major load in this field.

Education is of prime importance today where a decade ago this was practically non-existant. Today most people employed in turf have access to training programs, conferences or courses in turf management. Many colleges and universities are now offering or plan to offer under-graduate or graduate courses in this field. Some of these schools are now giving degrees in Turf Management.

Why this great increase in interest of turf management? This interest could be primarily attributed to the population explosion and more leisure time by workers due to shorter work day and week. As more and more people have time in which to play and relax the greater will be the strain on recreational areas. Cities, counties, states, the federal government, private industries, military and others have began to realize the importance of these areas to the American people. Since we know the population of the U. S. will not remain static then we know there will be an ever increasing pressure put on parks, golf courses and athletic fields both public and private. With this increase in pressure on recreational areas the greater will be the management problems to keep such areas inacceptable conditions to meet public demand.

This presents the second reason for the increase in turf interest among colleges and universities. They have realized that turf management has become a very exacting science. The turf worker of today and of the future will need every available bit of knowledge we can supply if he is to maintain turf areas to meet public demand.

How can we in the turf field of today help those that follow our foot steps tomorrow? This is not an easy task that we face. It will require time, thought, effort and money if we are to succeed. As we face this

1/ Assistant in Agronomy, New Mexico State University.

problem we must consider all phases concerned. For discussion sake the turf field can be divided into three categories. These are research, education and application.

Research is the field in which we strive to improve turf or to prove the existing practices are sound. Actually turf research is still in its infancy. We have just tested many of the basic concepts necessary for a greater effort in turf research. The field of research is extremely large and varied. There are many fields in which research is sadly lacking.

Research in turf can be divided into the following fields: (1) Soil development and management (2) plant establishment and maintenance (3) biological-pathology, entomology and physiology.(4) plant breeders and (5) weed control. Soil development and building for turf purposes has been studied at Texas A & M College and other schools. Although these studies have been conducted, much more work will be required to find the most desirable mixtures for turf purposes. For example we still must know which kind of sand is most desirable in making a soil. Which is the best proportions of various components to permit drainage, root penetration, hold nutrients and resist compaction.

We are probably further advanced in fertilization and watering than other phases of soil and soil management. This is due to the fact that basic concepts were transferred from the field of soil management as related to crop production.

The field of plant establishment and maintenance will require much basic research. We are unable to utilize much of the information of maintenance as related to crop production. This is due to the fact that in turf management we are acting contrary to the natural process of plant growth. The physical, chemical and physiological processes are being disrupted due to frequent close clipping of turf grasses. We must learn how to hold this disruption in nature to a minimum thus causes a healthier plant.

The field of disease and insect control is probably further advanced than that of soils and plant management. However this refers only to chemical control. The most economical and practical control is varieties of grass that are resistant to attacks of diseases or insects. We are sadly lacking in this category.

The field of plant breeding in relation to developing new turf plants is wide open. As more stress is placed on turf the greater will be the demand for plants to meet specific uses. We have relatively few species and varieties of turf plants today as compared to those used for forage use. In forage crops there are plants for specific purposes. Why cannot we also have a variety of plants from which to choose.

As mentioned previously, plants that carry any appreciable resistance to diseases and insects are scarce. The potential is far from being met in this category.

Weed control can be divided into three groups, namely mechanical, chemical and management. Rather rapid advances are being made in chemical weed control but in spite of these we still have many weeds that are impossible to control with ordinary means. For example no one has been able to control nutgrass without complete sterilization of the soil. Annual bluegrass is still a problem in spite of all the research to eradicate it. There are many others that could be added to this list. Again we are found wanting.

Education is just as important as research. This is the area in which we desseminate the knowledge obtained from research and practical work. We can divide education into two parts, namely technical and practical or extension. The technical is that in which we attempt to give an individual the basic theories of turf managment and related subjects that will be required. This is done in colleges, universities and other institutions. The practical application is held to a minimum.

Practical or extension is the field in which basic facts are converted to practical means and passed on to the turf worker. This is usually done by short courses, conferences, meetings and individual contact.

The educational field that was long neglected was that of technical nature. However this is fast catching up but as the turf management field beoomes more technical there will be greater stress on this field of education. A technical education does not eliminate the necessity of practical knowledge. It is merely a tool where by an individual becomes a more practical and a better turf superintendent.

Application of knowledge depends entirely upon the operator. All the knowledge we have on turf and turf management is worthless unless an individual is willing to accept and properly apply the information.

This then brings us to the point that we can ask "where do we go from here". That question can be answered thus, "It all depends on us". As was stated before, it requires time, effort and money to carry on a research and educational program. Unless those in all phases of the turf field are willing to give of their time, effort, and money, our technical advance will certainly not keep pace with the demands on turf. Let use look to the future, let use see that the turf industry is supplied with technically trained personnel and are well supplied with proven concepts of turf and turf management.

AERIFICATION - PRINCIPLES AND PRACTICES

Dr. Robert H. Wiley 1/

Sometime - centuries ago - aerification by application of a tool took place primitive man observed that breaking the soil surface aided plant growth and produced a greater food yield. No doubt this cultiva-

1/ Agronomist-Sales Manager, Aero-Thatch, Inc., Rahway, New Jersey.

tion of the soil was performed with pointed sticks and sharp stones. Very primitive, very inefficient but effective. Not only was it effective but it marked the inception of the evolution of agriculture and specifically soil cultivation which is my subject at this time.

As the methods of soil tilling were developed and improved and more complete and rapid pulverization of the soil resulted, it became an assumed conclusion that surface disintergration was one object - in fact - maybe the prime intent of cultivation. Whether this is truly beneficial in all ways is questioned by some research men. Certainly we in turfgrass culture know that the drastic effects of complete surface pulverizing are only an extreme and last resort in the solution of our problems. We would all like to have the beneficial effects of tilling out turf soil if they could be obtained with no serious surface damage. It would appear nearly hopeless to look for a method of cultivation worth the time, expense, and effort and expect no appreciable turf surface injury. However, the indomitable spirit of the men familiar with the problems present in managing turfgrass under pressure has driven them to search for this paradoxical procedure.

The primitive sticks and sharp stones of the historic researcher's have in our field their counter parts. Early turf cultivation tools were slow, backbreaking devices to puncture the surface. Square tined forks, pointed steel rods, nail studded boards, spiked rollers - all man powered - were used to make holes, to puncture, so that air and water could enter the soil. From this elementary beginning grew the concept that turf cultivation was practically limited to hole or slit punching and was followed, as mechanization of turf culture developed, by a number of more or less effective hole or slit punching devices most of which have served well within their limitations.

The implements which were developed for aerification were varied and interesting.

An early refinement of these tools, although still man-powered was the English tapered, hollow tine fork brought here by Walter Totty of Echo Lake Country Club, Westfield, N. J. This tool, which set the pattern for later machines with respect to hole cutting or punching, cut and lifted a core out of the soil.

Although the following comments may not be all inclusive nor may the order of mention be strictly chronological with respect to the implements mentioned nevertheless the recent history of aerification is generally as follows.

Following the English hollow tine fork and the type spike tooth disc, which is in common use today, came the Turferator. This was an excellent piece of equipment, it consisted of a set of small soil augers which drilled holes through the turf into the soil below. The result was fine but the process slow.

The Night Crawler was quite similar except that it punched holes with hollow tines rather than drilling them. This was a cumbersome machine and slow.

The most widely accepted of all the aerification equipment was the West Point Aerifier whose principle was a greatly improved version of the hollow tine.

Undoubtedly there are more West Point machines on Golf Courses today than any other make although in recent years the Ryan Greensaire has been making headway in the turfgrass field.

There is one common denominator in all of these machines. They are designed to aerate by making holes, generally speaking these machines all puncture the soil in one way or another. None of these machines cultivates and with the severe compaction factors of today, namely, heavy traffic, frequent mowing and weighty machinery, cultivation without surface damage is the great need. Obviously aerification alone falls short of the complete need of loosening the soil.

We all know not only the definition of soil compaction but have experienced or observed it in fine turfgrass areas. We have seen the soil structure so altered that water could not percolate, air had been forced out, root growth was greatly impeded and the turfgrasses dwindled away to nothing. The real need at this point is cultivation. Since soil activity and plant growth decreases as compaction increases it follows that plant growth will improve as compaction decreases and soil activity is restored, all other factors being favorable. Soil puncturing has done much to satisfy aeration needs but little to relieve compaction. There must be better ways to improve soil structure than perforating.

Thatch

Thatch, an accumulation of organic matter (leaves, stems and roots) as it becomes greater in depth and density, has an effect on the movement of water and air into the soil below. We may liken dense thatch to a poorly managed compost pile and in so doing see more clearly the necessity for keeping it under control. When we make a compost pile the object is to convert un-decomposed organic matter into decomposed, healthy humus and humus soil by encouraging the microbial activities by which conversion is brought about. Moisture and air in sufficient quantities is necessary to supply the micro-population so they may live and multiply to feed upon and convert this un-decomposed organic matter into useful material.

Aeration equipment can and does contribute to thatch control. The degree to which they contribute is governed by the principle employed. The hollow tine type of equipment removes a quantity of thatch with each plug of soil removed. However, the quantity is small in relation to the amount present. The spoon type equipment, being somewhat similar in action and principle to the hollow tine, removes more but still a relatively small quantity. The spike disc machine removes no thatch and will only puncture the surface. These punctures close quickly so again water and air movement is restricted.

MICRO-ROTARY cultivation, as accomplished by the saw tooth type equipment, displaces thatch from a cultivated groove in a continuous manner throughout the area. As in the Aero-Thatch equipment.

Layers:

Any turfgrass area which has received a top-dressing of poorly prepared material, an application of sand and/or humus, or of a single top-dressing substance may and often does have a layer of this material which restricts the movement of water and air into the soil below. In turn this inhibits root growth below the layer. Aeration machines play an important part in relieving this condition and improving it by puncturing or even better by cutting continuous grooves through it.

In summation I would say that it appears that aeration of turfgrass areas which are used for recreational purposes is a necessary practice, the purpose being to maintain and in some cases to restore soil structure so that the movement of water and air is not restricted, to control the accumulation of thatch and to relieve the effects of layers where they exist.

The type of equipment employed to accomplish this will remain a matter of choice of the individual. However, it is safe to say that soil cultivation which goes beyond mere soil puncturing must be the goal of the turfgrass industry.

A VEHICLE TO SOUND MANAGEMENT

Mr. Donald M. Winslow 1/

Long before the New Deal and the Fair Deal, about five thousand years ago in round numbers, planning was a known process in the Valley of the Nile. The old Egyptian rulers saw to it that their concepts of temples and pyramids were carried out over periods of ten to two hundred years. Today we don't have to wait very long for the completion of projects, although I know of a church in Seattle which has been thirty years in the making.

Although plans and planning are not new, the frequency with which the terms are used make the words sound tired and tiresome. And yet the validity today of sound planning has not changed, since man emerged from the stone age to live together with his fellow in communities. Flash floods, sewerage, domestic water, shade and shelter have been among the factors which have caused man to think about his environment. This thinking process has evolved from the simple process of scratching on sand to techniques involving the use of aerial photography, electronic computers and many diverse forms of planning technology.

1/ Landscape Architect, Tonto National Forest, Phoenix, Arizona.

For purposes of this discussion, I am including within the framework of planning and the planning consultant the professions and professionals in architecture, city planning, landscape architecture, civil engineering and any other planning discipline. The administrator of a golf course is interested in planning insofar as the construction, maintenance and policing of his golf course is concerned. He is interested in creating an environment commonly known as a good game of golf. To this end, he is normally prepared to enter into the planning process which I have outlined briefly below. But whether he is the administrator of a golf course, chairman of a cooperative apartment project or a city manager preparing to have streets paved, the very same planning processes are ultimately required.

THE PLANNING PROCESS

1. ESTABLISH THE NEED FOR A PLANNING CONSULTANT
2. SELECT A SUITABLE CONSULTANT.
3. PREPARE A PRELIMINARY PLAN AND COST ESTIMATES
4. REVIEW, AND IF NECESSARY, MODIFY THE PRELIMINARY PLAN
5. PREPARE DETAILED PLANS, SPECIFICATIONS AND COST ESTIMATES
6. CONTRACT THE WORK
7. SUPERVISE CONSTRUCTION
8. MODIFY THE PLANS TO REFLECT ACTUAL CONSTRUCTION
9. COMPLETE THE JOB WITH THE FINISHING TOUCHES
10. TURN THE FACILITY OVER TO ADMINISTRATION FOR MAINTENANCE
11. CONSIDER ANNUAL MAINTENANCE, HEAVY MAINTENANCE, REHABILITATION AND FUTURE EXPANSION
12. ANALYZE THE PLANNING PROCESS
    WAS THE PLAN FOLLOWED?
    WAS IT ADEQUATE?
    WERE DIFFICULTIES ENCOUNTERED?
    WERE REMEDIAL STEPS TAKEN?
13. SELECT THE CONSULTANT FOR NEW WORK

These thirteen steps, in sequence, provide the framework around which most construction projects successfully operate. The degree of success, or I should say, the lack of success can usually be attributed to a failure in any one of these steps. It is plainly a case of one weak link causing the chain to weaken or break. Among the commonest obstacles to sound planning is the inability of the professional to communicate with the administrator or client and vice-versa. This problem occurs early in the planning process and for that very reason is one of the most troublesome.

Once the need for a consultant has been established, the method of selecting this professional needs to be resolved. In the case of public agencies a choice must be made from among available qualified people. Often it is rather difficult to know just whom to call upon if the project involves different kinds of engineering or architectural skills. Normally, it is best to select an overall consultant and, if necessary, require him to avail himself of the services of specialists. As an example, a golf course architect or landscape architect will often call for the services of an engineer specializing in hydraulics.

If there is doubt about selecting the appropriate consultant, often the professional societies can be helpful in providing lists of qualified people who have had experience in a given field and who are available for consultation. As examples, most large cities list the American Institute of Architects, American Society of Civil Engineers, American Institute of Planners and the American Society of Landscape Architects. If names and addresses are not readily available, some of the departments at state universities can be helpful.

Discussion of fees at this stage is normally not very helpful because so often the services of the professional are intangible and based largely on experience and reputation. It is desirable to select a consultant on the basis of his qualifications and also to select an alternate in the event the first choice and administrator fail to come to an agreement. At this time a discussion should take place between the administrator and the consultant under consideration clearly outlining the scope of the work at hand. Then, and only then, can the subject of fees be discussed and it should be discussed openly and thoroughly. Given a fair fee, the professional should be expected to exert himself and act as the client's agent at all times. Not only is it important to establish the amount of the fee, but equally important is an understanding of when the fee is to be paid, if in stages; to whom it is to be paid; and at what point the contract with the professional can be mutually terminated. All these points should be agreed upon in writing in advance of actual planning.

There are several methods and combinations of methods for reimbursing a consultant for his services. Three of the prevailing fee systems are as follows:

1. HOURLY BASIS

   This method usually establishes an hourly rate for actual time spent by a consultant and his draftsmen. It usually provides for reimbursement of expenses, such as mileage and other abnormal expenses.

2. FIXED FEE

   This method is often used by a consultant who is able to accurately estimate the time required to do the work. It is also a method preferred by administrators or clients who are working with a tight budget.

3. PERCENTAGE FEE

   This is the most commonly used method when employing consultants for large projects. It is also the most frequently misunderstood method for reimbursing a planning consultant. If supervision is a part of the planning job, and it should be, the percentage fee is normally broken down to allow payment of 25% of the fee upon completion of the preliminary plan.

Following completion of detailed drawings and specifications an additional 50% is normally allowed. The final 25% of the fee is paid after completion of construction after supervision by the consultant. The most common problems and irritants surrounding this fee system can usually be avoided if there is mutual understanding between client and consultant.

a. Prompt payment of fees.
b. If, after some stage in the planning process, the client wishes to stop work, cancel the project or hire a new consultant, the consultant is entitled to fees previously agreed upon. Very few professionals regard their work speculatively and do not share in speculative financing. If there were a 50-50 chance of construction taking place due to a change required in zoning or the availability of financing, the consultant might under circumstances make his services available at a double or nothing rate. The ethics of this technique would depend upon the exact situation and the feeling of the consultant on that particular situation.
c. The nature of planning often creates misunderstanding between client and consultant. Naturally, the client wishes specific services for the fees he is paying. If the nature or extent of these services are left in doubt, fee problems arise.

ROADBLOCKS TO COMMUNICATION

1. SEMANTICS

Phrases like neutral color; blending into the surroundings; rustic; modernistic; attractive; are inexact and subject to a great deal of misinterpretation. Be sure to say what you mean in all ways possible. Use word pictures, photographs, scale models, and all other conceivable means to communicate ideas.

2. STATISTICS

This is a subject for which PHD's are awarded. Statistics not only need to be accurately collected and documented, but also need to be interpreted.

3. COLOR BLINDNESS, DEAFNESS, AND OTHER SUBTLE DISABILITIES

Many people are sensitive to particular colors. For this reason it is not wise to enter into discussions about color early in the planning process. A clear understanding about the overall project and the scope of work can be confused by use of controversial colors in preliminary renderings. The client is distracted from the shape and content of a building by the use, for example, of purple aluminum sheeting.

4. COST FIGURES

Since I have worked for the U. S. Forest Service, I have become exposed to several sets of cost figures. Although each one is accurate, certain intangibles make it possible for a fireplace and grate to cost anywhere from $20 to $50. Here are the possibilities.

a. Contract the entire work.
   Cost of fireplace in place $50

b. Contract the casting of the fireplace; have forest ranger install fireplace $45

c. Work performed entirely by Federal Youth Detention Camp with supervision by forest ranger. $20

There are many other possible combinations wherein the costs may differ. In each case the statistics have to be gathered on the actual costs involved, such as the ranger's salary apportioned to the job; the cost of operating his truck to and from the job; and all the other incidental features.

The way in which cost figures become an obstacle to communication between the client and the planning consultant is the extent that they are apart in evaluating the methods of financing a project. These are matters that require close attention in all discussions between client and consultant from the beginning of the preliminary plan stage through the supervision stage of construction.

MAJOR OBJECTIVES

WHY IS PLANNING A VEHICLE TO SOUND MANAGEMENT?

If we return to the case of the golf course administrator, we can, without much controversy, establish his main objective in securing the services of a planning consultant (golf course architect or landscape architect). He is interested in creating an integrated golf course facility which will attract people; will require a minimum of manning and policing. The emphasis should be on the word integrated, and by that I mean a golf facility should not be merely 18 holes, a golf club and a group of trees. A golf facility should be an ENVIRONMENT. No one single component stands out as an isolated part, but is smoothly related to the whole by all the means available to the administrator and planner. Trees, streams, hills and club house become a single entity.

In the use of recreation areas, one of the primary management requirements involves controlling the use of the area by people. It can readily be seen on the golf course. The golf club does not hesitate to ask people to use holes 1 thru 18, in that sequence. It's part of the game, you say. Think of the consequences if people were allowed to follow their own sequence. Imagine the rules of the highway being suspended and people are left to choose which side of the road to travel!

There are subtle ways of influencing people in design. The Park Ranger says, "Stay on the path and enjoy the informational displays." The Forest Ranger says, "Clean up your picnic table for the next fellow."

These are more effective than saying, "Do not get off the trail," or "do not leave a messy camp."

Sound planning should recognize the strongest motivations in people's use of areas. Most public agencies recognize the strongest urge of all and place their facilities accordingly! By the same token, there are strong attractions outside of the immediate area that defy control. Suppose that at the Grand Canyon there were no places for cars to stop to permit people to look at the Canyon. Would it be possible to prevent people from parking on the highway for a quick glimse?

There are less obvious attractions which the planner needs to recognize. Oftentimes a glimpse at the unknown is the only attraction and a well-worn path is developed to look at what? A garbage can? Perhaps a well placed tree, fence, or hedge can keep such curiosity from developing.

Sound planning and sound management also involves sound fiscal planning. At times it is not possible to finance an entire project, in which case there are several alternatives:

1. Abandon project temporarily or permanently.
2. Stage construction over a period of years.
3. "Shotgun" available funds. The phrase says what it implies, funds are spent on disassociated facilities without proper integration. "Shotgunning" is a mis-appropriation of funds because the benefits derived are of short range duration and often cannot be applied to the long range overall picture.

Staging of construction is a recognized form of planned development, PROVIDED the staged packages are logically broken down. Too often the primary decision in staging is to provide the public with a good first impression. It's like scooping the whipped cream off a chocolate pie instead of dividing the pie into reasonable portions! Staging construction often causes unit costs to go up, not to mention costs rising due to inflation. In recent years construction costs have risen between 3% and 10% per year.

MEDIOCRE DESIGN COSTS MONEY

Architects are often plagued with the instructions they receive from school administrators pertaining to use of conservative design and conservative colors. These instructions stem from school boards' sensitivity to criticism from the public on extravagences. School boards have felt that criticism can be avoided by building rather dull, colorless, inexpensive-looking structures. In actuality these projects cost as much as those which have felt the gifted hand of an imaginative architect.

Mediocrity in design is an offense to our learning institutions and should not be condoned by administrators, Public administrators owe the public the very best planning and architectural services that are available. Public recreation areas, because of increased leisure time available, should reflect the highest standards in planning and workmanship.

Planning leads to sound management because trial and error is held at a minimum. Through proper communication, the processes of physical and fiscal planning provides the administrator with the assurance that the job will be well done.

PERSONNEL MANAGEMENT

Mr. Charles E. Stenicka 1/

Not available.

TIPS ON SAFETY AND MAINTENANCE OF EQUIPMENT

Allan L. Van Pelt 2/

My subject today is entitled "Tips on Safety and Maintenance of Equipment". Safety can be a very important word to us all. We all should be vitally interested in learning ways to make an operation safer, whether it be driving a piece of farm equipment or pushing a lawn mower. Unsafe equipment or unsafe operators can be very costly to an individual or to an entire organization. Every state in the United States is attempting to make equipment safer.

Our Company often times find it very difficult to design and manufacture a unit to meet certain State safety regulations and still be able to build the machine so it will do the job it is supposed to do.

We find that many of these regulations come about because of the very bad experiences that operators have had. Maybe some have lost a finger; broken an arm or any number of mishaps.

We believe in safety and want to do everything possible to promote better safety. Along this line our Company has compiled several safety tips, safety suggestions and safe operating procedures which we hope will eliminate at least one accident each year for each organization represented here.

We are going to show you some slides involving the subject of safety and while you are looking at these slides I'll be adding some comments.

1/ Employer's Industrial Council, El Paso, Texas.

2/ Jacobsen Corp., Ventura, California.

1. This first slide will show us the importance of having guards over exposed parts. You can see the belts are exposed and exposed belts; chains, sprockets or other moving parts can be the beginning of a very serious accident. So many times, machines are equipped with safety devices but are removed forever because an operator wishes to reach his belt or sprocket a little easier. This is true here. The guard has been removed and this is a hazzard. The belt is exposed. A man's plant leg may be caught.

2. Here we see a missing gas cap. Many times a missing gas cap has been the cause of a very serious fire. I personally know of a fire recently from a missing gas cap on a mowing tractor which had just been filled with gas and backed into an equipment shed for the night. The gas splashed out, flowed onto the carb and a very serious fire resulted. The operator escaped without injury and he was lucky. The tractor, several other pieces of equipment and a large portion of the barn was destroyed. And, as so often happens, insurance covered only about $8,000 of the $23,000 damage. When we loose a gas cap - let's get a new one! Costs less than one dollar!

3. This is a worn sprocket and this can be costly to your operation as well as dangerous. Worn sprockets wear chains, can be hard on bearings; can be hard on almost all components of a machine. Loose sprockets and chains can also catch clothing and we already know what that can do. When we see or know we have a worn piece of machinery such as we see here, we will be doing ourselves a favor by replacing it.

4. When crossing narrow areas such as we see here, use the safety chains provided to keep the units in a secured position. An even better example of this would be running this unit along a busy city street where you would have a lane of traffic on each side of you. A failure in a hydraulic system would allow a unit to lower on top of a fast moving car. I don't have to tell you what that would cause. Yet I see operators driving this unit at 30 m.p.h. through city streets, never bothering to use the safety chains provided. Let's take advantage of all the safety devices provided by the manufacturer. An accident may be prevented - a job may be saved! A life may be saved!

5. When repairing engines be sure engine speeds are not increased beyond recommended factory specifications. We see a trackometer in use here. This is a very inexpensive tack. One that cost $5.00 and is very accurate and very simple to use. I have one here. Let me show it to you. (Show how it works). All shops should have these and use them. Excessive speeds can be dangerous and I know we all know how that can be.

6. A dirty tractor can easily catch fire when oil and gas are allowed to accumulate such as you see in this slide. It is so easy to keep a tractor clean and yet so many of us will allow this to happen to our tractors. We already have heard the hazzards of an equipment fire.

7. Operators should always follow state regulations when operating along highways. This picture shows us the tractor is going with the traffic. Occasionally we must go against traffic and, when we do, we should have someone stationed ahead to warn traffic. We should certainly have safety lights and flourescent tape on our tractors when returning after dark or operating near dark.

8. This shows us a rotary mower and rotary mowers are good. Many of us use them and plan to use them for many years to come, or at least until the industry developes something better. We all know that a rotary mower can be very hazzardous. And, for this reason, we suggest, whenever possible, a rotary mower should be used when no one is near. For example when cutting a school ground, we should mow when the children are in classes. Stop mowing for the 15 minutes when the children are out for recess. The operator could plan his coffee break when the children have their recess period.

   Cutting along highways could be done when traffic is lightest and not during rush hours.

   Even mowing the home lawn can be done when the children are not there. There are plenty of cases in court today resulting from an operator not using good judgment when using a rotary mower.

9. In this picture we see an operator driving with one hand. We believe it is a bad habit to not drive with both hands, particularly when crossing streets. It would even appear here that the operator may not be looking where he is going. Both of these are bad. Let's develop good driving habits with tractors as well as we do with automobiles. Operators must be trained to drive equipment.

   It would seem we continually aim at the operator when we talk about safety. This talk is not designed to be harsh on the operator, but I think we can agree the greatest number of violated safety rules occur with the operators. After all, they are usually the one present when a machine is being used.

10. Check your radiators often - particularly in the hot climates. When checking water level be sure to remove cap slowly. Many have been scalded this way. Overheating can cause a power loss in your tractor and a much earlier overhaul will probably be the result.

11. In extremely rough mowing conditions as you see here, it is always a good idea to walk through the area first to prevent tractors dropping into deep ditches, or hitting objects such as wires, fence posts or water pipes. You will notice here that the operator is operating with one hand and this could be dangerous, particularly in a rough area that hasn't been walked over before.

    Speaking of cutting off water pipes - here is a perfect example of how a water pipe can be cut. I saw this happen. The operator took the word of someone standing nearby that there was nothing in here that could be harmed. The tractor had traveled about 35 yards when a pipe

was severed. It took the City of Denver personnel 35 minutes to find out how to shut off the water. In the meantime traffic on the freeway had to be detoured. The moment was very embarrassing and very costly. I should know because I was the one driving the tractor.

You have just seen some of the things that can happen when we don't pay attention to the rules of safety. Now I would like to turn to a subject very closely related to safety and we will call this "Top-Ten-Tips on Equipment Management."

Our Company has been very interested in what we consider a very important phase of maintenance called "In-Service-Training". Some organizations have elaborate equipment training programs. Others depend on the "Catch-On-Method". The latter could refer to a Supt. that feels the operators can learn by mistakes, but unfortunately this may turn out to be very costly.

Here is a collection of training suggestions from supts. throughout the country. Each letter of the title Top-Ten-Tips has a meaning in good golf course practice.

T - Train the operator to report missing parts on the equipment.

In addition to the fire hazzard created here the operator could be caught in a heavy down-pour of rain on his way back to the barn. Unnecessary work needs to be done to get the water out of the gas.

O - Observing and reporting general course conditions is part of the operators education and responsibility.

He must be trained for this responsibility. The branch in the trap is merely one course condition that must be corrected immediately. The greensmower operator or the tractor might take care of this. The Supt. cannot learn of every problem that occurs on the course overnight. Train operators to report such conditions as these.

P - Projecting the need for replacement parts must be taught to your mechanics. Supts. and mechanics should be able to foresee part needs before actual failure. The belt you see here has a few hours left. A replacement should be ordered now before the breakdown and avoid an emergency.

T - Teach the importance of listening for sounds of impending problems. This pulley must have rattled for 25 hours before this excessive wear took place. Train the men to report unusual noises. This will keep repairs to a minimum.

E - Educate employees with a planned rainy day program. This is not a rainy day program. True, a form of teaching is present, but it hardly contributes to good course maintenance practice.

It may be too wet to cut, but not too wet to train. This operator will do a better job or at least he has had instructions and knows what he should do.

N - Never expect the best performance from poor instruction to workers.

Apparently the tractor driver has not received enough instruction and has been causing much tractor damage around the sand trap.

Just because the tractor driver may be a well qualified tractor driver does not mean he is proficient for turf mowing.

T - Tell the operator to immediately report if the equipment is doing turf damage or if evidence of vandalism appear.

This turf is being damaged and it is quite a ways from the equipment shed. A good operator will report this condition before further turf damage is done. He can save you many hours of work.

Evidence of vandalism can be seen here. When a golfer tells the Supt. about this and the situation is quickly corrected, it gives the general impression that the course is well managed. A golfer will respect a course well maintained and will do his best to keep it this way.

I - Insists the equipment be kept clean to insure maximum life.

How much life can be expected of a piece of equipment that is allowed to rust like this?

We don't suggest this litter box on equipment. This would be abuse. Tool boxes or litter boxes on equipment could affect the performance of the equipment.

P - Plan regular maintenance checks with employees present. One way to up-grade operators is to make them responsible for certain maintenance checks on their equipment. Though your mechanics and operator are responsible, they must be reminded of regular maintenance checks. Most of all, he should be educated on new equipment before it is put into service.

Let's not use the philosophy "When all else fails, read the manual".

S - Spare the worker from the jobs he cannot capably handle or better train him to know the limitations of the equipment.

This can be deadly. The operator attempted to cut an area the tractor could not handle. Training can be a matter of life and death.

Nearly any one of these subjects covered by these slides could constitute a one-half hour discussion.

One thing I have attempted to put across by this presentation is the importance of training. Training, even with the most informal plan, means work but can lessen the need for direct supervision of men. Let these "Top-Ten-Tips" serve as ideas for formulating some type of plan for continuous training at your course.

1962 Attendance Record

Officers of New Mexico Turfgrass Association.

Frank B. Feather, President
Preston E. Childers, Vice President
Clarence E. Watson, Secretary-Treasure

Apodoca, Nate T., 311 Lead Street, T or C., New Mexico.
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Beeson, Garland, New Mexico Military Institute, 201 W. 19th, Roswell, New Mexico.
Blassingame, Max E., El Paso Parks Dept., El Paso, Texas.
Boutz, Paul L., Chief Engr., Base Engr., Sandia Base Branch, Albuquerque, New Mexico.
Bunsen, Elliott E., Mason Chemical Company, P. O. Box G., Ysleta Station, El Paso, Texas.
Carasco, Marcello, Alamogordo Country Club, P. O. Box 925, Alamogordo, New Mexico.
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Childers, Preston E., Paradise Hill Country Club, 10000 Golf Rd., Albuquerque, New Mexico.
Day, Fred A., Dir., Physical Plant, N. M. S. U., University Park, New Mexico.
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Feather, Frank B., Physical Plant Dept., N. M. S. U., University Park, New Mexico.
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Halla, Frank, Pres., The Myers Company, 140 N. Cotton, El Paso, Texas.
Harris, Ted., El Paso Parks Dept., El Paso, Texas.
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Leftwich, Bill, Base Agronomist, Holloman Air Force Base, New Mexico.
Lessau, Heinz, N. M. Inst. Mining & Tech. Golf Course, Socorro, New Mexico.
Martinez, Ted, Four Hills Country Club, P. O. Box 8362, Albuquerque, New Mexico.
Moody, Lloyd, Ft. Bliss Golf Assn', P. O. Box 6592, Ft. Bliss, Texas.

Moore, Chuck, Apache Country Club, Mesa, Arizona.
Mora, Matias, Ascarate Golf Course, Ascarate Park, El Paso, Texas.
McClendon, Paul, Parks & Recreation Dept., 923 Broadway, Albuquerque, New Mexico.
Notgrass, Dale, El Paso Country Club, 400 Camino Real, El Paso, Texas.
Oliver, Hollis, Southwest Fertilizer & Chemical Company, 5030 Paisano Dr., El Paso, Texas.
Palmer, C. L., Superior Service Company, 2406 Silver, S.E., Albuquerque, New Mexico.
Patterson, A. S., Base Engr. Office, Sandia Base Branch, Albuquerque, New Mexico.
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