Factors in Repairing Winter Damaged Areas

1. Seed preferable to sod
   Lower cost — More readily available — Smooth surface — Seedbed preparation — Spiking — Cultivation
   Suggested for Quick Cover:
   Greens — Seaside and Redtop in 2-1 or 1-1 mixtures
   Fairways — Seaside, Redtop and Poa Trivialis 1-1-1 (Penncross a possibility)
2. Liaison with Golfers
   Progress reports — Use of turf service, publications
3. Nurse the New Turf
   Fertilization — watering — mowing — fungicides — golf car traffic — cup settings — pregermination — possible use of polyfilm for speed
4. Don't Wait — Study damaged areas — Set repair target date

Preventive Control of Winter Damage

1. Architectural Design
   No severe mounds — no pockets — Sensible car paths
2. Construction Features

Soil Mix — Sand	Soil	Humus
2	1	1
1	1	1
2	1	2

   Drainage
   Surface and subsoil
3. Adaptable, Resistant turf strains
4. Turf Management — fertilization — moisture — height of cut — root propagation — chemical treatment
5. Protective Covering — snow — branches — fencing — polyfilm — mulch
6. Ice and Snow Removal — soil — sludge — mechanical
7. Traffic Restriction — Authority to restrict play when turf conditions don't warrant it
8. Regular Inspection — during winter and early spring

Nature of Winter Damage and its Symptoms

1. Disease — Snowmold types
2. Desiccation — roots, plant, cracks
3. Ice Sheet — suffocation
4. Excessive Water — frost layers
5. Hothouse effect — snow cover, warm weather, subsequent freezing
6. Weak Turf — due to succulence
7. Winter Play — Bruising of turf and/or puddling
8. Kill Back — too close mowing
9. Chemical injury — Burn from overdosing, wrong applications
10. Heaving and Cracking — due to frost
11. Rodent Damage

that have been widely accepted as the only known methods of heading off the damage. What is needed in this respect, they agreed, is further investigation of prevention measures.

At the same time, as Sherwood Moore pointed out, the supt. should not be immediately concerned with what has been done in the past in trying to determine what causes winter damage or how it may be prevented. His most pressing need at the moment is to know what to do about it if he finds that it has attacked his course during the recent cold months. Two years ago supts. in the Midwest and in 1963, Norheastern supts. were faced with severe winter damage. Because so little was known about it in either of those years, they had to repair their courses with nothing more than the hope that they were proceeding in the right direction.

What Is Present Need?

Supts., Moore continued, have learned a good deal in a short time about restoring turf that has been injured by cold weather. There are some secrets that remain to be discovered because the restoration work still is in a trial and error stage. But those who have had to bring their courses back after being hit by winter damage will agree that the steps recommended in the chart at the top of page 31 are a very excellent guide in undertaking the repair work. It is, after all, a summary of the things they have tried and found to be successful.

Two-Step Program

Two years ago, for example, Midwest supts. who were hard hit by winter damage, employed a two-step program in bringing their courses back. First, they aerified extensively and then used a verticut machine to break up the plugs in the dead areas. Then, many of them overseeded at a rate of about five pounds per 1,000 square feet with some type of bent. The seed was worked into the soil and kept moist for a period of several days.

As a second step, they reversed the above procedure, overseeding and then aerifying. To prevent disease, caused by damping off, they liberally applied fungicides. But in many cases, it was early June before their greens came back to normal. These things were fine, the GCSA panel agreed, but the recovery date may have been moved forward with perhaps more intensive fertilization and cultivation.

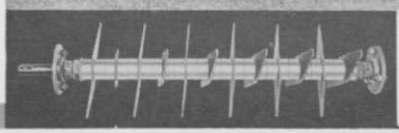
Making sure he hit the first ball at the dedication ceremonies of Metropolitan Dade County's new Greynolds Park golf course, metro vice mayor, Lew Whitworth, used a king-sized club and ball. Giving golf tips are fellow commissioners, Tom O'Malley, Harold Green and Joseph A. Boyd, Jr. Whitworth is said to play par golf. — Miami-Metro News Bureau Photo

Term Is Re-Defined

The Philadelphia panelists agreed that the term, winterkill, is a misleading one. In nine cases out of ten, turf actually isn't killed by desiccation, near-suffocation due to ice sheet coverage, or by heaving and cracking due to frost. What happens is that its emergence in the spring is delayed. Thus, winter damage is a more accurate and acceptable term than winterkill.

The big failing in the winter damage picture, Bob Williams pointed out, is that supts. have been notoriously lax in informing their members and players why turf recovery, following a severe winter, is slow. As a result, the known preventive steps taken the previous fall may be wasted, so far as the player is concerned. He assumes that the supt. actually did nothing to try to head off the damage when he had a chance. The result is that many jobs are jeopardized as they were in the Midwest in the spring of 1962, and in the Northeast last year.

Use the high speed, deep slicing RYAN MATAWAY to control thatch for better turf growth



Wide range of reel assemblies and blades—all blades carbide faced for extra long life.

The self-propelled Ryan Mataway is powered with a 9 HP engine to guarantee continuous high speed cutting through the densest thatch. The high speed helps blades lift out thatch without harming grass. The Mataway covers over 10,000 sq. ft. per hour so you can use it for all the jobs it's built to do—on greens, tees, fairways and approaches: *thatch control, vertical slicing of running stem grasses, grain control, erosion control and to reduce moisture run-off, to cut narrow furrows in soil surface before overseeding or fertilizing.* Choice of models, one with reversing reel, plus lighter weight Ren-O-Thin for power raking.

See how Ryan units team up to do more jobs: Use the Ryan Greensaire for superfine aerating (it pulls more cores per sq. ft. than any other aerator . . . core openings do not deflect putts . . . coring immediately relieves compaction). Follow up with the Mataway (or Ren-O-Thin) to turn cores into top dressing! See your Ryan distributor or write:

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GRAU'S ANSWERS TO TURF QUESTIONS

BY FRED V. GRAU

Give More Information with Your Questions

Many urgent questions are received by this department during the year. Some arrive with most of the essential information that makes it easy to write an answer. Others come with just a bare question and no supporting evidence on which an answer can be based. For example: "How much will it cost to rebuild our No. 4 green?" This is an unanswerable question. I've never seen their No. 4 green. The writer doesn't mention size, location, architect fees or anything else. It would take a considerable exchange of correspondence before a working basis could be established.

Here is another: "I have a disease problem and fungicides don't help. What shall I do?" Here again, there is no data to indicate what the problem may be. There is no mention of the kind of grass, soil mixture, feeding and watering program and the amount of play. After an exchange of correspondence it was determined that the two inches of thatch and mat that had developed was the determining factor. After that it was easy.

When Do We Water?

It is distressing to receive a question involving a controversy. For instance: "My green chairman says that greens should be watered all night every night. Our pro would like to see them watered once a week. I water them as they need it. What should we do?" This isn't an actual question but it is close to some I've had. It is a ticklish thing when you get placed square in the middle of a club argument.

Another difficult question is, "What fertilizer should we use on our fairways?" First, I do not know what kind of grass is on the fairways. The writer did not say whether or not it was irrigated. No information was given on soil test results, pH level, type of soil, etc., etc.

A letter has to go back to the club trying to get enough essential data to answer the question intelligently.

Many times we write back to the questioner and request a 2-inch plug of the turf (at least 4 inches deep) so that soil texture, layering and thatch or mat can be evaluated.

We can only give prompt replies to questions that are accompanied by as much supporting information as possible, such as:

Kind(s) of grass involved
Age of the turf
Irrigation procedures
Feeding program
Copy of recent soil test results
Description of the problem

Erosion on Slopes

Q. We have a serious problem with erosion on our slopes. Someone told us about crownvetch and we would like to have more information. We planted creeping phlox and Vinca minor but they are not doing well since nearly all of the topsoil was graded off. The soil is very acid and we plan to add lime. If we plant crownvetch, will it crowd out the existing cover? Or should we remove everything that has been

A. For all essential information on PENNGIFT crownvetch we refer you to a recent mimeographed release from the Agricultural Extension Service, Penn State University, by Dr. John C. Harper. Sources of seed and of crowns can be secured through Dr. Harper or through this department. Prices must be quoted directly by the suppliers.

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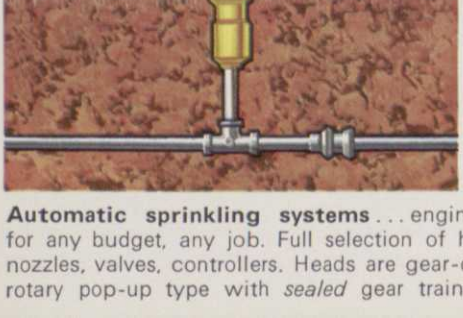

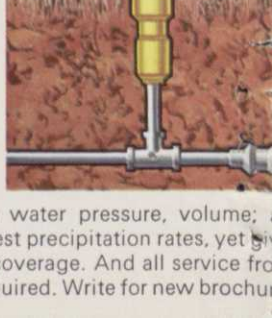

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Nitrogen: Symbol, N. A colorless, tastless, odorless inert gas, constituting by volume 78.03% of the atmosphere. It is a constituent of all living tissues found in greatest concentration in young growing parts, in leaves and seeds. Without N, growth is impossible.

The Nitrogen Cycle: (1) Fixation of N in air by organisms or by manufacturing; (2) Absorption by plants; (3) Conversion to plant tissue; (4) Utilization by animals or decomposition by organisms; (5) Reconversion to forms suitable for plant growth, loss by leaching or erosion, or escape into air in gaseous form.

Fertilizer N may be found in nature (sodium nitrate, Chile), accumulated as plant or animal by-products (seed meals, tankage, sludges, manures), or manufactured (urea, ureaform, nitrates, sulfates).

N for turf may be soluble (urea, nitrates, sulfates) or insoluble (ureaform, sludge, tankage). Solubles feed plants directly and rapidly. Insolubles feed soil organisms first. These, in turn, supply N to plants more slowly.

Conversion of complex N compounds in soil is by way of 1) ammonia, 2) nitrite, 3) nitrate. Nitrates combine with Ca and Mg and enter plant roots in solution. Many plants can use ammonium ions directly.

N tends to increase topgrowth, green color and to delay maturity. Excess of soluble N tends to increase some turf diseases. Insoluble N forms are safer even in large quantities.

Nitrogen is a part of an intricate complex chemical and biological system which is sensitive to environmental conditions. N serves turf best when soil bacteria are favored by good drainage, optimum soil aeration, pH range near neutral (7.0), ample energy supply (carbon), and all other nutrients in balance.

By all means use dolomitic limestone liberally. A soil test should be made. A pH value of around 7.0 is desirable.

You do not need to remove anything that has been planted. Fertilize as directed in the circular. Then, according to your choice, sow freshly-inoculated seed or plant crowns (living roots). If you don't see results soon don't become discouraged. New crownvetch growth is not easily recognized and, besides, it is very slow in getting started. It develops an extensive root system first — then the tops begin to develop. You will find that PENNGIFT crownvetch gradually will take over the other plants, weeds, included, until there is a solid erosion-control groundcover.

Zebra Grass

Q. We want information regarding Zebra grass. **(See page 44, GOLFDOM, Feb., 1964.)**

A. We answered this question by saying we have not found information on it. Now comes Dr. Felix Juska, USDA, Beltsville, Md., who called to say that Zebra grass is *Miscanthus sinensis* often mis-named "eulalia". The 1948 Yearbook of Agriculture (p. 734) named this grass, "Chinese silvergrass", said nothing about "Zebra grass".

It is a reedy, bunch-type, semi-tropical, ornamental grass 4 to 6 feet high, with leaves cross banded. These are two varieties in the U.S. Both are vegetatively propagated. When mature it has plumes similar to pampasgrass.

Hungry for Nitrogen

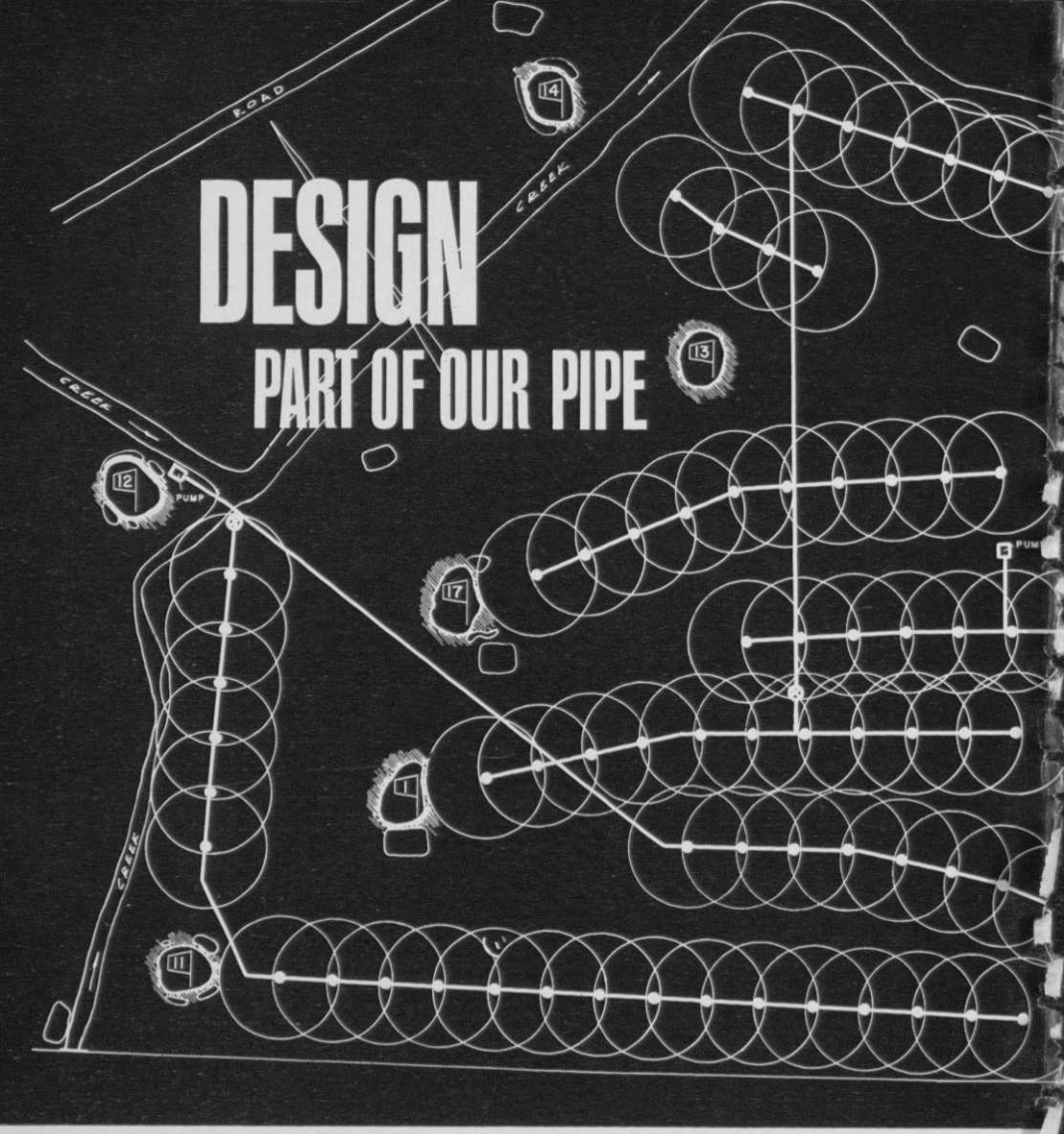
Q. We have had a problem with our greens for the last two summers. We have dollarspot and nothing seems to help it much. I spray one chemical on Monday and another on Friday. Sometimes I mix them but my only relief comes when I use twice as much as recommended. I tried hydrated lime at 3 lbs./M² back in the fall and it seemed to help some. What do you suggest? (Virginia)

A. Naturally I should know more about your greens such as 1) kind of grass 2) fertilizing program 3) irrigation. Also I would like to see a soil profile to check on thatch and mat.

Based on past experience these are distinct possibilities:

1. The light touch of lime helped because it probably stimulated soil bacteria which released some nutrients which, in turn, helped the grass to recover. I suspect that your grass is hungry for nitrogen. Well fed grass rarely develops dollarspot. Since you told me nothing about your fertilizing program it is difficult to make a valid suggestion. Also, some grasses are more susceptible to dollarspot than others.

(*Continued on page* 157)



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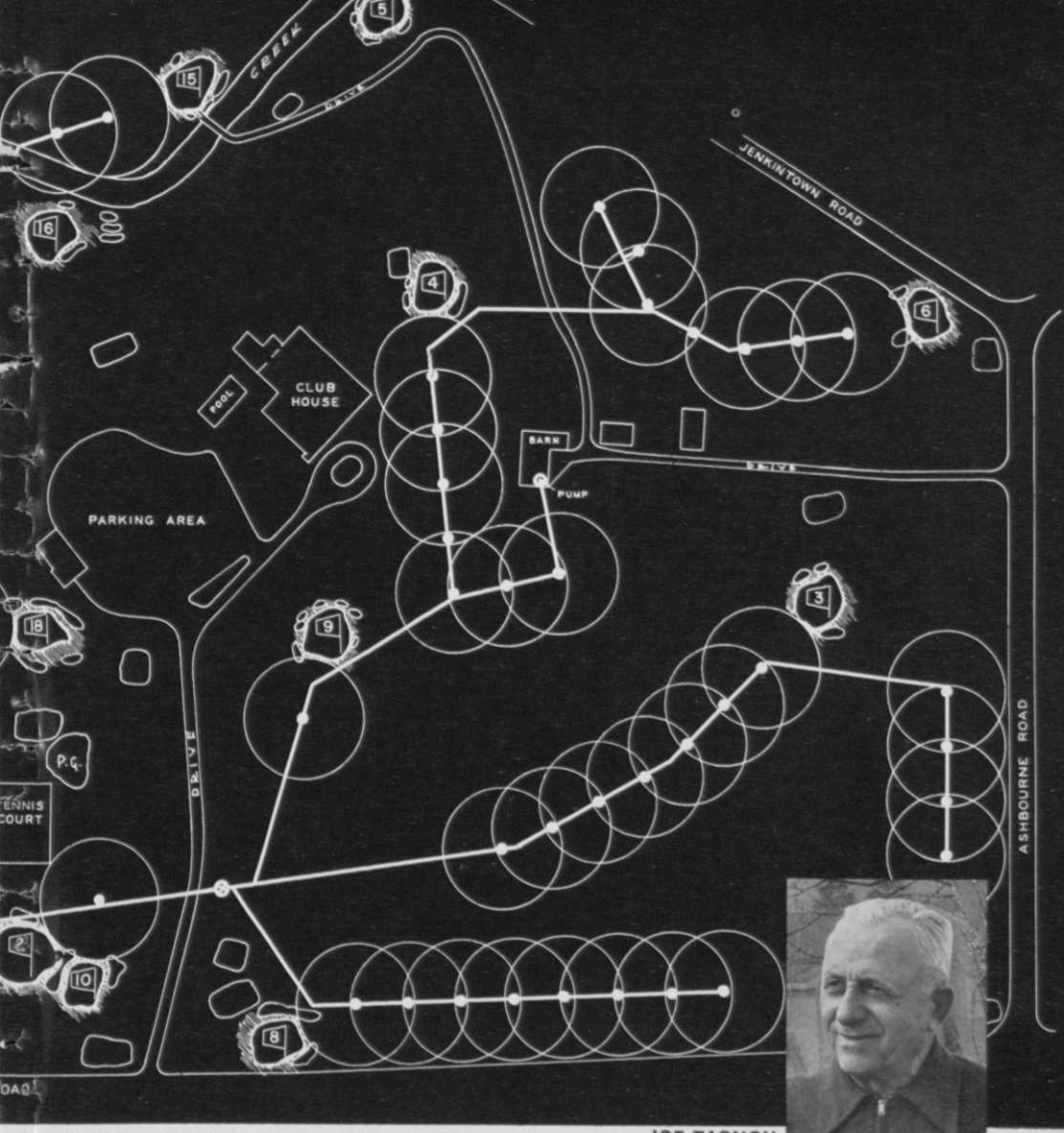
CERTAIN-TEED PRODUCTS CORPORATION



3, 4, 6 & 8-in. pipe sizes were used. Details of this system, designed and engineered by EECO, Inc., sent on request.

JOE TAGNON, Superintendent of Ashbourne Country Club in suburban Philadelphia.

and Mr. Tagnon reports, **"This sturdy pipe, with its FLUID-TITE® Couplings, stayed absolutely water-tight."** Approval for the entire project was granted, and this modern pipe now delivers water uniformly at low cost in a system designed by EECO, Inc., Harrisburg, Pa. ● Immune to electrolysis, rust-free Certain-teed "K&M" Asbestos-Cement Irrigation Pipe is your best choice for economical, long-lasting water systems. Write today for full details.

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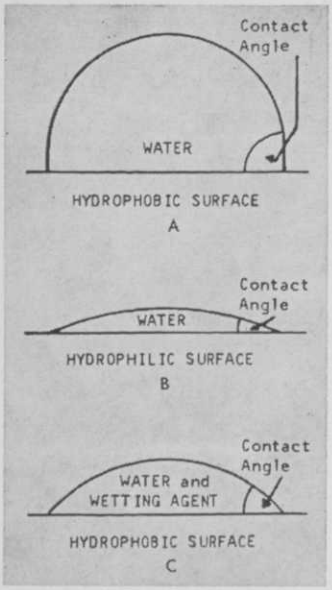

Figure 1 — Soils and soil mixtures present hydrophobic surface to water. Wetting agent reduces contact angle and moves water rapidly over treated surface.

WETTING AGENT	Percent Reduction in Evaporation					
	SAND			SOIL		
	FIRST WETTING	SECOND WETTING	THIRD WETTING	FIRST WETTING	SECOND WETTING	THIRD WETTING
AQUA-GRO	44.4	30.0	43.4	71.9	50.7	36.7
A	33.3	21.2	37.7	4.9	—	—
B	44.4	8.7	—	45.2	31.4	—
C	—	—	—	55.7	38.1	13.9
D	22.2	—	37.7	—	16.7	7.2
E	11.1	—	—	10.1	7.0	9.5
F	33.3	30.0	52.8	6.2	1.5	—
G	—	—	—	28.2	24.8	11.3
CHECK	—	—	—	—	—	—

Figure 2 — Texas A & M data show differences in commercially available wetting agents.

Tension is reduced and infiltration improves

Wetting Agent Increases Water's Spreading Action

By ROBERT A. MOORE
President, Aquatrols Corp. of America

(First of Two Articles)

A wetting agent is a surfactant — a peculiar group of materials that are very active at surfaces. In this group are detergents, empulsifiers and, of course, wetting agents. Their difference is primarily in molecular weight and chemical structure. One very important difference in these materials is that they can be ionic or non-ionic. Original research showed that non-ionic materials were preferred because of their safety to living plant materials and micro-organisms. As an example, many ionic materials are used as scouring compounds and germicides, and can be very toxic to plants and soil organisms.

Non-ionic wetting agents usually consist of an alkyl and an aryl group of differing molecular weights, as an alcohol, an ester or an ether. These materials act in such a way that part of the molecule is water soluble and part is water insoluble. This strange behavior causes the attractive forces of water, which are exceptionally large, to be tremendously reduced. A few thousandth of one per cent will reduce these forces by more than 60 per cent.

To first explain their action in and on soil, let us look at a flat surface with a drop of water standing on it. The attractive forces of water tend to pull it up into a ball. We've all seen this on the leaves of grass. A wetting agent lowers these forces, and increases (if the insoluble portion is correctly chosen) the spreading

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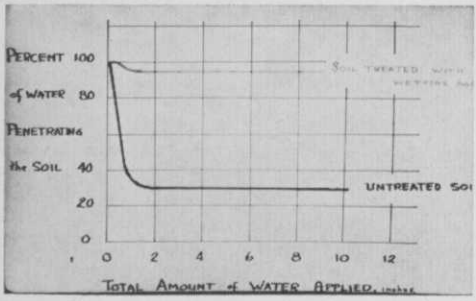

Figure 3 — Contrast in treated and untreated soils shows wide difference in penetration.

attraction of the water over the surface (figure 1).

Now let us look at a small pore in the soil — untreated soil that is! We see that the attractive forces of water will cause a bridging over of these pores and inhibit downward or sideward movement. It becomes necessary to increase the weight of water (filling of the large pores or saturating of the soil) before enough pressure is created to rupture this tension and force the water through the pore.

What happens in treated soil? With very little attractive force, bridging does not occur and the water readily wets the sides of the pore and moves downward and sideward without saturating. Data from Penn State shows that water passed through the entire profile at field capacity in one to two hours in a loam soil treated with a blended soil wetting agent.

In contrast, the untreated soil was

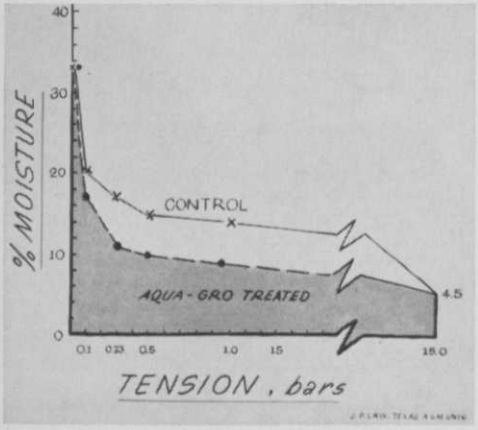

Figure 5 — Availability of moisture at any given soil tension is shown in this chart, developed by Texas A & M agronomy department.

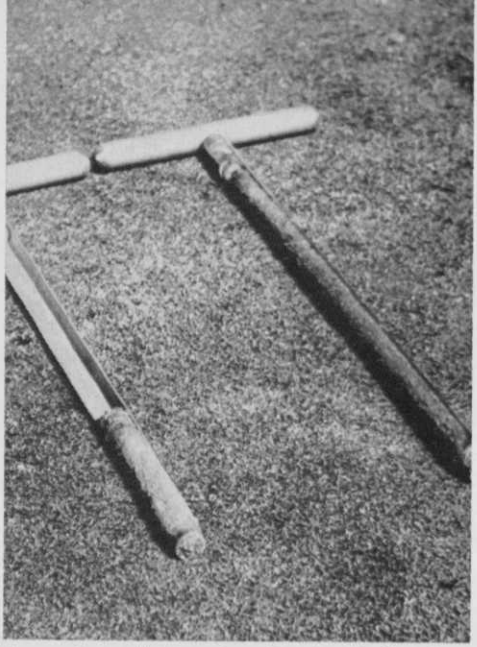

Figure 4 — Moisture is uniformly distributed to depth of 15 inches in treated soil. In untreated soil it penetrates only 1½ inches.

wetted to only one-third its depth and was above field capacity in this area. It takes between 24 to 48 hours for water to drain to field capacity in untreated soils. After 80 hours this unreated soil still had excess water, now located in its lower profile due to a perched water table effect.

The rapid drainage of saturating water through the soil profile to field capacity is extremely important. Soil, in good tilth, in a wet condition can be compacted with a feather simply by stroking the soil. When water takes 24 to 48 hours to drain to field capacity (as it does in most untreated soils), considerable compaction can occur from the typical situation of golfers playing two hours after a rain. The rapid drainage to field capacity of treated soils greatly reduces the changes of compaction.

So much for the action of soil wetting agents. Let's have a look at their effects. Figure 2 is recent work from Texas A & M and is shown to bear out that there are vast differences in commercially available wetting agents. As you can see, some materials were only effective for one irrigation, some only worked in one soil, some didn't work at all. What is desired is

(*Continued on page* 156)