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TEXAS FINDS BENT IS OK

GOLF club officials and operating executives who have visited the Southwest recently pay respectful tributes to the great comeback golf interests of this section of the country have made in general club status and especially in developing successful methods of maintenance to cope with extreme weather conditions.

One of the standouts in the Southwest's golf development is the new Colonial GC at Forth Worth, an establishment that in many respects exhibits the new note in golf business. Claude Whalen is general manager and professional. Even in Whalen's title there is something to stir thought in many places in the golf field. Especially interesting and probably the forerunner of considerable other greens work in the Southwest, is the work done with bent greens at Colonial.

Whalen tells the Colonial story briefly:

The first dirt work was started on the course May, 1935, with John Bredemus of San Antonio and Perry Maxwell of Tulsa, collaborating as architects.

The course has Bermuda fairways, the first seed having been planted in July, 1935. The accompanying picture of our

This 18th fairway at Colonial was photographed only a year after planting with Bermuda. It was formerly a ravine ten feet deep.

18th fairway gives some idea of the density of the turf, one year after planting. I might say that all our fairways are the equal or better than the one shown in the picture due to the fact that the 18th fairway was formerly a ravine, some 10 ft. deep, and required a great deal of filling and leveling to make it playable.

It was decided to give bent grass a thorough tryout in this section and after much research work a special selected type of Seaside bent was decided on.

The topsoil of the greens was composed of about 50% dairy loam, 50% fine sand, known as blow-sand in this section, to which about one bale of peat moss per 1,000 sq. ft. was added.. Two plantings of seed were made; one in late September and one in late November. In each instance, about 3 lbs of seed per 1,000 sq. ft. were used.

Turf Resists Weather Extremes

As far as the weather was concerned, the grass came through an unusual year in grand style. We had one of the coldest winters and hottest summer on record, yet these extremes did not seem to affect the bent in the least.

We did have some trouble with webworms and cut worms and several greens were damaged before we were able to determine definitely the cause of the damage. An article appearing in March, 1936, GOLFDOM, on sod webworm control was of great assistance in helping us determine just what these pests were and helped us decide on a method of control.

We have had practically no brownpatch and have had no dollar-patch at all. However, we have taken every precaution and treated our greens regularly, in order that we might keep the brown-patch to a minimum, owing to the fact that we did not establish a nursery.

The greens recovered nicely from the worm damage and are growing vigorously. They are creating a great deal of interest in Texas and I feel sure that within the next few years courses without bent grass greens in this part of the country will be just as obsolete as courses with sand greens are at the present.

We are most fortunate in having a river which affords ample water to take care of our fairways and greens. The hoseless system is used in the fairways and about four miles of pipe is used as feeders. We have a pumping plant capable of putting out more than 1,000,000 gal. of water in 24 hours, so our plant is never taxed very heavily to keep the turf in good condition.

The course was open for play on February 1, 1936, and was in unusually good condition from the first, owing to our desire to have it in as nearly perfect condition as possible before opening.

Kidd Heads Committee Planning Annual PGA Seniors Event

CONTRIBUTIONS of $1,500 from Alfred K. Bourne for a trophy to be played for annually at a PGA Seniors' championship carries along the plans for this interesting event. The seniors' tournament, being planned by a PGA committee headed by Willie Kidd, contemplates an annual tournament for PGA members over 50 years of age who have been pros for 25 years or longer.

A feature of the event that Kidd and his associates are considering is a pro-amateur affair bringing in members of the senior amateur associations in the United States.

The PGA senior championship should prove to be one of the finest sporting events of the year. One sponsor offered to present a trophy and a minimum of $7,000 a year toward defraying the expenses of the event.

Nan O'Reilly, Veteran Golf Reporter, Is Dead

NAN O'REILLY, golf editor of the New York Journal, died in the New York hospital Feb. 28 of an intestinal ailment complicated by a heart condition. Death followed an illness of two days.

Miss O'Reilly has been a newspaperwoman for 27 years, starting at the age of 14 by contributing a real-estate article to the New York Tribune. When she was 19 she went with the New York Post as a golf writer. After 10 years there she joined the sports staff of the New York Telegram. In 1929 she shifted to the Journal. She was the only woman covering golf for a metropolitan newspaper.

In 1930 Miss O'Reilly married Silas Newton, an oil operator and well known amateur golfer.

Miss O'Reilly wrote lively coverage of golf and called all the shots as she saw them. She was a hard, courageous and able worker and was widely known in both pro and amateur golf.

MICRO-ORGANISMS OF THE SOIL

NAGA Address

By N. R. SMITH
U. S. Bureau of Plant Industry

A MICRO-ORGANISM is an organism the details of which can not be seen by the naked eye. This does not mean that the eye can not see the mass-growth of a micro-organism. You have all seen moldy bread—the fungal mass being made up of great numbers of roots, branches holding spores and other details much too small for the human eye. Algae, the green scums of ponds, are about the same size. As we go down the scale, there are the yeasts and lastly, but not least, the bacteria, the smallest things in the plant kingdom.

How small are bacteria? A bacterium of average size has to be magnified 500 times if you are to see it easily; on other bacteria higher magnifications of 1,000 or even 2,000 are used.

Small size is no handicap to bacteria—what they lack in size they make up in numbers. One investigator took samples of soil from grass land and found 90,000 microscopic insects and mites in a square yard of soil one foot deep, and 150 million microscopic one-cell animals; at the same time one-half a teaspoonful of that same soil contained 6 million bacteria.

Micro-organisms, like the grass on the turf, must have food, moisture, and proper temperature. As long as these are present, they grow and increase rapidly in numbers until some factor puts on the brakes. Usually, it is lack of food. In ordinary soil, available food materials are not so abundant, and there is keen competition between the various types of micro-organisms and higher plants. Bacteria being so small, have a big advantage in the matter of food. In a compost pile great activity takes place, especially if the materials used in the pile are succulent and easily decomposed.

How Bacteria Decompose Organics

The question might be raised as to how do bacteria feed upon organic materials and decompose them? Being only one-celled, they must get their food by absorption. This requires that the food material be in solution. But if it is not in solution, if it is a solid substance, it may be made soluble by the action of enzymes, or digestive fluids which the cells excrete. When plants are plowed under and begin to die, the bacteria begin to multiply, secrete their enzymes and break down the complex compounds into simple ones.

Sugars, Starches Are First to Go

The first of the carbonaceous materials broken down by the bacteria would be the soluble portion—sugars and starches. After they are gone, the same bacteria or others or combinations of micro-organisms, attack the pentosans (a gummy material), cellulose and lastly the lignin, reducing them to carbon dioxide through various steps. Simultaneous with the destruction of the carbonaceous substances, there is a breaking down of the complex protein compounds to ammonia and CO_2; therefore, the theoretical ultimate end of the organic matter in a compost pile is NH_3 and CO_2. Most of the CO_2 escapes into the air, the NH_3 is absorbed by soil, organic colloids and by any undecomposed organic matter. A rapidly decomposing pile of horse manure often gives off large quantities of NH_3, plant food going into the air to be carried away and brought down by rain on someone else's land. A small amount of soil will hold a tremendous amount of NH_3 efficiently. In fact it is so efficient that we have difficulty in the laboratory getting out of soil as much NH_3 as we have just put in, so tightly does it hold on to it.

This NH_3 and CO_2 is food for certain bacteria, and strange as it may seem, the bacteria, in using the NH_3 and CO_2 in their growth, oxidize the NH_3 to nitrite (a rank poison to most green plants) but it is not troublesome except in special cases of waterlogging because it is at once oxidized by another group of bacteria to nitrate. Now soil does not hold nitrate very well, it is very easily leached out,

comes to the surface quickly with drying out of the soil, and is frequently lost in surface run-off; provided, of course, that there is nitrate there to be lost. In the case of ordinary sod, one has little to fear in this respect because of the low amount of nitrate.

The nature and chemical composition of organic materials greatly affect the rates of decomposition. It is well known that grass clippings, cottonseed meal and the like, decompose quickly and that straw, peat and such are very slowly broken down. Therefore, we choose the materials to be added to the soil which will best suit our purposes.

Straw Is Poor in Nitrogen

In all studies on the process of decomposition, one fact stands out. It is that materials having more than 1.7% nitrogen will show an excess amount of it over that needed by the bacteria involved in the process; that materials having less than 1.7% nitrogen do not release any of it upon decomposition, all the nitrogen being required for food by the micro-organisms. For instance, straw contains less than 1.7% nitrogen, usually about 0.6%. Its decomposition is slow for two reasons; the material is rather resistant and there is not enough nitrogen for the micro-organisms. The latter can be overcome by adding nitrogen, which hastens the process. This is best done in compost piles. A farmer may ruin his intended crop by plowing under a considerable amount of straw. The straw may decompose but in so doing, the soluble nitrogen of the soil has been used by the bacteria and it is therefore tied up. The NO_3 may be liberated slowly, but in the meantime, the crop has lacked nitrogen and shows the characteristic pale color of nitrogen starvation.

In contrast to straw, legume green manure crops, soybeans, cowpeas, vetch, etc., when plowed under, decompose rapidly. This is due to less resistant nature of the material and to the nitrogen content which is usually around 3.5%. This is an excess over the needs of the micro-population, the NH_3 and finally the NO_3 becomes available for crops.

The relationship of carbon to nitrogen is called the C/N ratio and is an important thing to know about a soil. The greater the proportion of nitrogen to carbon in a soil or compost, the greater will be the excess of nitrogen over the needs of the bacteria, resulting in either an accumulation of nitrate or nitrate available for plants.

At this time we might briefly discuss the growing of legumes. The early Roman observers recognized the value of growing legumes and exhorted the farmers to grow more of them. Much has been learned since those times but we are still recommending the growing of legumes. We now know that part of the beneficial effect of legumes is due to bacteria which invade the rootlets and cause a nodule to form. In this nodule, the bacterium lives and multiplies at the expense of the plant as far as minerals and sugar are concerned and in payment gives the plant nitrogen compounds which it forms from the nitrogen of the air. Obviously this enables the legume to grow on soil poor in nitrogen and to build up the nitrogen in that soil through the decomposition of its roots. This building-up process can go on provided the NO_3 in the soil remains low, otherwise the legume uses the NO_3 and the symbiosis between the plant and the bacteria is discontinued and no further benefit from the growth of the legume is accrued. Each group of legumes must have its own particular bacteria for best results. Sometimes nodules are formed by unsuited bacteria, but these are false alarms, often proving detrimental to the plant. To forestall this, it is becoming more and more the custom to inoculate the seed of legumes with the proper culture of bacteria. There are about forty commercial concerns making and selling such inoculation. It is one of the duties of the Division of Soil Microbiology in the United States Department of Agriculture, to test cultures from all sources to see if the bacteria are alive and capable of forming normal nodules.

No "Cultures" Are Available

We frequently get requests for information about cultures to put on grass, corn, wheat, potatoes and most any other crop. I wish to state emphatically that there are no cultures of bacteria which will form nodules on the roots of non-legumes nor are there any cultures known to help those plants in any other way. Our tests, as well as those made in other laboratories, have failed to find any beneficial bacteria for plants other than legumes.

Perhaps I should have brought up the question of soil acidity before now, for it

is quite important to know whether a soil is alkaline, neutral or acid. Before a western audience, one would have to dwell upon the alkaline conditions, but I dare say that the eastern half of the country is not troubled with alkali. The millions of years of leaching by rain has washed out the alkali and left the acid. In small amounts, acid is not considered harmful for most plants. Legumes do well, but with increasing acidity, they are among the first plants to suffer, both the bacteria and the legume seem to be paralyzed. Kentucky bluegrass is tough and can stand considerable acid. But this can be overdone. If the soil is very acid, the old roots of the grass do not decompose, nitrates are formed slowly, and the whole situation is one of stagnation.

Decomposition Checked by Acid Soil

In our studies upon the decomposition of green manures, we used a neutral and an acid soil. Decomposition in the neutral soil was rapid and complete. In the acid soil, however, although decomposition started out like in the neutral soil, the activity slowed up sooner and the decomposition was not so complete. By adding limestone to some of the acid soil without any green manure, the numbers and activities of the micro-organisms in the soil were increased due to the more favorable reaction. This, of course, would tend to deplete the organic matter in the soil if no other organic matter were added. There was an increase in NO_3 and an apparent increase in fertility. It is more apparent than real, for by adding limestone, we have unlocked the storehouse of organic matter and made part of it available.

Recently an article appeared in a British journal advocating the use of potassium permanganate on turf. It was said to decompose organic matter in the soil and to oxidize the nitrogen to nitrates. This resulted in an increase yield of grass clippings and made the grass greener. No details of the experiment were given and one wonders whether that is good advice—to destroy the organic matter. Certainly the treatment would not be applicable to all conditions. Perhaps it is just the thing for them to do.

Now you may ask, what is one to do? If the soil is too acid, there is not enough micro-biological activity, nitrification is slow, organic matter tends to accumulate and conditions are poor for plant growth. On the other hand, if the soil is neutral or slightly alkaline, just the reverse takes place—great activity of the microbes resulting in a decomposition of the organic matter and production of NO_3. Our advice naturally would be to take the middle course and in your specialized conditions of golf greens, to slow up the decomposition of organic matter by using those materials which are very resistant and mixing in only certain amounts of the more easily decomposable materials. The resistant material will absorb considerable quantities of NH_3 like a sponge, and will release it later as it is needed. By this technique, the danger of an abundant supply nitrate followed by a scant supply is partially avoided. I need not dwell upon the harmful effects of adding a large amount of nitrogenous easily decomposable fertilizer to a soil. The amounts of nitrate produced often prove detrimental by stimulating a rapid growth.

What would be the effect on the micro-population of treating turf for fungous diseases? This question can only be answered in specific cases, involving the nature of the fungicide, the amount of it used, whether its effect is accumulative and the nature of the soil. In general, the microbes in the soil and their activities would not be harmed unless the turf was injured. Here, again, organic matter comes into the lime-light. Its capacity to absorb poisons is as great as its capacity to absorb nutrients. You may know this as the buffering effect of organic matter, for that is what it is called.

Poisons Affect Plants Differently

Let us illustrate this buffering effect by soil from the cotton-growing regions on the Coastal Plain and the Piedmont Plateau. In certain cases along the Coastal Plain, the soil is very sandy and contains very little organic matter. Dusting the cotton with calcium arsenate to control the boll weevil has made the soil unfit for cowpeas following the cotton.

But on other soil, only a short distance away, containing some clay and some organic matter, several times as much calcium arsenate was applied without harmful effect. Again in the original district of the Japanese beetle infestation in New Jersey, it was the practice to add 1500 lbs. of lead arsenate to the rich loam soil to kill the beetles. This enormous amount was too much for certain plants, as might well be expected. The micro-organisms,

Experts in charge of growing fine golf turf, in attendance at short course session at University of Minnesota, check to see just what may be growing in the locks of Mike Sanko, vice-pres. Minn. Assn. of Greenkeepers. Those checking are (l. to r.): Victor Larson, Minneapolis GC; Leonard Bloomquist, Superior; Herb Graffis, editor of GOLFDOM; and Prof. L. S. Dickinson, Massachusetts States college.

however, did not seem to be put out of commission as evidenced by the good growth of plants which would tolerate the arsenate. I have been told that 900 lbs. of lead arsenate per acre has been used on golf greens without interference with the turf. If added before seeding, the growth of the grass was rather slow at first. If added to establish the turf, the grass was greener and more sturdy than without the arsenate. Nevertheless, we are not advocating such indiscriminate use of lead arsenate on golf greens—we have merely used this as an illustration to show the buffering effect of clay and organic matter and by analogy reach the conclusion that beneficial soil microbes, if protected by organic matter, can take plenty of poison. It is quite possible that certain groups of microbes would be killed by rather weak poisons, but what do we care about a few millions? Often the soil would be better off without them.

The killing off of some of the micro-population occurs naturally at times. Several droughts have been known to kill off more than half the microbes in soil. With rain, the survivors become very active, decompose the dead ones and with a production of nitrate, you then have the striking green growth of grass and other plants after a long dry spell. In a short time, however, re-inoculation occurs from dust in the air, brought, perhaps, from another part of the country and conditions revert to normal.

So in the applications of fungicides, if part of the micro-population is killed, most of the useful ones most probably would still be alive and able to carry on the micro-biological processes in the soil, viz., the breakdown of complex organic substances into simple forms and preparation of these for the use of green plants.

A PHILADELPHIA district golf authority notes what he considers a bad tendency in golf, that of making youngsters and women beginners feel that they have to have caddies.

He says that when these players are on the course during light traffic they should be encouraged to ease into the game at the lowest possible expense. He charges that in some cases caddymasters who get a percentage of caddie fees as salary are responsible for practically forcing caddies on the tyros, or embarrassing them to the degree they keep away from golf.

MALE members of the Carquinez GC at Giant, Calif., are taxed a dime every time they wear spiked shoes in the club's dining room. Proceeds go to the women's golf committee. The club also has a lively team competition; the Dutch vs. Irish.

TRAINING CADDIES

Massachusetts Golf Association has been a leader in this important phase of club-employee relationships

IN MASSACHUSETTS there are about 200 golf courses, about half of which are member clubs of the Massachusetts GA. It is estimated that there are between 25,000 and 30,000 boys ranging from 11 years to 20, who caddie regularly or at intervals in this state. Some of the larger clubs which are well organized have excellent caddie systems, and consequenty develop the most efficient caddies. Other clubs give little or no thought to the instruction of caddies, and what the boys learn about their work must be picked up by themselves.

The Massachusetts GA has had printed an excellent booklet on Instruction to Caddies. The booklet is illustrated, showing the right and wrong way for caddies to carry a golf bag, how to hold the flag on the putting green, where to stand when the player is making his shot, and in general, what to do and what not to do. The association has a supply of these booklets which it will furnish (at cost—15c postpaid) to member clubs so that they in turn may place them in the hands of caddie masters and caddies.

Player Has Responsibiilty

For a golfer to get the most pleasure and results, a great deal depends upon his caddie. It is a common thing for a golf player to say after he finishes a round that he had a "rotten caddie." This may be true on certain occasions, but more often it is not the caddie's fault. The golfer is simply making an excuse, and "takes it out" on the caddie. Every golfer should realize that a caddie may be trying to do his best. The golfer can be of great help to the caddie by simply showing a little personal interest in him. Most of these boys are so-to-speak in the formative age, and welcome suggestions and ideas from their employer. They are also subconsciously imitators, and will do and say the things that they see and hear on the golf course. In a word, what they pick up during the hours when they caddy is a considerable part of their education. It has been said by educators that boys can learn as much in nine weeks in the summer as they do in the nine months of the school year.

This puts a great responsibility on golf players. Parents have a right to assume that conditions and influence at country clubs where their boys caddy are good. If club members would realize that most of the boys who caddy for them come from homes which have few advantages, they would appreciate that there is a great opportunity to be of service in the direction of a boy's whole attitude in life. Friendly interest and example will sow the seed of good citizenship. The material is usually excellent, and a boy is responsive to suggestions and advice. If every golfer would stop to consider the opportunity that he has, and resolves to adopt the proper attitude toward the caddie, he would be doing a fine service to his caddie, his club, and the game of golf.

Standards for Caddie Masters

Most of the larger golf clubs have a caddie master in charge of the caddies. It is his duty to enroll caddies, instruct them properly, allot them to players when they start their round, and have general oversight over them. The caddie master should be a man who has certain qualities in order to handle boys well. He must be old enough to exert proper authority. He must have above all a sense of fairness and justice, for many times questions arise for the caddie master to settle, and he should have the ability to settle questions promptly and fairly. The caddie master's authority must be unquestioned. He must be firm and just. He must require obedience. He should be a good instructor so that he can properly teach the boys the technique of caddying. He will have

to anticipate the thousand and one things boys do and should not do, and must know how to deal with them in an effective way.

The caddie master should be required to keep caddie records. The system should be as simple as possible, but sufficiently complete to supply all the essential information. There should be individual caddie records, a daily service record, and the caddie slip, which is signed by the member for each round. The caddie record might be on cards alphabetically arranged. The daily register might be either in a bound book, or in a loose leaf binder. In this could be entered the name and number of the caddie, the time of his arrival, the member to whom he is assigned, and the time he starts out and returns. This would facilitate the method of sending caddies out in rotation, which would prevent favoritism.

Tipping should be discouraged. While a small tip may be an effective incentive, it more often becomes an evil which it is hard to stamp out. A good alternative is to establish a tipping box where members may drop tips and the total amount collected in this way distributed at the end of the month by some fair basis.

Uniforms or distinctive insignia such as colored caps, are very helpful and are appreciated by the boys. An adequate playground situated some distance from the first tee is highly desirable. There should be some place for boys to leave lunches and coats; some clubs provide simple lockers and shower baths for their caddies.

Grading Caddies Is Good Policy

Frequently caddies are divided into two or three classes. The first class gets paid more than the second and third, and a boy may be promoted or demoted for cause. There should be some reward at the end of the year for improvement or excellence, and there are many methods of compensation. For example, a certain number of boys could be given tickets to a professional baseball game, or to one of the larger college football games. Some such method of recognition maintains the interest of the boys through the summer, and encourages them to do their best.

The golf committee of a club should realize that there is a great responsibility placed upon them in connection with their caddies. They should also welcome the opportunity of taking the proper interest in their caddies, and seeing that the members of the club do so. It is a big field, and an important one. They can do a great deal for the individual boy. They can do a lot in the improvement of the technique of caddying, which will go far toward making every round of golf more pleasant for the members. The golf committee should also enlist the support of their own club members for some of them often need a word of advice about their own deportment. Golfers frequently get so intense about their game that they fail to think of the other fellow. Frequently the other fellow is the caddie, and oftentimes the poor caddie has to stand abuse unjustly.

This subject is so important and there are so many opportunities open that the sectional associations should seriously undertake the matter of caddie welfare with the idea that certain improvements can be instituted and abuses eliminated, and in general, standards raised.

GRANGE ALVES, Sr., father of Grange, Jr., member of the executive committee of the PGA, died in March at Cleveland, O., after an illness of five years. He was 72 years old. The elder Alves was a wheelwright and carpenter by trade and was introduced to golf clubmaking by Archie Simpson when Simpson went to the Royal Aberdeen club as pro about 1895.

Alves turned the hickory squares into shafts by hand. As clubmakers, Archie Simpson had George Low and Andrew Simpson with whom Alves retained close friendship until his death.

He came to the United States in February, 1921, and worked in the shop of his son Grange, Jr., for a year, after which he went into the contracting business, although maintaining many close contacts with the golf profession through his sons and friends of his boyhood.

Glass-In 19th Hole — Belmont Manor GC in Bermuda has replaced a wall with full-length windows allowing 19th-holers to overlook the 18th green. The architectural revision at the famous Bermuda establishment is in keeping with the clubhouse design found most pleasant in Great Britain but rarely seen in clubhouse design in the U. S.

Greenkeeping Scrapbook—John Morley, first president of the Greenkeepers association, had at Washington a scrapbook of greenkeeping historical and personal data that showed impressively the advance greenkeeping has made during the last decade.

SHORT COURSES DRAW CROWDS

By E. A. STEELE

Educational conference in East and Mid-West prepare greensmen for season ahead

GREENKEEPING short courses continue to demonstrate great interest and value to greenkeepers, although club officials and members for the most part are entirely unaware of the benefits the golf courses are receiving from the greenkeeper tieup with the faculties of state agricultural colleges.

Interest this year at the Michigan, New Jersey, Pennsylvania, Iowa, Minnesota and Massachusetts conferences made it very evident that the status of technical knowledge in greenkeeping is advancing. This year's programs were keynoted to probing and simplifying phases of course maintenance work covered in previous short courses rather than to new subjects. Cost accounting and labor management began to command much time in discussions, as might be expected considering the general situation.

Leadership in turf maintenance methods has been so plainly shown by greenkeepers that this year's greenkeeping short courses had the largest attendance of park, estate and cemetery superintendents ever present at the schools. Attendance by these people has been increasing steadily at the short courses which were established through the earnest solicitation of greenkeepers for the primary good of golf. Greenkeepers, of course, are pleased that the work instituted at their solicitation and so ably conducted by the state college faculties, is receiving this recognition outside of the golf field.

Why Don't Clubs Stand Cost?

But what the bewildered greenkeepers can't understand is that they pay out of their own private funds their expenses for this education that is reflected in improved course condition and greater economies while practically all of the cemeteries and private estates and the large majority of the park systems pay expenses of their men to these short courses as a sound, highly valuable operating expense. Maybe you can explain this failure of golf club officialdom.

There is deep study and lively discussion at these schools. The men go with the idea of studying and the school faculties give them programs that mean thousands of dollars saved to golf clubs each year.

John Anderson, formerly president of the National Association of Greenkeepers, tells highlights of the short course at Rutgers, the New Jersey state agricultural college. Says Anderson:

52 Attend Jersey Meet

"The opening day saw 52 entrants including some from New York, Pennsylvania, Massachusetts and Maryland, an eager crowd all anxious to get some knowledge about their particular problems.

"Those boys had to be sharp in order to digest all that was put before them that week at Rutgers. It was five days of cramming and then some. Some of the fellows who had been through this class a few times previous had a chance to follow through many of the subjects presented; but I am afraid the beginners had more than enough to ponder over. It was certainly a grand week.

"Sessions were opened by Dr. H. B. Sprague who discussed pure cultures and association of turf plants, including climatic factors such as rainfall, distribution, type and amount, temperatures both normal and extreme.

"Prof. Linwood L. Lee lectured on soils; soil classes and types in various regions and their relation to plant growth. Professor Joffe's first lecture which took three hours was on soil physics and physical properties of the soil; particles, pore space and specific gravity, different types of moisture and how they affect the plants. Joffe had the fellows scratching their heads when he told them about the aero-hydro-thermal condition of soil.

"Prof. E. R. Gross, talked on and demonstrated drainage in all its phases. Prof. A. W. Blair's fertilizer lectures were well

CAMERA MAN DOES HIS STUFF AT THE MASSACHUSETTS RECREATION CONFERENCE.

The candid camera was given a real work-out by Harrison Fisk at the recent Massachusetts State Recreation Conference and we reproduce here some of his better shots. The rapt listener directly above, for example, is Robert A. Mitchell, president of the New England Greenkeepers' Club. The threesome to his left are (l. to r.) Kent Bradley, Jack Harvey and Guy C. West.

Immediately below at the left is Prof. L. S. Dickinson, father of the Conference and sparkplug of Mass. State's justly famous greenkeeping short courses. He spoke on "The Hawthorne Valley System of Fairway Watering."

Right, second row, is Carlton Treat, (Montclair CC), snapped as he left after the lecture on "Golf Course Design and Construction" by Robert Trent Jones, golf architect, whose well-known grin is preserved for us in the third row, right.

In that same row, at left, is Arthur Anderson and friend discussing one of the lectures, perhaps "The Behavior of Fertilizers in Soils," which was given by George B. McClure, soil technologist of Ohio State university. An action shot of McClure during this lecture appears lower left. In lower right, Howard Farrant (The Country Club, Brookline) and Charles Parker (Wianno GC) are shown listening to the lectures.