



A short shallow tile line through a low wet portion of fairway costs little and helps the turf as well as playing conditions in wet seasons.

which will permit water to escape, fresh air is drawn down between the marbles in the glass as the water drains off. Each time the glass is filled with water and this water leaks away there is a complete change of air in the spaces between the marbles.

Drainage Provides Air to Soil

Tile, gravel subsoil, or other good drainage conditions provide for soil the same air changes as the crack in the above glass makes it possible for air to come in around the marbles. Heavy rain or sprinkling forces the air from the pores and crevices in the soil and, if the excess water can escape readily, new air is drawn down into the soil. Good drainage does not mean that every bit of water will go down through the soil because as the water seeps through the ground a film of moisture remains around each of the innumerable particles of soil. The film of water around each particle of soil is sufficient to provide grass roots with all the water they require. Heavy showers or ample watering can therefore serve the dual purpose of providing the plant with moisture and of changing soil air supplies,

but this can only be accomplished with adequate drainage. Without good drainage an excess of water remains in the soil and seals the lower depths from air for long periods.

There may be excess water in the soil from a direct or indirect source. The direct and obvious source is rain or sprinkling. The indirect source is seepage which is usually not apparent and therefore more likely to be overlooked and neglected.

When one suggests poor drainage as a possible reason for turf injury to club members it is by no means uncommon to hear the exclamation, "That can't be the case on this course for with all these hills drainage can't be a factor!" These individuals forget that in hilly country springs are common. Water that seeps through the soil often reaches a shelf of rock, slate or hardpan. It then slowly moves through the soil on the shelf until it finds an outlet. If it reaches a crevice through which it may flow readily, it may come to the surface somewhere down the hillside as a spring. If it continues along this ledge it may come out on a green or fairway over a wide area and there



Poor surface drainage is indicated by the puddles of water on important turfed areas of this course.

make one of those soggy areas that are altogether too common on golf courses.

Puddles Are Warning of Future Trouble

When too much water falls on turf or when it falls too rapidly, the excess runs off the surface. If surface drainage is not adequate pools of water will collect. Puddles of water are objectionable not only from the playing standpoint but may also result in poor weedy patches of turf. This condition is particularly likely to cause trouble on northern courses in late winter or early spring. On southern courses this condition is more likely to occur in mid-summer. The damage from inadequate soil drainage is likely to occur gradually at any time during the growing season. Unfortunately injury to turf due to poor soil drainage is apt to be most noticeable at the season when its cause is not apparent. Frequently the suggestion of poor drainage brings the reply, "Why, we have had no rain for weeks and we have used no water here all season." That is just how poor drainage usually works. A soggy soil with air only in the upper inch or so does not provide favorable conditions for turf growth. The root system remains shallow. Weeds like clover and *poa annua* which are better able to survive with shallow root systems

than are the finer turf grasses naturally begin to dominate in such areas. As long as there is sufficient moisture and heat, and if evaporation is not excessive, these areas remain green and are apparently "doing nicely, thank you!" When dry weather comes and seepage water no longer provides adequate moisture for this shallow rooted covering the trouble begins. The deeper rooted grasses in well-drained soil can better survive such unfavorable conditions. They remain as a sharp contrast to the injured areas which were most likely the greenest and best looking turf until affected by the unfavorable conditions. No wonder club members are often puzzled by the explanation of "poor drainage" for injury that occurs in periods of drought.

The only way to prevent injury due to poor drainage is to provide good drainage. The time to provide it, however, is not when the injury begins to show but months before when the real damage to the root system is taking place. For those in charge of golf courses it is therefore advisable that in the spring (or old) man's fancy turn to thoughts of drainage. When courses are still wet with spring rains or thawing snow, then is the time to locate areas where soil drainage is inadequate. The cost of tile drainage is low considering the benefits derived. Even if tiling operations cannot be carried on at once, every greenkeeper should look over his course carefully in the spring. Areas where tiles are needed should be definitely located and recorded, so that they may be wisely placed at some later date when funds and labor are available. As a matter of fact, a cheaper and much better job of drainage can be done when the soil is in good working condition than can be done when it is saturated with water.

Is System Functioning?

We frequently hear it argued that drainage cannot be the cause of some particular turf injury because "that area is already tiled." That may be true. The important question is whether or not that tile system is still functioning. Many a well-laid tile line is worthless because it is plugged with soil, roots of trees, or a crushed or misplaced section. At times changes have been made since the tile line was laid which have cut off or closed the outlet.

If an area known to contain tile does not seem to drain well, that line should be examined. If no diagram of the tile system is available (which is the unfortunate case on many courses) it is possible to locate a line readily with a simple pointed rod commonly known as a "feeler." By systematically poking this feeler into wet soil until the tile is felt one can soon trace it across any area. When located, a chart should be made to permanently locate its position. The outlet of the tile should be examined to determine how much water is flowing from it. In wet weather a good flow of water may come from only a fraction of a tile line. When the soil is not well drained a section at the upper end of a suspected tile line may be removed and water from a hose



Samples of tile from a line that no longer drained. Do you wonder why?

may be flushed through the line to determine if it is open. If it is found to be clogged it may not be necessary to remove the entire line. A section removed here and there along the line will soon show the exact location of the clogging. In such a search one should first suspect trouble at intersections or areas where there appears to have been some settling of the soil.

Flow of Water

No Sign Tile Is OK

At times tiles do not function properly even though water flows through them readily. This is normally due to improper laying of the tile or a sealing of the joints with a sticky clay. When tile is laid and covered with heavy clay, especially when it is very wet, the tile may prove to be about as ineffective as if it were sealed in a thick layer of putty.

In laying tile every effort should be made to place the line in the most effective position and then to do a good job in laying it. One good tile line properly

placed is far better than half a dozen poor, inefficient lines.

In placing drains for seepage water it should be remembered that it is far better to intercept that water before it reaches an important piece of turf than it is to try to remove it directly from the affected area. It is also well to remember that unless the intercepting line is placed deep enough it may be ineffective if seepage water continues to creep along a shelf below the tile line. The tile must be placed below the surface of that ledge. All tiles should have ample fall and should be well covered with some open materials such as gravel, crushed rock or cinders. It cannot be too often urged whenever a new tile line is laid or an old one is located that a record should be made and filed which will make it possible to easily locate that tile in the future.

"An Introduction to Soil Science" Brings Fundamentals Up To Date

A NEW textbook, "An Introduction to Soil Science," by Benjamin Isgur, instructor in soils at the Massachusetts State college, has just been published by the Agricultural Scientific Publishing Co., 27 Beach St., Boston. This book, which sells for \$2.90, brings up to date the fundamentals of soil science.

Isgur has tried to make his work a practical handbook of soil culture and has more than succeeded in so doing. An important feature of this volume is a diagnostic table or key which any greensman can use to "run down" his soil troubles. Another important feature to the greenkeeper is a method of determining the relative value of peats in increasing the available water in the soil.

Main topics which are of especial importance and interest to greenkeepers and golf clubs for the maintenance of fine turf areas are: soil texture and soil structure (with an explanation of soil puddling); organic matter and peats; soil bacteria; soil acidity and liming (with an easily understandable explanation of the meaning of pH, and with explicit directions as to how much lime to apply to obtain suitable soil reactions); soil moisture and drainage systems; and a chapter on fertilizers with an easily understandable chart which shows what happens to fertilizers when they are applied to the soil under both favorable and unfavorable conditions.

SUCCESSFUL SHORT

Rutgers' Turf Management Short Course Has Registration of 72

RUTGERS' turf management short course, conducted this year from Feb. 7-11, under the direction of Dr. Howard B. Sprague, agronomist, had a total registration of 72 golf course superintendents and greenkeepers, landscape architects, and others interested in fine turf. Registrants included representatives from Kentucky, Iowa, New York, Pennsylvania, and Connecticut.

The course of lectures, given by the teaching staff of the Agricultural college

sciences were presented, as well as standard information which would provide a scientific basis for modern turf practices.

The 1938 short course, the tenth such course given at Rutgers, was celebrated at a dinner on the evening of Feb. 11. At that time certificates of attendance were presented, and a brief speaking program was followed by a special motion picture on the growth of plants under control conditions. This unique moving picture, which was produced in the plant physiology laboratory at Rutgers, showed normal growth movements of plants during germination, growth, and blooming, as



Five states were represented by registrants at Rutgers' greens short course this year.

and the New Jersey Agricultural Experiment station, was designed to provide fundamental information on the production of turf. Recent advances in related

well as the differences in type of response to various chemical elements. The university plans to conduct the short course next year in view of its continued popularity.

Tenth Anniversary Fine Turf Conference at Penn State Is Big Success

PROGRAM at the tenth anniversary Fine Turf Conference, held at Pennsylvania State College, State College, Pa., Feb. 22-25, was credited by observers as being one of the most interesting and informative lineups given at any of the previous sessions. H. B. Musser, Agronomy Dept., was chairman of the conference.

Speakers and their subjects on the opening day's program were: "A Half-Century of Research at the Pa. Agricultural Experiment Station," by S. W. Fletcher; "Weed Control and Grasses Abroad," by Fred V. Grau, PSC. Tuesday evening was given over to a committee meeting and an informal get-together. Heard at Wednesday's morning sessions

were: "The Soil Chemist and the Greenkeeper," by J. W. White, PSC; "Soil Fertility Studies on Fine Turf," by F. J. Holben; "Pedigreed Greens and Fairways," by H. B. Musser. Wednesday afternoon speakers were J. O. Pepper, PSC, who spoke on "The Present Status of Our Information on the Control of Turf Insects," and H. W. Thurston, PSC, on "Present Ideas Concerning Disease Control."

O. J. Noer of the Milwaukee Sewerage Commission gave assembled greenkeepers a most interesting talk Thursday morning on "The Season of 1937; a Challenge to Greenkeeper and Research Man." Other informative papers heard that day were "A Landscape Architect Looks at the Golf Course," by J. R. Bracken, PSC; "Turf Research Work for the Last Ten

COURSE SEASON

Years," by Dr. John Monteith; "Some Soil Requirements for Fine Turf," by F. G. Merkle. The anniversary banquet was held Thursday evening, and the turf experts were treated to a lot of valuable turf information in the general discussion that followed the meal.

Attendance Nearly 100 at ISC's Two Day Short Course

SEVENTH annual two-day short course for greenkeepers at Iowa State College, Ames, held March 1 and 2, was concluded just as GOLFDOM went to press, and reports from the session indicate it was one of the most successful ever held at the college. Approximately one hundred greenkeepers and members of allied professions gathered for the two day program.

At the opening day's sessions speakers and their subjects were: "Turf Management on British Golf Courses," by John Monteith; "Greenkeeper Diplomacy," by A. L. Brandon, sec.-treas. GSA; "Soil Testing," by B. J. Firkins, Agronomy dept., Iowa State college; "Trouble Shooting on the Golf Course," E. G. McKibben,

At the closing day's sessions H. B. Sprague, Rutgers U., spoke on "Relation of Soil Characteristics to the Growth of Turf Grasses," and W. V. Dennis concluded the conference with an appropriately titled address, "Where Do We Go From Here?"

agricultural engineering dept., ISC; "Care of Mowers," Paul Sandahl, Supt., Des Moines park system. O. J. Noer, Sewerage Commission, Milwaukee, also led a discussion on soil-testing.

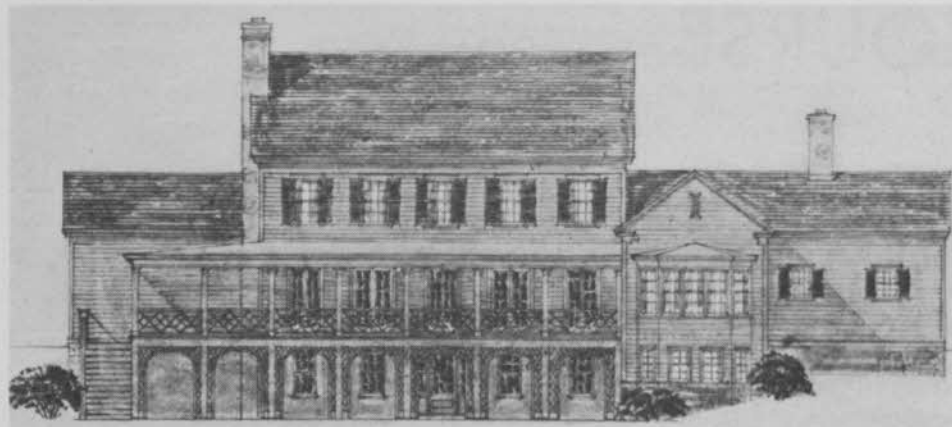
On Wednesday, March 2, in addition to talks by Noer and Monteith, the former on recent developments in turf culture, and the latter on the International Grassland Congress, the following speakers contributed valuable thoughts during a two-hour panel discussion on greenkeeping; S. W. Edgecombe, ISC; Joe Benson, Cedar Rapids CC; Fred Keating, Des Moines CC; C. J. Drake, ISC; G. C. Decker, ISC; C. J. Yarn, secretary, Iowa Greenkeepers' Assn.; C. W. Mendenhall, Kansas City; Henry Glissman, Sr., Omaha, Neb.; and B. J. Firkins, ISC. The annual greenkeepers banquet was held Tuesday night at the Sheldon Munn Hotel.



Here's the class that attended the twelfth annual winter school for greenkeepers at Massachusetts State College, Amherst. Course began January 3 and will continue through March 14. Lawrence S. Dickinson, shown fourth from left in front row, is in charge of the sessions. More than 240 have completed the course since it was begun eleven years ago.

Purdue Adds Short Course — Purdue university at Lafayette, Ind., will conduct the first of its short courses in golf club operation, stressing greenkeeping, March 22 and 23. Complete details may be secured from M. L. Clevett, intramural director. Greenkeepers, pros and club officials of Indiana are invited. Carl Bretzlaff, pres., Indiana Greenkeepers' Assn. helped work

out the program as did officials of the Indiana PGA and the Indiana Golf Assn. Course will be run under the supervision of the Purdue Agricultural Extension div. Among speakers will be John Monteith, Jr., A. L. Brandon, O. J. Noer, Wm. Diddle, Herb Grafis, and experts from Purdue's agricultural dept.



Twelve-foot porches overlooking the Lord Howe valley give the Ticonderoga (N.Y.) CC lounging and dining spaces with beautiful vistas.

MODERNITY IS KEY TO NEW CLUBHOUSES

THERE is in progress a minor boom in clubhouse building, especially at private clubs and WPA projects. These new structures range from simple shelters to very elaborate layouts, yet all of them have been designed to incorporate modern features for better and more efficient operation. Among the trends in the larger buildings:

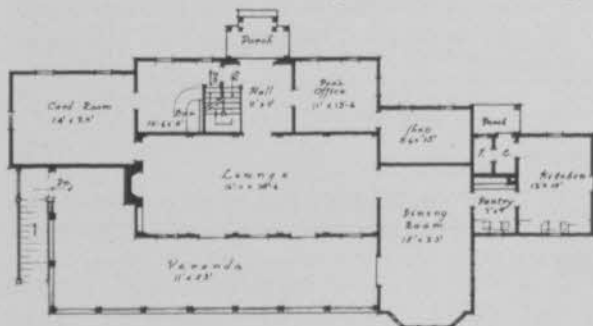
Increasing difficulty of getting clubhouse help is reflected in plans which locate kitchens for quick service to dining rooms, grills and terraces. Terrace service seems to be in for growth, mainly as a result of swimming pool patronage.

Surprising about some of the plans is the failure to make more use of course scenes from windows of dining rooms and grills. In this respect the British clubhouses have it all over American design. Best views of the course usually are obtained from lounge windows in American clubhouses and lounges seldom are occupied in daytime except for bridge parties.

There is a decided tendency toward re-

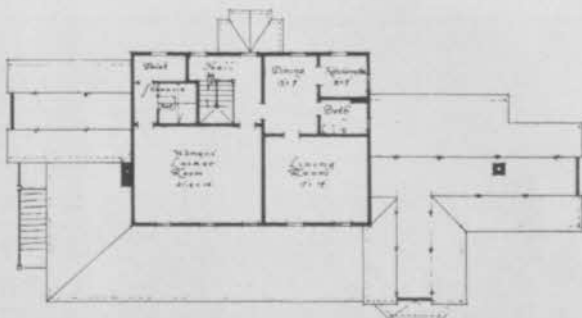
ducing lounge area and toward locating the lounge so it can be used conveniently for over-flow dinners without having the appearance of make-shift arrangements. Far more attention is being paid to fire protection. Stiff insurance rates have forced this.

New clubhouse exteriors show more effort to blend in with local landscape, instead of making the clubhouse look like the old baronial castle, if the club had plenty of money, or like an overgrown farmhouse if the club was building on a close financial basis. New clubhouses in the United States are not making use of the restrained modernistic idea extensively used in the newer British clubhouses, in which large window space and elevated dining and refreshment outdoor facilities



First floor of the new Ticonderoga clubhouse. Note kitchen light and ventilation; ease of service to lounge in case of overflow dinners; and pro-manager's dept. Lounge is finished in knotty pine and has a hand-hewn beamed ceiling.

Top floor at Ticonderoga. By putting women's dept. on different floor than men's, more room is available. Pro-manager's living quarters are compact but comfortable.



are features. Colder and longer American winters probably account for this, as present tendency is to make clubhouse so it can be economically operated the year around.

More of a point is being made of air circulation in the locker and bath departments. The clammy, steamy shower rooms are so obvious a rap against architects' reputations and a continuous discomfort to members that architects have quit muffing this problem.

Provisions for air cooling have been made in several of the newer clubhouses, although actual installation of air conditioning in some cases will wait until expense is reduced. There has been a sharp reduction in air-cooling cost during the last two years and several representative cases show air-conditioning has increased house revenues enough to warrant the cost.

Very cute tricks are being done in the design and decoration of women's locker and cocktail rooms. Adequate but compact facilities and dainty handling of furnishing and colors, together with half-size lockers seem to be giving the answer to the women's long and loud yells for more attention in clubhouse facilities.

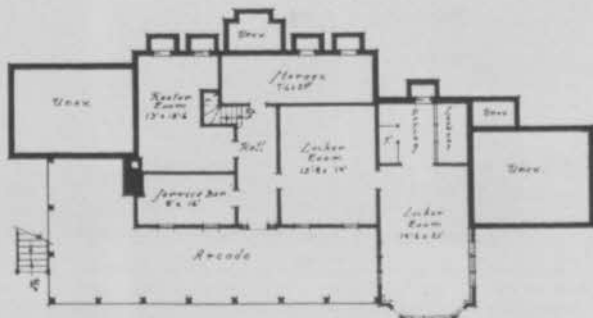
Gradually the architects and building committees are getting around to the realization that the men's locker-rooms, one

of the few remaining places where women can't horn in, can be made to look less like jails. Most of the country club male member's inside time is spent in the locker-room. Architects privately comment that they know what can and should be done to make locker-rooms distinctive and attractive but seldom has an architect the disposition to fight with the building committee to get the money and authority to do the job right.

Basement showers and lockers for swimming pool service are details of several new clubhouse plans.

There is a definite trend toward providing the manager with attractive quarters in the clubhouse, inasmuch as the long and uncertain hours of the manager and his inability to enjoy any more than a brief association with his family have made it imperative that pleasant quarters be made available for the manager when he can get to them.

There does not seem to be much development in supplying storage space for emergency furniture, or workshop facilities. Clubs pay for this oversight. Living and eating quarters for the employees continue to be uniformly awful and to explain the almost hopeless problem confronting managers who want to give to their members competent, interested, pleasant and sanitary service.



Hillside site of Ticonderoga clubhouse puts the locker-room partially in the basement, but prevailing wind helps solve the ventilation problem.



The exhibition hall at 1938 greenkeepers' convention, was a sellout. Manufacturers and dealers report considerable business transacted.

NAGA BECOMES GSA AT MEET

By PAUL GREEN

AFTER four strenuous and constructive days at the 1938 convention and exhibition of the National Association of Greenkeepers, held Feb. 15-18 in Cincinnati, delegates to that meeting returned to their homes cheered by the news that the NAGA is in excellent financial condition, that memberships in the association are up 10 per cent, and that the time has come to tighten up on the requirements for membership in the greenkeepers' national organization. All of which pointed to the fact that the past year has seen real progress in the NAGA.

Among other pieces of business, delegates authorized a change in the name of the association from its former "National Association of Greenkeepers of America" to the shorter and better liked "Greenkeeping Superintendents Association." This was a step which has been contemplated for some time, but which the association had not been able to effect, due to legal red-tape, until this year's meet.

Annual election put Joseph Ryan, veteran superintendent of Rolling Green CC, Media (Phila.), Penna., in the presidency for the ensuing year. With him were elected Frank Ermer (Ridgewood CC, Cleveland) as vice president, and A. L. Brandon (St. Charles CC, St. Charles, Ill.) as secy-treas. Three directors were elected for 2-year terms: John Gray (Essex G & CC, Sandwich, Ontario), Harold Stodola (Keller GCse, St. Paul, Minn.) and Arthur Snyder (Alcoma CC, Wilksburg, Penna.). Holdover directors are Don Boyd (Portage, Akron), John Gormley (Wolferts Roost, Albany) and Chester Mendenhall (Mission Hills, Kansas City).

Next year's convention of the GSA will be held in Kansas City somewhat earlier
(Continued on page 66)



Three action shots of speakers doing their stuff at annual greens convention. John S. McCoy, Ohio State U. greenkeeper, (left) adds a few words to what he had already told assembled greenkeepers during movies of O.S.U. course construction; R. J. Garber, Penn State College, (center) uses blackboard to show more clearly what he means on "The Selection of Grasses"; and James Morrison (right) Cincinnati CC green-chairman, explains "The Chairman's Viewpoint."

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WHAT RETURN?

By HERB GRAFFIS

ALWAYS a pertinent question, and being asked with increasing frequency by canny club officials in these times, is "What do we get for our association dues?" No golf association, district or larger, is immune to the appraisal of that query. Foresighted association officials encourage the asking of the question for in numerous instances there are specific services such as the Green Section work of the USGA that far exceed in direct value the annual dues paid into the USGA.

Primarily the functions of golf associations have been those of rule-making and supervision, tournament operation and handicapping, with intermittent attention to matters of legislation. As organizations concerned with business phases of golf club operation, the associations usually have performed only when some collective emergency has arisen. Generally the district association function has been predominantly social.

However, there is a sharply recognized need for an expansion of association activity on a regular program of business service and in near prospect is the probability that association officials will have to overhaul organization platforms to meet the current needs. The problem is difficult. Association officials under any circumstances have thankless jobs, unduly exacting and unpaid. Association revenues in most cases are low. There is a discouraging disregard shown by member clubs toward attempts to secure information and teamwork for the common good.

Weak on Collection of Valuable Data

Consequently such matters as taxes, insurance, legislation, caddie and course and clubhouse labor wages, charges, sudden epidemics of turf diseases or pest ravages find most associations unprepared for effective collective action. It is strange that among country clubs where concerted action and exchange of data might be so highly valuable because of the frequent turn-over of officials, data is so difficult to obtain. GOLFDOM knows this, because each year we have been compelled to spend heavily in money, time and effort to dig up information urgently needed by puzzled officials.

Some years past there was activity in district cooperative buying in the mistaken notion that worthwhile savings might be made. The experiment was conducted at a loss in money, purchasing satisfaction and service to the individual clubs although operated by conscientious and diligent theorists. Since that time there has been very little cooperative effort by member clubs of district organizations in the numerous matters requiring cooperation. The outstanding exceptions are in the cases of the Massachusetts, New York Metropolitan and Detroit District golf associations.

Massachusetts Section Functions Smoothly

The Service Section of the Massachusetts association consists of an active committee of club officials and greenkeepers who pool their experience for the prompt use of any club having unusual maintenance problems. Bulletins are issued as required and the work of the year summarized in a vest pocket diary that contains, in condensed form, much valuable reference data. The association maintains offices in charge of a paid executive secretary, John Corcoran, among whose duties is that of securing from member clubs operating data and information that can be used in solving the problems of perplexed club officials and department heads. The usual district championships are conducted by the Massachusetts organization.

The report of the Detroit District GA Board of Governors for 1937 exhibits a sectional organization answering to any questioner's satisfaction, "what do we get for our association dues?" Among jobs done by the Detroit association last year was the distribution of 10,000 caddie training rule booklets, the standardization of caddie rates and cooperation with the Apprentice Training course of the Detroit Employers assn. in securing technical education for caddies over 18 years of age. The Detroit Green-committee report contains information of great value to green-