



A vista at one of the newest and fine public courses, the Galloping Hill course, constructed and operated by the Union County Park commission, Elizabeth, N. J.

## Doing Away With Weeds

By B. R. LEACH

THE spectacle of five or ten boys or men reclining in more or less graceful attitudes at spaced intervals over the topography of a golf green, each more or less assiduously engaged in digging out the festive crab grass with a dull and rusty knife, is still altogether too commonplace in this age of efficiency. When a green gets into a condition where wholesale hand weeding must be resorted to it is simply another instance of locking the stable after the horse is stolen. The greenkeeper is a busy man and during the season of maximum weed growth he is pushed to the limit to maintain the course in fair playing condition for the period of yearly maximum play which corresponds usually with this period of heavy weed growth. Under the circumstances the greenkeeper cannot be entirely blamed for letting the weeding go until rank growth reaches a stage where there is no fun in it. When a green, heavy in weed growth, is finally weeded it has all the aspects of a singed cat: thin turf, spotted and pitted with the holes left by the knife, rough and uneven and entirely unsuited for the de luxe putting of the effete, present day golfer. Then follows a distracting period of topdressing, fertilizing, etc., with the object of nursing the green back into

shape, all of this taking place at a period of the year when the growth of the grass is naturally slowing down. Year after year the struggle continues. It is no wonder that half the time the greens are in poor playing condition.

That the above system of hand weeding is out of date and not in keeping with the present day system of doing things in a so-called scientific manner, goes without saying but some years will yet elapse before the system of wholesale hand-weeding will give way to the cheaper and more efficient system of weed control by the use of certain chemicals, notably, ammonium sulfate and arsenate of lead.

### Ammonium Sulfate's Virtues

Ammonium sulfate has been in extensive use for several years as a fertilizer and weed control agent in fine turf. It is a valuable chemical and has its place in the scheme of things. Its fertilizing value has never been seriously questioned but its weed-controlling value has been the subject of much discussion, pro and con, and not by any means all con. This condition of affairs is no one's fault in particular but is due to a combination of circumstances of a rather complex nature which I shall try to explain at this time.

When ammonium sulfate was first advanced as a weed control agent it was hailed with a fair measure of acclaim by the more progressive fraternity of turf enthusiasts. They proceeded to give it a thorough try out. Some of these experimenters were hot-blooded and the compound was altogether too slow in its action to satisfy them. Consequently we have passed thru a period of years in which ammonium sulfate has been the target for all the gibing shafts of many who think they know a lot about turf and in reality don't know much. Some of these boys are still knocking. In extenuation of this school of thought as regards ammonium sulfate I will say that in my opinion just a little bit too much has been claimed for this compound in the past than can be entirely justified by subsequent experience.

On the other hand the more conservative of the amateur experimenters with ammonium sulfate continued to test it and say little or nothing during the extended process. As a result of several years of this testing they have arrived at certain conclusions, sound, conservative and based on solid fact. Hark for instance to the written opinions of Joseph Valentine, greenkeeper of the Merion Cricket club, Haverford, Pa. I have known Mr. Valentine for a good many years, and take this opportunity of advising all and sundry that, in the vulgar parlance of the day, he knows his onions.

### Valentine's Experience

In the current issue of the *Bulletin of the Green Section*, page 122 he writes as follows: "Sixteen years ago the fairways of the east course of the Merion Cricket club, were seeded with a mixture of Kentucky Blue grass and South German mixed bent. The following year the fairways of the west course were seeded with the same mixture. Our fairway fertilizing program then included the application of bone meal, mushroom soil, nitrate of soda, and some limestone, especially where we believed the soil to be acid. In 1920, eight years ago, our fairways were covered with crab grass, goose grass and clover. In the latter year we discontinued the use of nitrate of soda and in its place began the use of sulphate of ammonia. The weeds in the fairways have since been reduced about 80 per cent, and the clover almost 90 per cent. In fact, there is practically no crab grass in our fairways at this time. We expect to have all the weeds and clover com-

pletely eradicated within the next few years."

"This year, for the first time, we have also used activated sludge on our fairways, mixed with arsenate of lead at the rate of 500 pounds of the sludge and 40 pounds of arsenate of lead per acre. The arsenate of lead is used as a grub control and also to eliminate chickweed, which has started to appear prominently on some of our fairways. Last year we used arsenate of lead on our putting greens, applied mixed in top dressing at the rate of two pounds per 1,000 square feet of surface. We did not have to remove a single plug of chickweed from the greens, as had been necessary previous years, and very little of the so-called fall grass (I presume he refers to *Poa annua*) appeared on the greens."

Mr. Valentine then goes on to say that three applications of ammonium sulfate are applied annually, each consisting of 150 pounds per acre, the first in early spring, the second in July and the third the middle of September.

Suppose we take the time to analyze the two paragraphs above as written by Mr. Valentine. By doing so I believe it will be possible to readily explain the course of events at the Merion club and also to show the reasons for the changes in the fairway turf as they occurred.

### Soil Nature Changes

Prior to 1920 they used bone meal and nitrate of soda and some limestone, so that while in all probability the soil was neutral or slightly acid at the inception of this fertilizer program they nevertheless gradually changed the nature of the soil, causing it to become alkaline. This program could result in only one thing if continued long enough; it simply made the soil less suitable for the fine turf grasses and more desirable for the weeds, hence the weeds flourished. In 1920 they faced about, discontinued the use of nitrate of soda and other fertilizers with a tendency to make the soil alkaline, and began the use of ammonium sulfate which has exactly the opposite effect on soil. They thereby began the long uphill fight to change the nature of the soil from the alkaline to the acid. Believe me when I say that this is some job with the chemicals we have available for this purpose at the present time. As the ammonium sulfate was applied year after year the lime was gradually worked out of the soil and the latter gradually took on an acid reaction. In this operation they were aided by the fact that the soil

was in all probability of a naturally acid nature to begin with and no watering with lime-impregnated water was resorted to. As a result of eight years of this continued treatment the weed growth has been appreciably reduced, the clover almost eliminated and the grass is going strong.

It is fairly obvious that there is nothing of a quick acting or spectacular nature in the results obtained from the use of ammonium sulfate as a weed control agent. The weeds do not disappear overnight, in fact it is not a question of days or weeks in obtaining weed control with this compound but rather a question of consecutive years of consistent and persistent treatment, hence the impatience of those who demand quick results.

The experience of Mr. Valentine with this chemical has been reasonably satisfactory because his course is located in a section of country where the soil is naturally slightly on the acid side. Under these soil conditions every bit of ammonium sulfate applied gets in its good work and gradually but steadily increases the acidity of the soil, although in this case it required a longer period of time due to the previous applications of limestone, bone meal, etc.

### Alkaline Condition

Let us suppose, on the other hand, that your course is located on naturally alkaline soil, high in lime content, such as is prevalent in large areas of the middle west and where in all probability every drop of water used for artificial watering is impregnated with lime. Under these conditions ammonium sulfate is just as good a source of nitrogen as any other fertilizer, but it is my candid opinion you will never be able to safely apply enough ammonium sulfate in ten years of consistent treatment to make that soil acid and thereby obtain any degree of weed control. The lime content of the soil and water is too big a handicap for the limited amount of ammonium sulfate which can be applied annually with safety.

On many courses all the expected weed control from the use of ammonium sulfate is counteracted by the soil, sand, etc., used in topdressing, any or all of which may be barely on the acid side or even alkaline in nature, so that the ammonium sulfate in the limited quantities applied is entirely incapable of counteracting the alkalinity of the relatively huge bulk of soil annually applied.

To sum up the situation: if the soil of your golf course is not naturally alkaline and you take care that all materials such as soil, sand, fertilizers, etc., applied to the turf are not alkaline, then ammonium sulfate will return dividends as a weed control agent apart from its fertilizing value. If your soil is naturally not alkaline but has been artificially rendered so by the use of lime or alkaline fertilizers, then the use of ammonium sulfate will change this soil condition and pay dividends, but it will be a long drawn out business, a matter of years and not months. If your soil is naturally alkaline and your water supply is impregnated with lime, then ammonium sulfate is one of your best fertilizers as a source of nitrogen, but you might as well forget it as far as weed control is concerned.

To become more specific as regards the action of ammonium sulfate on the more common weeds infesting golf courses it may be said that the action of the chemical on clover, under the limitations of soil type outlined above, is the most striking. Clover gradually disappears over a period of years when the ammonium sulfate does not have too much alkalinity to counteract. If the opposite condition prevails, then the clover will persist. The effect of the chemical upon goose grass is comparable to that upon clover.

### Crab Grass Control Uncertain

When it comes to the question of crab grass control by means of ammonium sulfate it may be said that greenkeepers and turf enthusiasts are divided by their opinions into two armed camps. Some say yes, some say no and say it profanely. It is my personal opinion that the compound is overrated as regards its effect upon this weed. At best the chemical only seems to discourage the crab grass in a measure. The result is not clean cut.

Referring again to the excerpt from Mr. Valentine's article as given above you will note that he has turned to the use of arsenate of lead for the control of chickweed, this matted growth having appeared in the fairways and greens in spite of an eight-years' consistent application of ammonium sulfate. They have had the same experience with chickweed at the Pine Valley Club at Clementon, N. J. In the years prior to 1927 tons and tons of ammonium sulfate had been applied to the fairways and greens, and yet the chickweed consistently increased. It was entirely

cleaned up in one season as a result of the grubproofing operations during 1928, using arsenate of lead.

Prior to the advent of arsenate of lead into the turf maintenance system, ammonium sulfate was the only chemical which gave a measure of weed control results. It is still the only chemical which reacts against clover, providing there is not too much lime content in the soil to be overcome. I say the only one, because clover is apparently entirely indifferent to the presence of arsenate of lead in soil and grows normally in grubproofed soil provided the latter is not too acid in nature. The sulfate is slow in its action on weeds and will give only this degree of results when soil conditions are favorable. Arsenate of lead, on the other hand, is quick in its action on the weeds it affects, gives a very high percentage of control and will work in *any* soil, regardless of whether it is acid, neutral or alkaline. For the control of such matted-growth weeds as crab grass, chickweed and the death-defying *Poa annua* the compound has no equal at the present time. In next month's article I propose to discuss the use of arsenate of lead as a weed control agent, detailing its weaknesses and strong points, bringing out the more important points to be observed in its use for this purpose.

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## Cedarbrook's Fertilizing Is Successful, Thrifty

By LOUIS M. EVANS, Greenkeeper

Cedarbrook Country Club

THE system for fertilizing the fairways and the material used has proven most satisfactory and gratifying here at Cedarbrook and this is written in the hope that other clubs may benefit from this "not too expensive" a method of fertilizing. In 1926 we purchased 42 tons of chicken manure just as it comes off the car. This was put into a stock pile and when the ground was frozen about a half inch we decided that it was now time to start. The truck was loaded with chicken manure and taken to the point where the dirt was to be loaded and there dumped. The ground is grubbed or picked and as the lumps of dirt are thrown into the truck one-quarter of the truckload of manure is added to the dirt. I have used the words "lumps of dirt" for the reason that the more severe

the slopes of the fairways the larger we tried to have both the lumps of dirt and manure. This idea was introduced by the chairman, now our president, Mr. Charles Havey and that we get wonderful ideas from men not in the line was proven in this case as in many others. The idea of the lumps on the slopes is that they dissolve slower and do not wash away as would the fine dirt and manure. The latter we put on the more level fairways that are not subjected to severe wash.

The mixture of one to four is hauled on the fairways and dumped and spread with shovels, care being taken to pick out such places as show need of fertilizing. We continued this treatment until we covered every bad spot on our fairways and the results now speak for themselves.

This mix is washed into slight holes on the fairways and helps to level up slight depressions left from divots and also stimulates the grass in those places. It is my opinion that where your thought is only to stimulate grass growth that you can put on the straight manure in the freezing weather without fear of burning. In the spring we hand pick such trash as was in the manure or soil and then watch for results. The same mix of one to four is fine for greens with one third sand added for spring compost.

The greens compost should be kept under cover for chicken manure is a dampness retainer and can only be worked properly when thoroughly dry. The seeding of fairways we do in the spring, using about 1000 pounds of 85% blue grass and 35% red top and this is put on with the wheelbarrow seeders. This amount is usually enough for courses of about 6500 yards.

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IF your club publishes a news-bulletin or magazine, put GOLFDOM on the list to receive a copy of each issue. We frequently find ideas in club magazines that develop into worth-while articles for the pages of GOLFDOM. Thank you.

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HEAVY greens are more subject to brown-patch than closely cropped ones. Accordingly, the mower blades should not be raised in summer. It is better to have fast greens and a few kicking members than ruined ones and the whole membership down on you.