



Officials are caught by the camera prior to the opening of the annual Turf Conference in Detroit's Book-Cadillac Hotel. (L to R) James D. Standish, Jr., Chmn., USGA Green Section; Hal White, Secy., Detroit Dist. GA; Marshall Farnham, past pres., GSA; Clarence Wolfram, pres., Mich. and Border Cities GSA; Fred Grau, Dir., USGA Green Section; Clive Helferich, Chmn., DDGA Green Sec. Committee; and A. L. Brandon, Secy., GSA.

Advances in Turf Management Reported at GSA Convention

Chet Mendenhall, Mission Hills CC, Kansas City, Mo., was elected pres., Greenkeeping Superintendents' Association, at the greenkeepers' national organization's 19th annual convention, held at Hotel Book Cadillac, Detroit, Feb. 9-13. Mendenhall's administration team-mates are Carl Bretzlaff, Meridian Hills CC, Indianapolis, as v.p., and A. L. Brandon, Box 106, St. Charles, Ill., who was re-appointed by the association's directors to the sec.-treas. position in which he has served for some years so capably.

New directors elected for two year terms are William H. Johnson, Griffith Park courses, Los Angeles; John Counsell, Salem CC, Peabody, Mass., and Norman C. Johnson, LaGrange (Ill.) CC.

L.A. in '49; Boston in '50

The GSA selected Los Angeles for its 1949 convention which will be held Feb. 7-11 and awarded its 1950 convention to Boston where it will be held Feb. 5-10.

The Los Angeles district delegation at Detroit (Wm. Stewart, Wm. Beresford, W. H. Johnson, Tom Hood and Gomer Simms) in making their successful bid for the 1950 convention pointed out that weather conditions would allow outdoor demonstrations of equipment. In making their convention bid they reminded the GSA that the advance of turf maintenance science and practice had outgrown the

bonds of sectionalism. Work of the Southern California greenkeepers, the Southern California GA and other organizations in substantially financing a turf research program soon to be inaugurated was cited as another factor meriting recognition of Pacific slope greenkeeping with a national convention.

In addition to a big draw from west of the Rockies the Los Angelenos expect many superintendents from as far away as the Atlantic coast to have their programs for winter work indoors well under way so they can combine a cross country inspection tour with a vacation.

900 at Detroit

The Detroit convention had an official registration of about 700, with unregistered men bringing the total attendance to about 900.

Special attention to regional problems was given in the northern and southern section meetings Feb. 12. There was lively discussion following papers in both sectional meetings. Although weather troubles kept southern greenkeeper attendance lower than expected at Detroit the addresses, discussions and progressive spirit manifest in that section of the conference gave clear promise that notable advances in the general standard of southern golf turf, winter and summer, are not far off.

In general session the GSA ruled out proposals for a change in name of the association and new by-laws which would alter the original purpose of the greenkeepers' organization and make it an association for all concerned in fine turf. A move to expand the membership of the association by admitting, in certain classifications, turf specialists other than greenkeepers, was tabled.

Standish Awards USGA Plaque

Pres. Marshall Farnham got the first general session under way after Charles E. Caril, Ford's director of public relations, welcomed the greenkeepers who crowded the convention hall. James D. Standish, Jr., chmn., USGA Green Section, briefly outlined the Green Section's plans, stressing that there was considerable gap between the money available and the section's ambitious plans. Standish mentioned the constantly growing demand for Green Section services based on its substantial past performance, and urged that the greenkeepers cooperate in getting more USGA members. He reminded that the new basis of USGA membership was planned to allow clubs of all sizes to participate in the association's operations.

Standish presented from the USGA a plaque as an award to the GSA's golf champion. The plaque was engraved with the names of Emil Mashie, 1946 champion and Roy Jones, who won the greenkeepers' 1947 championship at State College, Pa. It is to be retained by each year's champion.

Crane Lauds Greenkeepers' Work

Tom Crane, executive sec. of the PGA, spoke on greenkeeper-pro cooperation. He paid tribute to the greenkeepers for the excellence and scope of their educational work and their advances in course management. He told of his own association's publicity problems in having most newspaper and magazine publicity accent the tournament pros to the extent that the club pros were in the shadow. But, he emphasized, the club pro who is on the job knows that the results of the greenkeepers work has a definite, important relation to the pro's income. Hence pro cooperation with the greenkeeper is urgent and sound good business for the pro. The pro also has an obligation, Crane pointed out, to understand enough of the greenkeeper's problem to be able to explain the situation to the inquiring or complaining member.

Crane touched upon the necessity of the pro and greenkeeper working together in making a specific analysis of the members' needs and desires in playing conditions. Referring to playing conditions of tournaments Crane said he'd never heard a tournament player complain about a course being too easy. He mentioned the elimina-

tion of rough on public and fee courses as an indication of the trend toward making playing conditions easier. Greenkeepers' comment on this observation was that speeding up play and reducing ball loss during war time probably accounted to a marked degree for the elimination of rough.

Courses Losing Character

Rough, by the way, was subject of informal discussion among greenkeepers. With weed elimination now comparatively sure and inexpensive rough doesn't mean much loss of balls. Rough is an interesting architectural feature and veteran greenkeepers of better courses generally were of the opinion that cutting down the rough has brought some formerly distinctive private courses to the point where there isn't much difference between them and public courses. These old timers believe that the older school of pros in ability and opportunity to play spectacular recovery shots from rough put on a better show for the public than is presented on the roughless courses today.

Dr. James Tyson of Michigan State college in speaking on "Importance of Water and Air Drainage in Turf Production and Maintenance" said that about 75% of the trouble on greens was caused by faults in water and air drainage. Low spots where moisture collects and particularly low spots where woods interfere with air circulation are danger spots on courses. Correct soil condition that is not altered by topdressing that stratifies and halts drainage makes the greenkeeper's job less troublesome, Tyson declared. He advised against too much organic matter in topdressing as making the green too soft when wet. The sand, loam and clay proportions in topdressing are a problem the greenkeeper has to solve with caution and certainty or he's building trouble for himself and his successor Tyson reminded his audience.

Tyson said he welcomed the tendency not to topdress as much as formerly because so much of the topdressing had built up trouble by impeding drainage. He advised greenkeepers to depend on putting water from the top rather than figure on water being drawn up from the bottom.

Heritage of Bad Construction

The Michigan State authority remarked that most of the greenkeepers present had a pretty clear idea that faulty water and air drainage bequeathed them by bad construction gave them plenty of rebuilding problems that would have to be solved by not repeating the old errors of drainage and improper topdressing.

Dr. Karl Dressel, Michigan State college Dept. of Forestry, told that there are 862

species of trees in the U.S. and each one it seems has to be treated almost as an individual. They grow by elongation of limb and expansion of girth. They contract with cold and expand with heat. At 6 A.M. they are at their largest diameter and at 6 P.M. shrink to their smallest diameter of the day. Most tree growth is during 20 days in spring. The balance of the year is spent in hardening. About 2/3 of tree growth occurs at night. The roots start growing earlier in the spring and continue later in the fall than the above ground part of the tree does.

Dressel advised caution in drainage operations that might interfere with roots of tap-rooted trees.

Golf at Army Posts

Col. W. N. Baird, Ft. Leavenworth (Ks.) GC in a sparkling address that gave the greenkeepers a lot of laughs along with sage observations from an accurate perspective, talked on the value of golf at an army post. Col. Baird is a pioneer in army golf and was prominent in planning the army's wartime golf program which was especially valuable to the GIs in camps near small towns where there were not enough girls or other entertainment to go around. The result of the program that was patterned after Baird's experience has been to bring hundreds of thousands of ex-GIs into golf as ardent addicts.

Col. Baird in summarizing his experience with army golf noted that golf facilities at an army post have very favorable influence on morale, relaxation, physical and mental development of all the military personnel. Golf is a medium of public relations, interplay and competitive sport at an army post. Tournaments and play by military personnel are also arranged between outside civilian players and clubs.

Every army post course is maintained only by the players. Upkeep of army post links is not paid for by taxpayers. Enlisted men do not pay to play on army post courses.

The setup of post courses is: Commanding Officer is the President of the club. This is largely an honorary position. He in turn has a Golf Director, usually an officer of the post, sometimes a civilian. If the Golf Director is a turf maintenance enthusiast, he is the best to have. In turn he is assisted by a pro golfer and a greenkeeper—each with his own, distinct responsibilities. Col. Baird said his experience had impressed on him that as long as the greenkeeper is doing his job he should be let alone. Ninety-nine times out of 100 the man can perform his job, the 1%, (often serious) is when Nature plays pranks.

All types of turf maintenance and their related problems are found at an army

post, such as airfields, lawns, park areas, play and parade grounds, cemetery and golf. The man on a post who knows turf, especially if he is a greenkeeper, is the best one to have in control of all turf upkeep.

Maintenance budgets are best not set up on the yearly basis, but on a 3 months term ahead.

Post golf club membership is always changing, often 50 to 100% turnover in a year, due to transfer of officers and men, Col. Baird said. A suggestion box is a good thing to have at an army post course. If anyone has a complaint, suggestion, etc., he is asked to write it out and put in the box. This automatically eliminates 50% of bellyaches, as the guy has to put it in black and white—not often a good thing to do voluntarily in the army.

The Colonel remarked that the difference between a wise greenkeeper and a stupid one is the wise man understands things the second man only sees.

Mott On Air and Moisture

Emil Picha, Oak Ridge CC, Hopkins, Minn., was chairman of the northern turf section and presided over the section meetings.

In his address on Aeration and Moisture Relationship in Turf, Dr. G. O. Mott, Exec. Secy., Midwest Turf Foundation, and the Purdue University faculty said the largest share of turf problems go back to soil structure and related factors. He noted that there has been confused thinking regarding aeration. The water holding capacity and texture of soil are important. Look for trouble in the soil profile caused by layers of different textured soils.

Plant roots die from lack of oxygen supply. Oxygen is important as a nutrient and is tied up with other elements. The oxygen supply can be cut off by a compact or wet soil. Oxygen is important for respiration in the plant as well as the animal kingdom. A plant starved for oxygen will not absorb potassium, even if the latter is plentiful in the soil. Saturated or compacted soil will cause a plant chlorotic (yellowing of leaves and stems) condition if potash is not absorbed due to oxygen supply cut off. Shallow root growth is caused by lack of soil oxygen. If oxygen is present, soil iron will be in an oxidized condition. A ferrous-ferric iron test to show if the soluble iron is oxidized can be made to indicate oxygen or its lack. It is not necessary to tear up a green if it needs aeration. Hand forking and mechanical aeration to make holes—the closer together the better, can be resorted to in extent and frequency required. In regard to topdressing to refill aerated holes, if the material is not right it may aggravate the

(Continued on page 96)

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ADVANCES IN TURF

(Continued from page 50)

original condition. If turf is very poor, and soil conditions bad, sod may be stripped. Layers existing can be rotary tilled and soil conditioning materials worked in.

Unique Fairway Watering

"How We Water Fairways at Denver CC" was described by Jim Haines, the club's supt. The system used at the Denver CC is unique as the areas are flooded instead of using sprinklers. This method is used as a large quantity of water is needed. It was first put in use in the early 1900s. Water is pumped from wells and a creek, to a high point and flows by gravity thru 12" pipes then oil treated canvas tubes 10" in dia. 30 ft. long. These are fastened together by hand. 2400 GPM is the flow, working 12 hours 6 nights a week in cycle. Admittedly there is a great waste of water to wet high spots. Where gravity flow is available and pumping costs low, the method is economically sound; although Haines said he is recommending a change-over to a modern, large capacity underground sprinkling system.

Tool and Maintenance Buildings was the convention subject of Ray Gerber, supt. Glen Oak CC, Glen Ellyn, Ill. Construction starts with known requirements for needs based on experience. Architecture should conform with existing nearby buildings. The site is important for accessibility and utilities available. Work should start with respect to weather conditions. Inspections should be made with the architect and contractor during construction, and final inspection approved prior to completion of contract.

Gerber said the Glen Oak maintenance building contains a 9 ft. x 12 ft. supt. office, a 9 ft. x 12 ft. locker room with toilet, wash basins, shower, lockers, tables and chairs. It has a large work room 28 ft. x 34 ft., with concrete floor and center drain, metal work benches, and a ceiling I beam for a hoist.

A 12 ft. x 28 ft. plumbing room keeps sprinklers, hose, pipes and fittings all in one place. A 12 ft. x 14 ft. room holds small tools used on the grounds work, and a 12 ft. x 14 ft. room is for small mowers. A separate section is being built to house tractors and gang mowers. Overhead doors, cinder block construction, practically fireproof are features of the buildings. Insurance premiums are kept low. An oil burning, thermostat controlled



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heater overhead encourages the men to be on time on cold mornings. The present building is 46 ft. square, but when the addition for tractors is included the size will be 46 ft. x 86 ft. Efficiency obtained from a properly designed building is worth the money to a club. Regardless of cost, be sure of having a good, solid foundation, Gerber stressed.

Flowers at the Club

"Flowers, a Part of the Greenkeeping Superintendent's Job" was the subject handled by Warren Bidwell, Cincinnati (O.) CC. Bidwell said the greenhouse and cold frames are part of the maintenance building at his club and growing flowers is part of the maintenance program. It keeps crewmen busy through the winter, avoids layoffs and keeps men so they are available for work through the maintenance season. Plants are grown for both inside and outside the clubhouse.

During maintenance season in inclement weather the men work in the greenhouse. Leftover plants are given to the men to take home, which they do with pride.

In cooperation with the clubhouse manager, cut and potted flowers are grown for table, lounge, and ladies locker room. Part of the raising cost is carried on the clubhouse budget. Numerous natural color slides were shown of varieties used in bedding, window box, border and mass plantings. A few dollars spent for plants and seeds plus labor cost show big returns at a golf club. Bidwell observed that the ladies and most hard-boiled business tycoons appreciate the beauty and effect of flowers and plantings in and around the clubhouse and grounds. The superintendent who is responsible gets good recognition for his efforts besides the personal satisfaction and enjoyment of raising and arranging flowers.

Wolfram Speaks on Drainage

Clarence Wolfram from Maple Lane GC, Warren, Mich., in talking on "Drainage—How and Why" said three good reasons for drainage are to promote good turf development, make it more pleasant to play the game more often, and prevent revenue loss from reduced play patronage. One club in the Detroit district failed because of poor course drainage. Drainage costs make a sizeable figure nationally. Wolfram remarked: "At my club we have spent an average of \$2,000 yearly for the past 17 years for drainage. Before we installed our system we used to have areas up to three acres that would be subject to floods. With the original small tile 4" in diameter, it used to take 4 to 6 days for the water to drain off.

"Fortunately I have had the same green committee chairman for the past 17 years. We have worked along with the problem

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lines causes loss of suction and the lines do not 'draw'."

Cadmium Fungicides for Turf Diseases was the subject presented by Dr. W. H. Thurston, Jr., Penn State College, State College, Pa.

Dr. Thurston said the use of cadmium fungicides for turf diseases developed while looking for a new material for potato treatment. Chromate materials were tried in the Philadelphia section. These are complex materials containing copper, zinc chromate and calcium. Tests were made on plots on courses of Joe Valentine and Marshall Farnham. Slides were shown of 1946-47 observations.

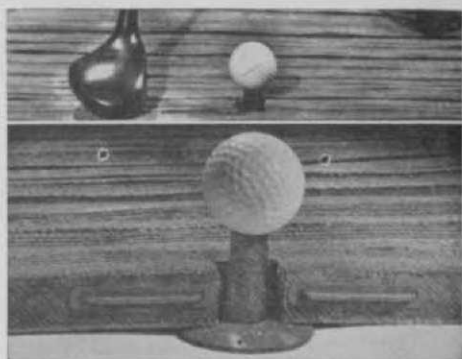
Excellent control was found on dollar spot. The chromium materials are not as efficient on large brown patch as some other materials.

The cadmium materials have the advantage of not discoloring or setting back turf growth rate, are non-corrosive, and can be used either wet or dry. To the question raised if the copper in the mixture had any ill or cumulative effect due to residue, the reply was no injury was observed over a two year period of the copper complex. This may be due to the copper being tied up with the other elements.

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Cadmium fungicides are not the answer to large brown patch control. Using "Ter-san" and "Crag" alternately in judiciously spaced intervals was suggested. Tests are incomplete on snow mold control.

Differential Responses of Norbec and Arlington Bent Grasses to Kind and Rates of Fertilizer were reported to the convention by Ethan C. Holt of the Midwest Regional Turf Foundation at Purdue University.

Experiments were run under controlled greenhouse conditions with controlled solutions. (Norbeck is C36 and Arlington C1, previous USGA strain test numbers.) Nitrogen, phosphate, potassium and calcium deficiencies were studied on growth rate of tops and root accumulation. Dated photos were taken of tests. Grass growing on top of pots containing white quartz sand were photographed, and negative density measured with a photo or light meter, in foot candles. Slides showing the tests, and printed data were shown at the convention. Grass roots were later weighed dry, to tabulate growth.

Effects of Urea-form Fertilizer

Effects of Urea-form Fertilizer on Turf, the address by W. H. Arminger of the U.S. Dept. of Agriculture, was illustrated by slides. Arminger explained that materials are a combination of urea and formaldehyde, containing 34-to 38% nitrogen.

Arming summarized the greenhouse tests as follows:

"Bermuda grass and perennial ryegrass grown as indicator plants in pots have shown that the nitrogen content of urea-form materials is available to crops over a much longer period than nitrogen applied as ammonium sulfate or Milorganite. In contrast to standard nitrogen sources which usually are applied in readily available forms, urea-form materials have a low solubility and are not readily available at the time of application. After application they undergo gradual decomposition and release nitrogen slowly for plant growth over an extended period.



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"Analysis of variance of the data from both the Bermuda grass and perennial ryegrass experiments show that crop yields were significantly greater in the latter part of the season when one of the urea-form materials of moderately low solubility was the nitrogen source. Crop yields were greater in the early part of the growing season when nitrogen was supplied by a standard nitrogen source, thus indicating the desirability of using a mixture of the two types of nitrogen to promote uniform growth.

"Urea-form materials, in general, stimulated greater root and crown development than did conventional sources of nitrogen. This development is desirable from the standpoint of turf production.

"Urea-form materials have been applied at the rate of 400 pounds nitrogen per acre without any trace of plant injury due to burning. This rate is the equivalent of applying 4,000 pounds of a 10% nitrogen fertilizer per acre."

He summarized the field tests as follows:

"Certain urea-form materials applied to Centipede grass in Georgia and Bermuda grass in Florida did not promote as heavy or as uniform turf production over an extended period as did ammonium sulfate or sodium nitrate. A long period of low rainfall at both locations enabled the highly soluble materials to remain available in the soil longer than normal. The urea-form materials failed to release adequate amounts of nitrogen during this period since the unfavorable moisture conditions decreased the bacterial activity required for their decomposition.

"During the first 41 days after application conventional nitrogen sources were superior to urea-form materials in the production and quality of the turf on an established Kentucky blue grass sod in Ohio. Following this the urea-form treated sod was superior to that treated with ammonium sulfate or Milorganite for the next 89 days. At this time the bluegrass sod was affected physiologically by extremely high temperatures and thereafter only

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slight differences were noted between any of the treatments.

"In the first 95 days of a 195-day experiment on established Bermuda grass in Texas, conventional nitrogen fertilizers produced higher clipping yields than any of the urea-form products under test. The most readily available urea-form material gave higher yields in the 96-195 day period than the standard sources of nitrogen. The less readily available urea-form products either failed to show any superiority during the experiment or showed it considerably later in the season. This excessive delay in release of nitrogen by the urea-form materials is attributed to low temperatures at the start of the experiment followed by a period of inadequate rainfall. As a result only one of the urea-form products gave a total yield higher than Milorganite, which in turn was exceeded by both ammonium sulfate and sodium nitrate.

"Three urea-form materials, ammonium sulfate, and Milorganite were compared on Alta fescue sod at Beltsville, Md. The grass was clipped weekly for 10 weeks without removal of the clippings, and then it was allowed to grow for two weeks to obtain yield data. All plots receiving urea-form gave yields considerably greater than those treated with ammonium sulfate or Milorganite."

Charles Hallowell presided as chairman of the Southern Turf section which opened with O. S. Baker, supt., Indian Creek CC, Miami Beach, detailing his procedure in changing to bent greens at the famed Indian Creek course.

Baker seeded with a mixture of Astoria, Colonial and Highland on a 1-1-2 basis. He seeded Oct. 15 and by Feb. 1 had fine dense greens despite unfavorable weather conditions. He sowed rye as a nurse crop but regards that as an error as he discovered that rye was susceptible to disease and exposed the bent to stronger attack than it might normally suffer.

Indian Creek, as well as other Florida courses, have been subject to a fusarium attack, identified by David Stoddard of the Everglades Experiment Station as snow mould. The spore is wind-borne from the north and found Florida condition last November and December favorable to its development. Usual snow mold preventive treatment employed in the north now looks to be something more for southern budgets. Baker said the snow mold finds rye more susceptible than Bermuda although unfertilized Bermuda areas were hard hit. As in the north bad drainage on Florida courses was associated with serious snow mold damage.

Prior to seeding with bent, Baker had a program of chemical elimination of weeds and Bermuda on greens. Although he kept this program on the conservative side to avoid risk of soil sterilization he said that torrential rains following treatments diminished power of the applications.

Work Schedule for Seeding

Greens, prior to seeding were topped with a mixture of coarse beach sand, limestone screenings and muck, then worked over with an aerifier, a Cultihoe, harrowed to further mix and true up, worked over with a box drag, then dragged with a 6 x 10 steel door mat. A jeep operator and helper did this work. Greens then were rolled with a fairway roller. A Delmonte rake furrowed for the bent seed which was put on with a Gandy seeder. Then a greens roller went over the job. A mist spray was applied to keep the seed from being blown.

Heavy rains handicapped the work, making it necessary to process the greens four times before seeding.

Baker said that he believes bent greens will be the answer to saving \$2500 to \$3500 seeding costs annually on greens of the better Florida courses and will provide greens the year around that will put like northern greens.

During last year's late storms Baker got hole-cutter plugs of grasses from the Florida experiment station when there appeared to be danger of the station's turf

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plots being washed away. Baker showed colored slides of these samples as of approximately Feb. 1 and views of his beautiful course.

This summer the Indian Creek bent greens will be mowed on regular schedule and from these greens and observation of the test strains Baker hopes by fall to have some fairly good information on what bents will do best in southern Florida. By then he also expects to have definite data on the procedure that will keep Bermuda from growing into the bent greens.

Air and Moisture Balance

Fred Grau, director, USGA Green Section, in substituting for Dr. Thomas Longnecker, Texas Research Foundation, in talking on "Aeration and Moisture Relationship in Turf" also commented on Baker's address in remarking that the finer Bermuda strains still are a possibility in the southern greens picture.

Grau emphasized that the proper balance of air and moisture is the most important topic in turf maintenance. Cause of most putting green trouble is too much moisture or not enough air, he said. There's no one answer that solves the problems of air and moisture balance but changing soil texture is the answer that many courses will have to apply before they can solve their greens troubles, observed Grau. He

said that if greenkeepers had the proper balance of air and moisture to promote the growth of micro-organisms essential to plant health and to provide hair roots of grass with nutrients in solution they wouldn't have to water greens as much as they now think they must.

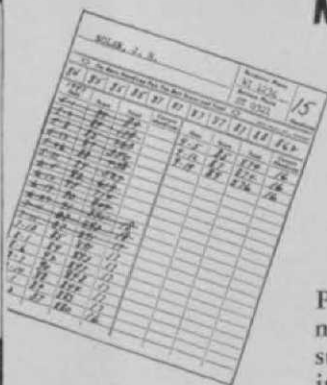
The Green Section director declared that more research is needed on the problem of placing fertilizer where the plant can make best use of the food. The farmer who can plow has an easier job of getting plant food to roots but the greenkeeper who can't use this method and who has to keep his plant product in use 366 days of a year has a complex job. He reminded his hearers that plant roots constituted one of the best means of breaking up heavy soil and binding light soil but how to get deeply rooted turf is a job that calls for all the business knowledge the greenkeeper can muster.

Dixie Meeting in May

T. M. Baumgardner, Supt., Sea Island (Ga.) GC, presented an excellent practical round-up of fairway management methods for good results in the south. This paper appears in this issue of GOLF-DOM. Baumgardner urged that all interested in southern turf attend the Second Annual Southeastern Turf Management Conference which will be held at the Coastal Plain Experiment Station, Tifton,

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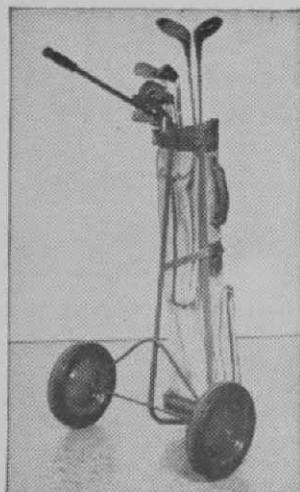
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Ga., in May. He said exceptional progress has been made in the experimental work conducted by Dr. Burton in cooperation with the USGA Green Section. Among the many experimental plots are more than 100 distinct strains of Bermuda, some of which are far superior to ordinary Bermuda in texture, color, aggressiveness and in some cases, disease resistance.

Everitt Shields, supt., Druid Hills CC, Atlanta, gave a remarkably complete but concise paper on "Summer Maintenance of Bermuda Greens." The Shields address was practically a compact handbook on the subject and will appear in its entirety in GOLFDOM.

Chlordane Results Noted

The informative, helpful address of Dr. Roy A. Bair, Everglades Experiment Station, Belle Glade, Fla., on "Minor Elements in Turf Production" also will appear in GOLFDOM. Before his talk on minor elements Dr. Bair spoke on chlordane results as observed in Florida. He said it shows great promise of cricket mole control. Chinch bugs, army worms and ants have been closely controlled by the material. Chlordane is inactivated quickly on sweet soil, Bair said. Results on acid soil are more complete. Mixed with organic material as a bait chlordane gives quick results but it has to be watered in.

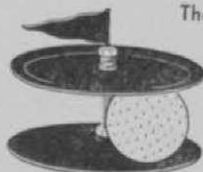
Bair also said that the latest dope on 2, 4-D is that it is activated by ultra-violet light and gives best results on a clear day especially after rain has cleared the dust from the air.

"What's New in Control of Turf Insects," the paper of John C. Shread of the Connecticut Agricultural Experiment Station, appears complete in this issue of GOLFDOM.

Fitting the Fungicide

A history of fungicide chemicals was given briefly in the address of Frank L. Howard, Rhode Island Experimental Sta-

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tion. There are over 50 fungi species which can effect or kill turf grasses. This makes it a problem to find one chemical to control all diseases, and calls for a "tailoring problem" to fit the fungicide to the fungus control. In a way, fungicides act as a monkey-wrench to wreck the fungicide mechanism. Two methods of disease control are generally considered. 1—a chemical barrier to prevent disease, and 2—to build up plant resistance to disease. Safety margins vary with the material used, soil type, moisture, temperature, pH, soil structure, organic matter present. These factors enter into the effectiveness of fungicides and the extent of plant injury which may occur. Also, the age, variety of turf, and height of cut need consideration. Another problem in turf fungicides is how poisonous the fungicide is to man, animal or bird.

Whose responsibility is it if someone is poisoned by the use of fungicides? It is not the government's and not the manufacturer's. So long as the container is properly labeled as to contents, marked poison, with the usual skull and cross bones, and antidote given, the responsibility is up to the user of the material. Humans may be affected internally, by mouth, by respirators or breathing, or skin injury.

In preparing fungicides, plant pathologists strive to make all materials in dry materials so they can be applied either wet or dry and to make materials concentrated, and non corrosive to equipment. In considering the cost of fungicides bear in mind you are buying control; not tonnage.

The longer-lasting less frequent applications made, the better, and scientists strive to develop materials which need only three or four applications per growing season. Materials must be comparable with other materials and controls such as insecticides. The residue effect from continued use needs to be considered, and tests made on various turf species. Plant feeding for vigorous growth helps resist disease. Applications of 2, 4-D on greens turf lowered the grass resistance to



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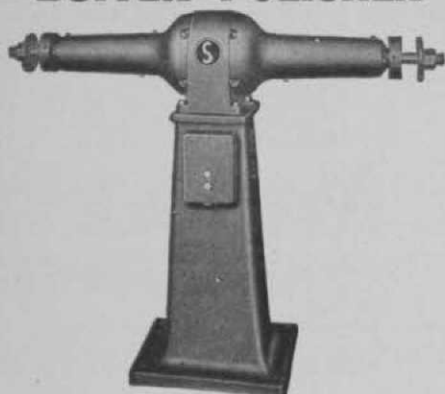


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disease attacks. Summarizing disease control, Howard advised to maintain high plant vigor, use an alternate spray control, and until further developments, for best control, use mercurials (inorganics) cadmium compounds and phenol mercury materials alternately.

New 2, 4-D Developments

Speaking on New Developments in Weed Control with 2, 4-D, Chas. Hamner of Michigan State College emphasized that 2, 4-D is one of the most potent of plant toxicants. Scientists are seeking a plant antidote for 2, 4-D to revive plants which accidentally may be sprayed with the material. It has been observed that monocotyledonous (single stalk-leaf) plants such as grasses and onions are most resistant to 2, 4-D. Experiments are being made with plant extracts from "monocots" to check 2, 4-D injury.

Slides were presented by Hamner showing the amount of growth inhibition measurement. Below pH 3 or 4 2, 4-D was greatly stimulated. Buffer solutions are being tested to prevent acid changes. Buffered solutions greatly controlled 2, 4-D toxicity.

Another line of study is the effect of 2, 4-D on weed versus grass seeds. Some seeds can be killed with concentrations weak as 1 part per million. Ten parts per million will kill most weed and grass seeds in soil. The toxic effect lasts about two weeks, and after three or four weeks there is hardly a trace left in soil, and new seeding may be done. 2, 4-D was first discovered as a root-promoting substance when plowed into soil 5 lbs. per acre. At higher concentration of 20 lbs. per acre plant growth was checked.

Slides showing corn experiments, illustrated a cornfield damaged by hurricane winds. Corn in soil treated with 2, 4-D had developed brace roots of sufficient strength to prevent them blowing loose. 2, 4-D placed in soil controlled 95% of weeds, although some seeds are resistant. The present limiting factor of using 2, 4-D

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as a soil weed seed sterilizer is the cost of application due to lack of proper equipment to apply very small dosages. The cost to apply has run as high as \$10 per acre. However, a wheelbarrow rig with spray boom for hand operation was made up, and a manufacturer is working on developing this for general use.

Balanced Course Design

The Fundamentals of Golf Course Design as set forth in the interesting talk of Stanley Thompson, noted golf architect, gave the greenkeepers a close-up on the architect's design problems. An expert study needs be made of the balance of holes on a course. Over 90% of players score 92 average. This type player pays the costs and should be catered to in designing. A compromise needs be made between playing and maintenance conditions. Study of an air photo is advised by Thompson prior to laying out the course. He usually takes at least a week to lay out a course on paper, with the architect and two engineers. Do not build a course around a few feature holes, Thompson warned. There should be two or three easy starting holes and the holes stiffened up as the layout advances.

"Use of Visual Education in Turf Maintenance" was detailed by Albert E. Cooper, Extension Agronomist, Penn State College. He showed colored motion pictures used in the extension job which carries the college to the people of the state. Motion pictures and slides are used to great advantage and clarity to explain methods and give demonstrations, Cooper said and noted especially that the results of experiments are greatly clarified. The three reels shown at the convention were of course maintenance practices, equipment, etc. at Philadelphia and other Pennsylvania courses.

"Behind the Scenes," movie of the PGA 1947 Championship at Plum Hollow GC, Detroit, were shown after preliminary remarks by Emil Beck, secy. Michigan PGA.

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