APRIL 1983

A PATCH of GREEN

Official Publication of the
Michigan & Border Cities Golf Course Superintendents Association

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LOOK BACK - AND AHEAD

by Dr. Fred V. Grau
Consulting Agronomist
President, The Musser Foundation
Former Director, USGA Green Section

Few people alive today have known every president of the National Greenkeepers Association, now the Golf Course Superintendents Association of America. It has been a real privilege to have known these men who have helped to shape the turfgrass industry. Rhode Island was working with turf before the turn of the century. They have had a long and interesting continuous track record.

Turfgrass selections were made in Connecticut about 1910, largely red fesues.

The first book on turf in the U.S. was published in 1917. The authors were Dr. C. V. Piper and Dr. R. A. Oakley, USDA forage crop scientists. These pioneers helped to bring the U.S. Golf Association Green Section into being after Columbia C.C. greens were destroyed by disease, heat and humidity, following applications of ammonium sulfate to have lush green turf for the 1920 U.S. Open. They putted on sanded BROWNS!

1921 saw the formation of the USGA Green Section and Vol. No. 1 of the BULLETIN, now a collector's item.

CONTINUED PAGE 19

Are Acti-Dione Fungicides Safe?

TOXICITY OF ACTI-DIONE® FUNGICIDES

Toxicity, potential health hazards, and the impact of pesticides on the environment are subjects that have been widely discussed and reported in news media during the past few years. One of the most common measurements of pesticide toxicity is the Acute Oral LD_{50} in the rat. The test involves oral administration of the test chemical at various levels to laboratory rats to establish the dose required to kill 50% of the test animals. This LD_{50} value is expressed in mg/kg, meaning the milligrams of test chemical per kilogram of animal body weight required to kill 50% of the animals. Most reported LD_{50} values refer to technical or pure chemical as opposed to formulated commercial products.

Two important points must be considered when evaluating the LD_{50} value for Acti-dione. First it must be clearly noted whether pure technical chemical or a more dilute formulated product was used in the test. Second, consider the wide species variation in the response of test animals to Acti-dione. The following comments relate to these two subjects.

Cycloheximide, the activite ingredient in Acti-dione fungicides, has an Acute oral LD_{50} of 1.75 mg/kg in rats. Unfortunately, such data are misleading and do not present the true picture regarding the toxicity and possible health hazards of formulated Acti-dione products. When evaluating potential hazards to the consumer, primary consideration should be given

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Responses to late fall applications of Nitrogen Carriers

By R.A. Bay and P.E. Rieke

In mid-Michigan the time for this late fall application of nitrogen is suggested for November 7-10 when using soluble nitrogen sources. The appropriateness of this date will vary with the particular season and the location in the state.

For several years, we have had late fall nitrogen fertilization studies on annual bluegrass fairways, while other studies have been carried out on Kentucky bluegrass for 3 years and 2 years on a bentgrass green. Typical data for quality ratings are given in Tables 1 and 2 for applications on a green and a fairway, respectively. Similar responses have been observed on Kentucky bluegrass, although fewer carriers were studied.

Clearly, response to timing of the fall application is dependent on the nitrogen carrier. Slow release nitrogen sources must be applied much earlier than soluble sources as would be expected. Based on experience for several years, suggested timing of specific carriers can be related to the date of application of a soluble source such as urea or ammonium nitrate recommended for November 7-10. The following nitrogen sources should be applied at the intervals previous to these dates depending on the season: sulfur coated urea from C.I.L., 10-14 days; sulfur coated urea from LESCO, 2-3 weeks; Milorganite, 3-4 weeks; IBDU, 4-5 weeks; fertilizers containing both soluble and slow release nitrogen sources, 7 days, depending on the relative amounts of each and the slow release carrier present. To date, no differences in snow-mold or winter injury occurred on these studies, although these may yet occur in the future.

Advantages of successful late fall nitrogen applications include: 1) Good turf color in the spring without the flush of growth typical of spring applications; 2) The plant is able to

CONTINUED NEXT PAGE

ROSTER CHANGE

Edward Clann (Grace)
200 Marlette Drive
Venice, Florida 33596

People who want milk should not seat themselves on a stool in the middle of a field in hope that the cow will back up to them.

Elbert Hubbard

continue photosynthesis in the fall, increasing carbohydrate levels and root growth; 3) These may be less susceptible to spring and summer diseases than when comparable spring applications are made.

The benefit of early fall (early September in mid-Michigan) application of nitrogen at appropriate rates is well documented. This allows the plant to accumulate carbohydrates and grow new roots after the summer stress season, yet the plant can begin the hardening process in October. Early fall fertilization is essential for good turf maintenance. Increasingly, nitrogen is being applied in late fall (sometimes called dormant or late season application) on turf with good results. Timing of this application is critical especially on greens, tees and fairways. The nitrogen should be applied to uptake occurs after vertical shoot growth ceases, yet early enough so the nitrogen can still be taken up by the active roots and some photosynthesis still occurs.

Potential disadvantages are: 1) Foliar burn can occur after the irrigation system is shut down; 2) Unusual periods of warm weather after application could result in too much late growth and potential loss of hardiness – of greatest concern with early application could result in too much application of slow release sources; 3) There could be greater susceptibility to snowmold diseases if the turf is not treated for control; 4) There could be greater susceptibility to late winter-early spring low temperature injury; 5) The potential for leaching of nitrate nitrogen exists – for this reason completely soluble sources should not be used on sand soils.

We suggest 1 pound of nitrogen per 1000 square feet timed for the specific nitrogen source according to the above outline. A carrier which provides both fast and slow release sources is probably safest to use.

The plots shown include year-round fertilization programs with some late fall nitrogen treatments. No differences in winter injury or snowmold occurred this past winter. Similar late fall studies have been initiated on annual bluegrass, Kentucky bluegrass and perennial ryegrass plots.

System Developed to Control Canada Goose Nuisance

Method Proven Effective After Five Years of Field Testing; Is now Commercially Available

Golf Superintendent Pat Lucas of Old Greenwich, Connecticut has recently developed what he describes as the first really effective system for controlling the problem of Canada Geese on the golf course.

Perfected after five years of intensive field testing at the Innis Arden Golf Club in Old Greenwich, Lucas' method, which he calls the "Sentinel Swan Family System", is now being marketed commercially for the first time. Prospective customers include golf courses, parks, and grounds superintendents at locations where the persistent presence of Canada Geese has become a continuous nuisance.

According to Lucas, the Sentinel Swan Family System works where other methods fail because it uses replicas of entire family groups of extremely life-like, full-size swans made of bouyant foamed polystyrene.

"Research has shown that Canada Geese are not easily fooled by any number of physical, scarecrow-like devices, including some crudely designed and placed swan replicas", said Lucas. "But we have proven that geese are smart enough to respect the threat posed by what they see as greedy and vicious swan family groups."

Complete documentation of the Sentinel Swan Family System's effective-

CONTINUED PAGE 15

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*Daconil 2787 is a registered trademark of Diamond Shamrock Corporation.

Tank mixing brings other advantages, too. With TERSAN 1991 in your tank, you get systemic action for protection from within the turf plant. Disease control is longer-lasting and is less affected by rainfall or frequent irrigation. Tank mixing fungicides with different modes of action also reduces chances of benzimidazole resistance. You help insure the long-term effectiveness of TERSAN 1991 in your disease control program.

This year, plan on using TERSAN 1991 in combination with Daconil 2787. It's the tank mix turf diseases can't match.

With any chemical, follow labeling instructions and warnings carefully.

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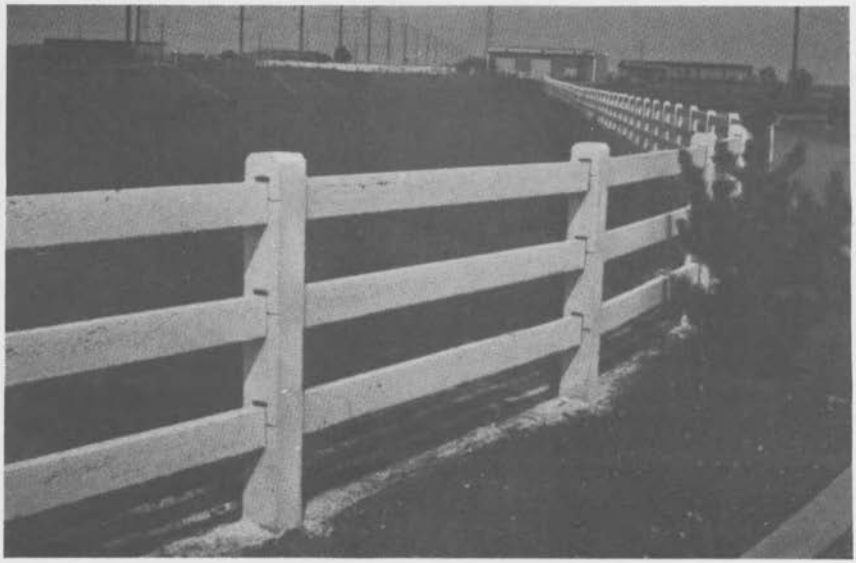
Kentucky Rail



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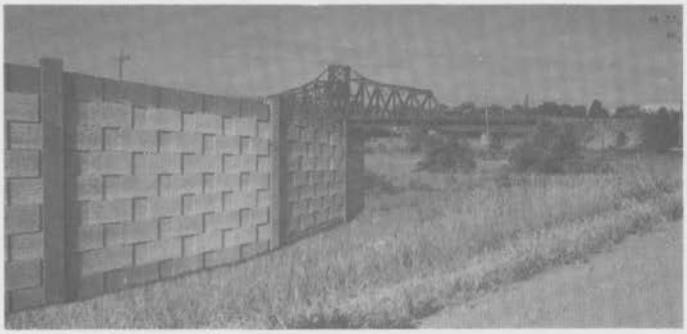

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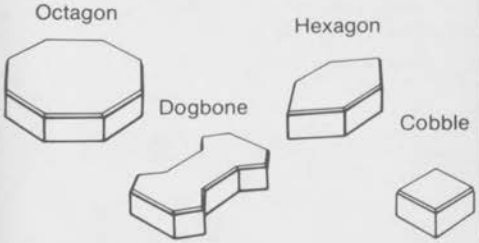

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Honker Control, cont.

ness is provided in a feature article by-lined by Lucas that appears in the September, 1982 issue of GOLF COURSE MANAGEMENT magazine. In it he cites many of the more obnoxious aspects of unwelcome resident flocks of Canada Geese on golf course ponds, waterways and fairways – including the clean-up of unhealthy droppings, packed power rollers, feather-clogged irrigation suction strainers, and, on an even more personaal level, having to deal with complaints from club members.

The commerical version of the Sentinel Swan Family System includes a set of five realistic, life-size swan replicas that represent both adult and young swans. The "swans" readily float and require no complex mountings or installation procedures.

A single Sentinel Swan Family System is available for $130.00, and orders of from two to four Family Systems cost $125.00 per System. Five or more sets ordered at one time are available at $120.00 per System. Each order includes a six page instruction guide prepared by Lucas. To order, buyers are requested to send a check with indication of the number of Systems required (Connecticut residents add 7½% sales tax) to Sentinel Swans, 81 Tomac Avenue, Department "P" Old Greenwich, CT 06870. Orders are shipped freight collect. For more information, call (203) 637-3939.

LEAF GALLS ON SHADE TREES

James A. Fizzell,
Sr. Extension Adviser, Horticulture
University of Illinois

Galls are abnormal growths on plants. They come in a variety of shapes, sizes and colors depending on the insect, disease, or environmental condition that caused them. According to James A. Fizzell, University of Illinois Horticulturist in Cook County, when insects cause these tumors, the growth is stimulated by chemicals that the insect produces.

Although insect galls on the leaves of shade trees may detract from the

CONTINUED NEXT PAGE

Leaf Galls, cont.

beauty of the tree, they really don't weaken it.

Succulent oak galls are very common on oaks this year. They are green growths that occur at the base of leaves of pin oak and some other oak varieties. They look like small green grapes and are caused by tiny non-stinging wasps which lay eggs as leaves are emerging in the spring. The pin oak leaves continue to develop into full-sized leaves and no more galls are produced until the following spring.

Honey locust pod galls are actually leaflets that are deformed into small, green to reddish balls about ⅛ inch in diameter. The flies that cause these galls haveseveral generations a year producing additional galls on honey locust throughout the summer.

Maple bladder galls appear as green, pinhead-sized lumps on maple and box elder leaves in the spring. These galls are caused by mites that have several generations that produce additional galls throughout the summer. Although these galls are green when produced, they soon turn red.

Hackberry nipple galls are caused by insects that are close relatives to aphids, called psyllids. The gnat-like adults enter our omes in the fall to hibernate for the winter and return to hackberry leaves in early spring to lay their eggs. The immature psyllids that hatch from these eggs cause the green, nipple-like galls to be formed around themselves as the leaves develop. One generation is produced each summer that emerges as adults in the fall.

Generally says Fizzell, control measures are not recommended for gall producing creatures, since galls on leaves usually cause no apparent harm to the tree. Although the appearance of the leaves may be different from normal seldom is the gall infestation large enough to be noticeable exept by close inspection.

CREDIT: BULL SHEET

Little girl to her mom: "Mom, why did the elephant sit on the marshmellow?"
Mom: "I don't know, why?"
Little girl: "So he wouldn't fall into the hot chocolate."

Palmer Wins Prestigious New Golf Award

Arnold Palmer has been named the first recipient of the "Old Tom" Morris Award, established recently by the Golf Course Superintendents Association of America (GCSAA) to satisfy the need for a significant international award that would help identify with the true heritage and traditional founding of the game.

"Old Tom" Morris, one of golf's first greats, was a greenkeeper, golf professional, club and ball maker, golf course architect and accomplished player who won four British Open Championships between 1861 and 1867.

While at the Royal and Ancient, St. Andrews, Scotland, "Old Tom" acquired worldwide fame, boosting the popularity of golf through his role as the first superstar of golf – as detailed in the November 1982 issue of GOLF COURSE MANAGEMENT magazine, GCSAA's official monthly publication.

Selection of Palmer as the first recipient of such a significant award was an easy task, according to GCSAA President, James A. Wyllie. "Besides being a superstar like 'Old Tom,' Palmer has displayed a continuing, selfless commitment to golf and furthered the welfare of the game in a manner exemplified by 'Old Tom' Morris," Wyllie said last week.

Palmer, himself the son of a greenkeeper, has made clubs and designed golf courses in a career studded with more than 70 tournament victories. His contributions to the popularity and welfare of the game are, according to Wyllie, "immeasurable."

Palmer is slated to accept the award at GCSAA's 54th International Turfgrass Conference and Show in Atlanta, Ga., on February 24, 1983.

GCSAA, the sponsor of this premier international event in turfgrass management, is a professional association 5,500 strong representing golf course superintendents in the United States, Canada and 25 foreign countries.

Acti-Dione, cont.

to the formulated products actually being used – not the technical cycloheximide. Because of its very potent fungicidal properties, the concentration of cycloheximide in our formulated Acti-dione products ranges from only 0.027% in Acti-dione PM, to a maximum of 2.1% in Acti-dione TGF. The Acute oral LD_{50} values of these various Acti-dione products in rats are compared to technical cycloheximide as follows :

Product	% Cycloheximide	Acute Oral LD50 (mg/kg) Rat
Technical Acti-dione®	95	1.75
Acti-dione PM®	0.027	5,500
Acti-dione® Thiram[1]	0.75	189
Acti-dione RZ®[1]	1.3	217
Acti-dione TGF®	2.1	156

[1] It should be noted that Acti-dione Thiram and Acti-dione RZ are combination products with tetramethylthiuram disulfide and pentachloronitrobenzene, respectively; and, therefore, reflect the toxicity of these fungicides as well as that of cycloheximide.

A second consideration in attempting to estimate possible hazards of Acti-dione to the user based on Acute Oral LD_{50} data in rats, is the dramatic species variation in response to this chemical. While the Acute Oral LD_{50} in rats is 1.75 mg/kg, the analogous value in mice is 133 mg/kg. This means that the rat is about 75 times more sensitive to cycloheximide than the mouse. Since cycloheximide was orignally evaluated as a potential human drug, evidence is plentiful to indicate that man is one of the more tolerant species. Single doses of greater than 700 mg. have been administered successfully to humans. Human beings with fungal diseases hae tolerated 30 mg four times daily intramuscularly and 180 mg per day intravenously. Cycloheximide has been used in clinical studies for cancer chemotherapy in doses up to 15 mg/kg two to three times per week for up to 48 days.

Acti-dione (cycloheximide) was discovered in 1946; and since that time, has been widely used for plant disease control. In more than 20 years of commercial use, there has never been a single authenticated case of accidental poisoning. Although this is testimony to the relative safety of Acti-dione products, it is important to remember that as with any pesticide, they should be used in accordance with label directions, and handling and use precautions should be carefully noted. Remember! STOP, READ THE LABEL.

Greens were mowed with hand-push mowers and horses pulled 3-gang fairway mowers. These were the days when greens had only surface drainage and were topdressed with compost made by building layers of sod, lime and manure. Weed seeds were not killed so that men and women picked the weeds with sharp knives. Rotary screens sifted the compost which was spread with shovels.

Calomel and bichloride of mercury helped to control the two major diseases, dollar spot and large brown-patch. Moveable sprinklers watered the greens of Cocoos bent (Seaside bent) and, in New England, Velvet bent. Fairways got nothing but rainfall. It was a chip and run in summer.

Fertilizers included sulfate of ammonia, nitrate of soda, blood meal, superphosphate, quano and cotton-seed meal. Sprinkler barrels put the dissolved solubles on the greens. Many were the disasters when sulfate ammonia and hydrated lime were applied too close together. That lesson was learned the hard way.

Earthworms spoiled putts so corrosive sublimate was applied to control them. Mowrah meal also brought them up where they were removed with brooms and scoop shovels. Grubs were tolerated because we had no control until arsenate of lead was found about 1930 to be effective.

In 1927, my first year at the University of Nebraska I took care of the first turf plots in Nebraska. My wages were 25 cents an hour, money furnished by a small grant from the USGA Green Section. I would go to classes on alternate days. The other days I was greenkeeper on an 18 hole golf course with Washington bent greens and bluegrass fairways. No. 4 hole was seeded with sheep fescue (by mistake). That rough mixture has persisted all these years but now, with irrigation, it is nearly gone. We had a cast-iron water cannon fed with a two inch hose. I watered fairways at night bare footed. let me tell you, a 2-inch hose full of water is HEAVY! One green planted to Virginia bent by stolons. It was the grainiest grass I've ever seen. Thank goodness it is long gone.

My next assignment was in Chicago at the Mid West Turf Gardens on the A.D. Lasker Estate. One of the old Demonstration Gardens was located there. After a month I was called to Washington D.C. to join the Green Section staff headed by Dr. John Monteith. The Arlington Turf Gardens were on the South bank of Potomac, where the Pentagon now stands. When it was built the plots were moved to Beltsville where I inherited them in 1945 when I was named Director of the USGA Green Section.

By now the states of Michigan, New Jersey and Penn State had turfgrass research and education programs established. The pioneers were, respectively: Dr. James Tyson, Dr. Howard Spraque and Prof. H.B. Musser There was little active coopertion among the Big Four but a lot of active controversy which, at times, became spirited. Prof. L. S. Dickinson was one of the pioneers in education at the Stockbridge School.

In 1931 at the Arlington Turf Gardens, there was a start of gathering turfgrass selections. We had U-1, U-2 and U-3 bermuda grasses, Zoysia was there but it was considered a botanical curiosity. Several bluegrasses, including B-27 had been collected. Also there were C-strains of creeping bentgrasses starting with C-1 which later I named Arlington.

Experiments were conducted at the old Bannockburn golf course (now all houses) where we learned that early morning watering resulted in less disease than evening watering. There we had a "PIE GREEN" where the better bentgrasses were compared under one management. Greenkeepers always rated dark green grasses higher than yellowish-green grass such as C-7, later named Cohansey (Pint Valley). But, C-7 was aggressive, heat and disease reistant so that it invaded the weaker bents.

In 1937 the Depression caused the USGA to lose nearly all its members. Lack of income caused all Green Section employees to lose their jobs. I had finished my Master's degree at the University of Maryland on "Weed Control in Turf" in which I tagged sodium arsenite as the No. 1 turf weed killer. There was a lot of brown turf where it was used but it did the job and discouraged soil insects as well. With

CONTINUED NEXT PAGE

no job and no money two Maryland professors encouraged me to go on for my Ph.D. degree. That came in 1935 at which time green keepers Valentine, Farnham and Steiniger pulled strings to get me to Penn State as the first extension turf agronomist in the U.S. Prof. Musser in research and teaching and with Grau covering the state, I brought problems to Burt for his research program. Ours was the first "team" in turfgrass and it really worked.

On one of my trips I stopped my Model A Ford to take a picture of a yoke of oxen coming in from plowing a field. I still have th ox yoke that Farmer Brown gave to me.

Further on I played on creeping red fescue greens that received a winter coating of strawy horse manure and rarely were watered. They were good greeens, mowed maybe weekly.

Wheelbarrow seeders were used to put common Kentucky bluegrass seed in Spring on hard fairways with no soil preparation. Rarely did a seed grow.

In philadelphia we killed crabgrass with sodium cholorate which softened goosegrass and made it stand up to get cut off by mowers.

Musser and I encouraged several farmers to grow "Penn State Chewings Fescue" in cultivated rows. That didn't last long but seed that I grew planted all the fairways at the National Links on Long Island where Aleck Girard was pro greenkeeper. He gave me the original version of the first turf plugger (I still have it).

Much turf was neglected during the War. I recall visiting New England courses with Dr. Jesse DeFrance in an effort to get golf courses operating again. Thatch was terrible.

Many of us attended the 1937 Fourth International Grasslands Congress in Europe, England, Wales, Scotland and Scandinavia.

In August 1945 I was named Director of the USGA Green Section, Collaborating with the USDA at Beltsville, Maryland. During the next 8 years many things happened. I can highlight only some of them.

2, 4-D had just been discovered for killing broadleaf weeds in turf without

CONTINUED NEXT COLUMN

harm to the grass.

Dr. K. G. Clarke learned how to make a slow-release, non-burning, long-lasting fertilizer by combining urea and formaldahyde. Nitroform came out of that discovery and still is on the market.

I began to encourage graduate students and developed Green Section Service Subscriptions from all turfgrass interests in order to have money to offer fellowship grants. Among those who were helped are: Jim Watson, Marvin Fergusom, Ralph Engel, Bill Daniel, jack Harper, and Joe Duich. It was a good move.

Dr. Glenn Burton at Tifton, Georgia received modest grants from the Green Section to start his program of hybridizing bermuda grasses. His work has revolutionized the South.

The American Society of Agronomy recognized the turfgrass industry by establishing a Turf Committee. For 8 years they kept me on as a chairman. It has become an integral part of the Society.

Merion Kentucky bluegrass was studied, named and released in 1950, the first bluegrass that came true from seed (apomictic) and the first improved turfgrass to be planted by seed.

Meyer (Z-52) zoysia was studied, named and released as a warm-season lawngrass. The combination with Merion made a very tough sod that was shown at the 6th International Grasslands Congress at Pen State. In the August 1953 issue of the National Geographic it was featured in full color.

Zoysia seed was produced at Beltsville. One selection yielded at the calculated rate of 1800 pounds of seed per acre.

National Coordinated Turf Trials were set up and operated with good results.

The Aerifier was begun as a crude drawing on my desk with the mascaro brothers and Charles Hallowell working together. The Aerifier was demonstrated at one of the National Turfgrass Field days at Beltsville. Soon after that the Verticut came into being.

In 1946-47 "Timely Turf Topics" carried condensed reports of every paper that was presented at every turfgrass conference in the U.S.

Grass, the "1948 USDA Yearbook"

CONTINUED NEXT PAGE

was a best seller. Chapters were written by leading turf workers.

In 1953 I grew grass to sell, then became traveling consultant for West Point Products. Once again I visited my friends on golf courses and sold Aerifiers and Verticut through demonstrations and education.

Nitroform Agricultural Products beckoned to me and I went to work for Jim O'Donnell. I gave the names Blue chip and Powder Blue to those products which have stood the test of time. When hercules bought Nitroform I spent a year in the hospital in a full body cast with a fused backbone. Even flat on my back I wrote my monthly "Grau's Q & A" for Golfdom. In 1961 I traveled for Hercules, drinking "Powder Blue cocktails" and teaching turfgrass managers how to use this safe material.

I forgot to mention that in June 1935 I discovered a field of crownvetch near Virginville, Pennsylvania. As Mrs. Grau and I worked with it the name PENNGIFT was given to it. Just recently the Pennsylvania legislature named this the official State "Beautification and Conservation Plant".

In 1954 polycross bentgrass seed was named "Penncross". The parents were given stress tests at Beltsville. Since then Penneagle has been developed at Penn State. Almost all vegetative bents have been replaced by those two seeded bents. Later Emerald and Prominent have been released.

When Prof. Musser died in 1968 a group of his friends established the H.B. Musser Turfgrass Fellowship, Inc. Yes, I'm still president. We've supported Fellowships in part in Ohio, New York, Pennsylvania and Texas. It encourages higher levels of learning and research in turfgrass science.

All this time great advances were being made in the control of weeds, insects and diseases. Everyone is familiar with these accomplishments. Equipment changed, became more sophisticated and complex in the name of labor saving. New forms of fertilizer were developed such as IBDU (Japan) and SCU. Following Merion in 1950 there was an "explosion" of new cultivars of bluegrasses, ryegrasses, fescues and fall fescues. Irrigation systems grew more sophisticated with push-button controls and Poa annua thrived. Sand began to emerge as the principal material for building greens and for topdressing them. The Green Section became a consulting (for fees) outfit, leaving research to the institutions.

In pondering the host of improvements one has to wonder - "What Next?" I'd like to offer a few opinions based on 55 years in the profession in almost every phase of research, extension, teaching and selling.

Sophistication will yield to naturalness. Already some courses are on the way, using less fertilizer, less water, mowing less often and having less Poa annua.

Sturdier grasses are on the way that will provide good playing turf with less care at great savings.

One day we will learn how to grow good turf without a multitude of chemicals which seem to poison the soil. There are indications that soil bacteria can colonize plant roots and keep them healthy with no chemicals.

Over a broad band between cool and warm season grasses we will have combination turf that will hold green color for almost the whole year. Weeds will be minimized by sturdy turf. Some of the zoysias will be grown from seed.

Turfgrass organizations will grow stronger because of the need for exchange of information and evaluation of new developments. We have witnessed a remarkable development in the last 50 years but there is more, much more to come. Turfgrass Science and Turfgrass Management are honorable professions that will challenge the intellects and the initiative of coming generations.

It seems unlikely that there will be tax money for turfgrass research. The future lies in cooperation among all turfgrass interests. Funds will be generated by the combined efforts of all groups. Special groups such as The Musser Foundation, dedicated solely to promoting research and education through advanced degrees (Fellowships), deserve funding from those organizations oriented toward fund raising. By working together, with mutual trust and reciprocity, the world of turf will develop with greater assurance and integrity.

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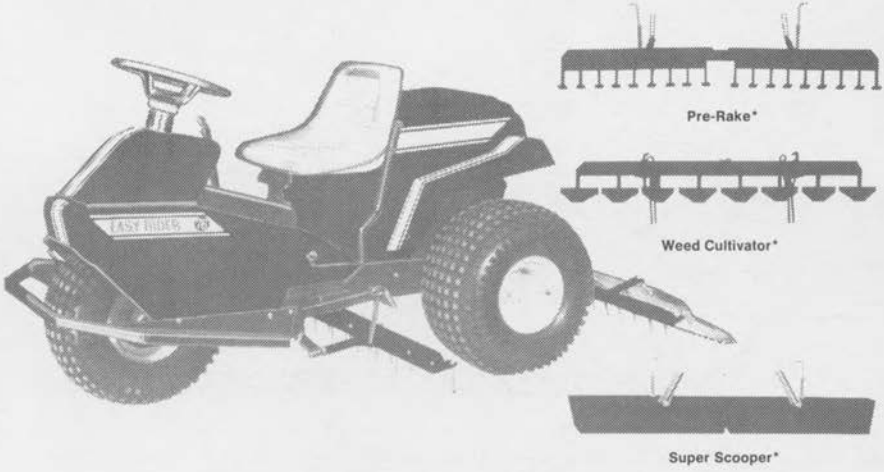

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*Patent Pending

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