# Fall 1971

# TURF BULLETIN

MASSACHUSETTS TURF AND LAWN GRASS COUNCIL
INCORPORATED

*Featured in this Issue*

*Maintenance Operations at the Greater Hartford open*

*"MAINTAIN" as a Growth Retardant*

*Another Look at Mercury*

**FALL 1971**

BETTER TURF THROUGH RESEARCH AND EDUCATION

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**Vol. 8, No. 1** **Fall 1971**



The Massachusetts Turf and Lawn Grass Council Incorporated is chartered under the laws of the Commonwealth of Massachusetts as a non-profit corporation. The turf council seeks to foster "Better turf through research and education."

More detailed information on the subjects discussed here can be found in bulletins and circulars or may be had through correspondence with the editor.



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# Maintenance Preparations for the Greater Hartford Open at Wethersfield Country Club

The G.H.O. has been held at Wethersfield C. C. since its inception, twenty years ago. The one thing that hasn't changed is the condition of the course demanded by the pros. Superintendent Fred Bachand has the year-round job of keeping the golf course in tip-top shape. Lee Trevino, after a few practice rounds, stated that the greens were the best he had played on all year. That statement in itself attests to the job Fred and his crew are doing.

The local Jaycee Chapter sponsors the Tournament and does much of the setting up. They line the fairways with stakes and ropes, although supervision is needed so they don't interfere with the water lines.

Superintendent Fred Bachand begins lowering the height of cut on the greens two weeks before the Tournament so by opening day they are down to 7/32 of an inch. Fairways and tees are cut at 5/8ths. Mowing of these areas starts a day before the Pro-Am and continues for six straight days which results in a very finely groomed course. Of course raking traps and cutting cups is done for six straight days also.

Additional Out of Bounds markers are added to speed up rulings on O. B. shots during the Tournament. All drop areas are marked off by a member of the maintenance crew supervised by a P.G.A. official.

**PRE-TOURNAMENT PREPARATIONS**

The week prior to the Tournament the maintenance crew is experiencing its busiest days of the year. All the traps must be edged, and fungicides applied. Extra part-time men may be employed so all the operations are completed.

No one person is busier than the superintendent. Fred Bachand, in addition to his regular duties, works with the T.V. station covering the event, the Jaycees, the P.G.A., the phone company, and the crew setting up the tents. He helps coordinate these groups so everything gets done and the course operations are not interfered with.

In preparing the course, Fred tries to get everything in shape so the course looks fresh. Rotary work is one operation that adds to the groomed appearance of the grounds. The final touch is an application of fertilizer ten days before the Pro-Am. This helps achieve good color and even growth throughout the Tournament. The roughs are the only area not fertilized, however, they are not cut so as to increase their purpose as a hazard.

**MAINTENANCE DURING THE TOURNAMENT**

After the Pros arrive, the only operations that can be performed are mowing, raking traps, changing cups and tee markers, and watering.

For the six days the Pros play the course, these operations have to be completed between 6 p.m. and 7 a.m. Because of this the crew reports to work at 5:30 a.m. or 6:00 a.m., depending upon the first starting times. Watering is done at night thanks to the all-automatic system. Greens are mowed in the early morning. Single units are used instead of the triple greensmower for aesthetic value and because of the time involved. Some of the fairways are done in the morning while others are mowed at dusk. The tees are all mowed after each day's play.

*Mechanic Clint French mowing fairways just after the third round.*

The greens, which received praise from many Pros, are kept as firm as possible. They must receive enough water at night to get them through the day without syringing. They also must be able to hold a shot. They are rolled after the first and second rounds to remove the spike marks made during the day.

**POST-TOURNAMENT RECOVERY**

Suprisingly, the condition of the course improves as the tournament progresses. There are a few reasons for this; first of all, most divots are replaced by the players or the caddies, secondly, no golf carts are used, thirdly, all ball marks are fixed by the conscientious pros, and finally, only 70 or 80 players compete on the final two days of the event.

The course does experience wear and tear in certain areas. The practice tee and green require special care to help them on the road to recovery. Usually aerification, verticuting and overseeding

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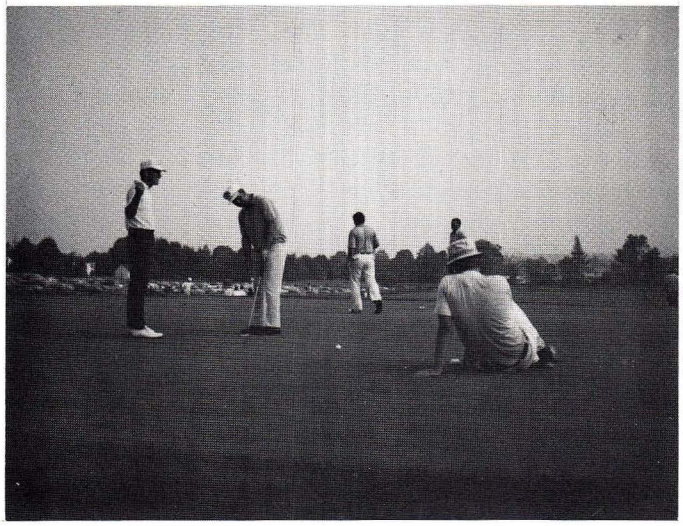
will bring back the practice tee. The practice green is aerated and topdressed.

The galleries create much debris and trampling in the rough areas where they are contained. A special contract is made in order to pick up the debris after each day.



*A few of the pros on the practice green after the round.*

*Evidence of wear and tear by the gallery along the 18th fairway.*

The G.H.O. went without a hitch this year. The superintendent and crew deserve recognition for keeping the golf course in excellent shape.

The year round members of the crew, Armand LeSage, assistant, Clint French, mechanic, Paul LaRosa and Dick Sawyer, along with the seasonal help are an integral part in the success of the maintenance operations.

Fred himself is one of the more conscientious persons in the business. Anyone who knows Fred understands why the course is in the condition it is. Superintendents like Fred Bachand are great assets to their profession.

—Reprinted with permission from the Dept. of Public Works and the Federal Highway Commission.

# "MAINTAIN"* AS A GROWTH RETARDANT

John M. Zak and Peter A. Kaskeski

Chemical growth retardants have been used along Massachusetts highways for the suppression of grass growth to eliminate mowing (2). Because of the cost factor and the uneven suppression of highway turfgrasses, growth retardants have not been used as extensively as they should be. Erratic results of suppression are sometimes obtained because of climatic conditions, time of application, activity of grass, and low amount of chemical used (1, 3, 4, 6). Heavy applications of maleic hydrazide and 2, 4-D are very effective and economical in eliminating mowing in difficult areas (4). Growth regulators such as maleic hydrazide and chloroflurenol are replacing mowing in some instances in the Pacific Northwest (5).

This study was undertaken to determine the effectiveness of "Maintain" as a growth suppressant of grass under Massachusetts conditions.

**Materials and Methods**

The growth retardant "Maintain" consists of Maintain Cf-125 (contains 1 lb. chloroflurenol per gallon) plus Maintain 3 (contains 3 lbs. active maleic hydrazide per gallon).

One gallon of each chemical was mixed with water in a 50 gallon drum. The grass was sprayed with a tractor drawn sprayer at 30 Psi at the rate of 50 gallons of liquid per acre. One and 1/3 acres were sprayed along a median strip on Route 116 in Amherst on May 23, 1969. The turf consists of creeping red fescue, Kentucky 31-tall fescue, redtop, bluegrass, and some timothy. One half of the area was mowed to a height of 5" three days prior to the application of the growth retardant; the other half was left unmowed. Samples of four one square foot quadrates were taken at random on all treatments to determine height of grasses and yields per acre in order to evaluate the effects of the growth retardant.

**Results**

Table 1 shows the average height of clipped grass and yields per acre for each treatment. "Maintain" was more effective in reducing the height of the grasses on the mowed than on the unmowed areas. This is shown by a decrease in height of 50% and 22% respectively. Yield reduction was 33% on the mowed areas and 23% on the unmowed areas.

Table 1 . Average height of grass, percent reduction in height, yields per acre, and reduction in yields.

| Treatment | Clipped height of grass | Reduction in height | Dry matter yield per acre | Reduction in yield |
|---|---|---|---|---|
| **Mowed area:** | | | | |
| Treated | 6" | 50% | 577 lbs. | 33% |
| Untreated | 12" | | 865 " | |
| **Unmowed area:** | | | | |
| Treated | 25" | 22% | 1695 " | 23% |
| Untreated | 32" | | 2154 " | |

Grasses on all areas treated with "Maintain" were reduced in height. The most significant effect was on redtop which showed no seed heads. Seed heads of Kentucky 31-tall fescue and creeping red fescue were reduced in size and number. Timothy showed almost no reduction in seed heads which may have been due to a late maturing strain of the grass.

Observations in July showed less weeds on grass areas treated with "Maintain" than on areas that were not treated. All broadleaf weeds listed below in Table 2 were retarded (stunted and malformed) and some were completely killed.

Table 2. Effects of "Maintain" on various weeds

| Complete kill | Retarded |
|---|---|
| Dandelion | Giant foxtail |
| Red clover | Hawkweed |
| | Pepperweed |
| | Plantain |
| | Red sorrel |
| | White clover |
| | White daisy* |
| | Yarrow |

*Produced no flowers

**Summary**

The use of the chemical "Maintain" as a growth suppressant on a mowed median strip was effective in reducing the growth of grass. The appearance of this grass in July was uniform and did not require mowing. All areas treated with "Maintain" showed good broadleaf weed control. Further observations will be made this fall.

*Product of U.S. Borax

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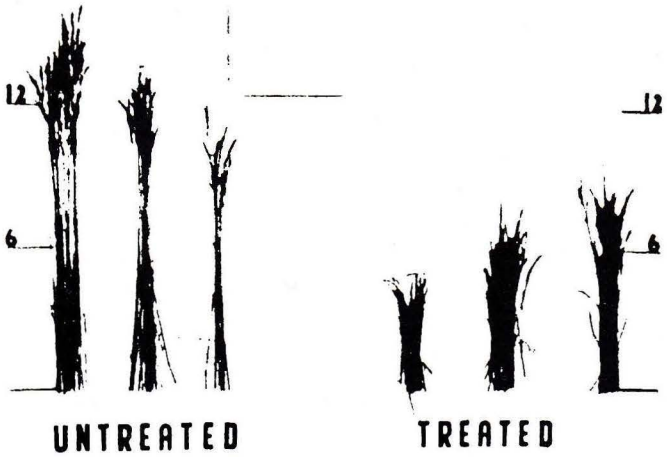


*Figure 1. Reduction in height of grasses as affected by "Maintain". Chemical applied May 23, 1969. Picture taken July 14, 1969.*

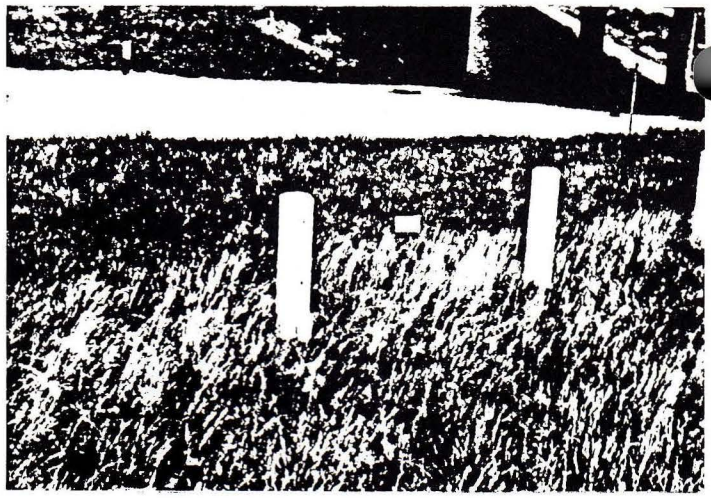

*Figure 2. Mowed area, in background treated with "Maintain", foreground untreated. Picture taken July 14, 1969.*

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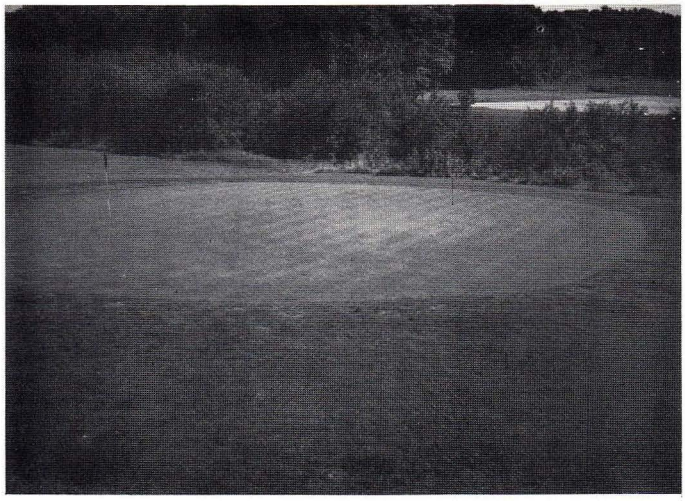
April



August

**BEFORE AND AFTER PICTURES** — The Superintendent's proof of his work. They can really impress people with short memories.

The above pictures are of an experimental green at UMASS that was renovated this year from the destruction of past experiments.

— Reprinted from — Lawn/Garden/Outdoor Living, Vol. 10, No. 6, June, 1971


# CHICAGO ORDINANCE CURBS POWER EQUIPMENT NOISE

An anti-noise ordinance that will have far-reaching implications for those engaged in the manufacture, sale and rental of powered lawn and garden equipment, recreational vehicles, chain saws and other equipment, will go into effect in the city of Chicago on July 1, 1971. With this ordinance, Chicago has become the first city to establish such an extensive anti-noise pollution law. It would be logical to assume that other cities will follow with similar ordinances to an extent that production of powered equipment for the whole U.S. will be affected.

The basis for the Chicago anti-noise ordinance was a study made for the city by Bolt, Beranek and Newman, Inc., acoustical consultants with a regional office in suburban Downers Grove, Ill. The ordinance specifies maximum noise levels for equipment which will be decreased at intervals to allow manufacturers time for redesign of their products to meet the eventual degree of quietness required. A number of existing models of lawnmowers, etc., may meet the initial requirements set forth in the ordinance, but will have to be modified or redesigned if they are to meet the final sound-level requirements.

For lawn and garden equipment dealers in Chicago, the ordinance specifies, "No person shall sell or lease, or offer for sale or lease, any powered hand tool that produces a maximum noise level exceeding the following noise limits at a distance of 50 feet, under test procedures established by Section 17-4.34." The noise limits are specified as follows:

"Powered commercial equipment of 20 hp or less intended for infrequent use in a residential area, such as chain saws, pavement breakers, log chippers, powered hand tools etc.

-Mfg. after 1 Jan. 1972 88 dB (A)
-Mfg. after 1 Jan. 1973 84 dB (A)
-Mfg. after 1 Jan. 1980 80 dB (A)

Powered equipment intended for repetitive use in residential areas. Such equipment includes lawn mowers, small lawn and garden tools, riding tractors, snow removal equipment.

-Mfg. after 1 Jan. 1972 74 dB (A)
-Mfg. after 1 Jan. 1975 70 dB (A)
-Mfg. after 1 Jan. 1978 65 dB (A)"

Dealers who sell recreational equipment to supplement their lawn and garden business will be concerned with a section of the ordinance that states, "No person shall sell or offer for sale a new motor-driven recreational or off-highway vehicle of the type not subject to registration, including dune buggies, snowmobiles, all-terrain vehicles, go-carts, and mini-bikes that produce a maximum noise exceeding the following noise limit at a distance of 50 feet from the centerline of travel under test procedures established by Section 17 4.36."

For snowmobiles, the noise limit is 86 dB (A) for those manufactured after January 1, 1971; 82 dB (A) for those manufactured after June 1, 1972; and 73 dB (A) for those manufactured after June 1, 1974. For all other recreational vehicles mentioned above, the noise limits imposed are the same as for snowmobiles, but the dates for compliance to successive steps in noise level reduction are January 1, 1973, and January 1, 1974.

The operators of recreational vehicles are limited to the amount of noise they can permit their vehicles to make by a section of the ordinance that states, "It shall be unlawful for any person to operate a motor-driven vehicle of a type not subject to registration for road use, at any time or under any condition of load, acceleration, or deceleration, in such a manner as to exceed the following noise limit at any point on a business or residential property line or beyond, that is at a distance of not less than 50 feet from the path of travel". The noise limit specified is 86 dB (A) before January 1, 1973, and 82 dB (A) after that date.

To check noise levels for violation of the city ordinance, a number of Chicago police patrol cars are being equipped with sound level recording equipment. As the ordinance in its entirety will apply to all noise producing equipment and motor vehicles, the experience of enforcing the ordinance should be "very interesting". It would be a mistake to consider the ordinance as a local issue not worthy of national attention; it should be closely followed, as what happens to noise control in Chicago could have effects in this industry across the nation.

**Measuring Sound**

When we read specifications of a lawnmower which state that the mower weighs 72 pounds, is powered by a 3½ horsepower engine and has a 21 inch width of cut, we feel fairly well informed about the mower's weight, engine power and

cutting width. However, the statement that the maximum noise level of the mower is 80 dB (A) as measured from a distance of 50 feet may mean very little as most of us are not as familiar with the units of sound measurement as we are with the units of measuring weight, linear distance and power.

With the growing concern about noise pollution, the measurement and comparison of sound levels become more important. Thus, the next few paragraphs are dedicated to a layman's understanding of measurement of sound as related to the normally expressed unit, the decibel "A" scale or dB A's.

Sound, or noise, results from vibrations at some source (i.e., a musical instrument, another person's vocal cords, or a tractor engine exhaust) creating variations in air pressure which are transmitted through the atmosphere to our ears. The normal human ear can detect vibrations, or variations in air pressure resulting from the vibrations that occur at frequencies between 25 and 15,000 cycles per second (cps).

The loudness of a sound detected by our ears is determined by a number of factors which include the intensity of the vibrations at the source, the distance between the source and our ears and the frequency at which the vibrations occur. Thus, though the intensity of the vibrations remains constant, a sound will be louder to our ears if the frequency of the vibrations increases or the distance between the source and our ears decreases.

The commonly used unit of measurement for the intensity of a sound is **the decibel (dB) scale.** On this scale, O dB is the threshold of hearing and represents an air pressure variation that can be detected by the most sensitive of human ears; a sound of 140 dB is of such intensity to cause pain.

The decibel scale does not take **frequency** of a sound into account. Thus, a broad frequency sound level meter will "hear" a sound of 90 dB just as loud at 500 cps as at 3000 cps. The sound level meters used for detecting noise that can cause hearing damage are usually those which are equipped with a filter so that only the sounds occurring at frequencies between 1000 and approximately 7000 cps are fully weighted. This filtering system which decreases the reading of sounds with frequencies lower than 1000 cps and above 7000 cps is denoted as **the decibel "A" scale,** abbreviated dB "A", dB (A), or more simply, dBA.

The dBA scale is logarithmic and an increase of approximately 10 dBA between sound level readings indicates a doubling to the ear response. **Therefore, to our ears, a sound of 90 dBA is twice as loud as one of 80 dBA and four times as loud as a sound of 70 dBA.**

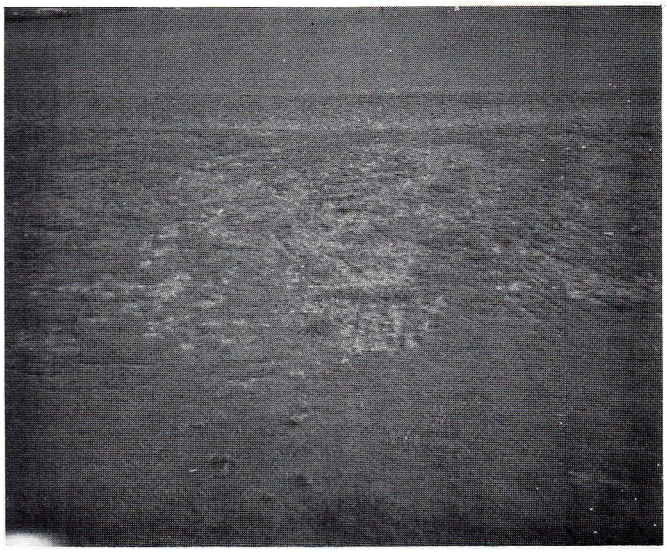
## *Turf Bulletin's Photo Quiz*

**CAN YOU IDENTIFY THIS PROBLEM?**

**Date: September**

**Description: Area devoid of turf in irregular pattern.**

**Answer on Page 19.**



**EDITORS NOTE:**

**The following article presents the view that mercury is seriously threatening our lives. It is being published because it has some merit, but mostly to show what information the Senate committees are receiving about mercury. Comments on this article and the mercury problem will be appreciated.**

**STATEMENT OF THE**
**HONORABLE CARL L. KLEIN**
**ASSISTANT SECRETARY OF THE INTERIOR**
**FOR**
**WATER QUALITY AND RESEARCH**
**BEFORE THE SUBCOMMITTEE ON ENERGY, NATURAL RESOURCES AND ENVIRONMENT**
**SENATE COMMITTEE ON COMMERCE**
**JULY 30, 1970**

# THE MERCURY PROBLEM

Mr. Chairman, I greatly appreciate the opportunity to appear before the distinguished Members of this Committee today to discuss the effects of mercury on man and his environment.

Mercury is Number 80 in the Table of Elements, but it has ranked much higher recently in public attention because of some dramatic revelations regarding its appearance in several of our Nation's waterways. In order to be able to deal effectively with this problem, we must understand some facts about mercury and its uses.

Mercury is a heavy, silver-white metallic chemical element; liquid at ordinary temperatures, which sometimes occurs in a free state, but usually in combination with sulfur.

Being an element, the amount of mercury present on the Earth and in the Earth is always constant. The only changes are the geographic locations and the forms in which mercury appears.

The domestic production amounts to only 28,874 flasks, while world production was 255,474 flasks. United States production is thus only about 1/9th of total world production — but the United States uses about 35 percent of the world output, importing enough additional to balance the deficit in U.S. production.

Mercury's effects on man have been evident for sometime, though its precise damage has been somewhat obscure. In past centuries, liquid mercury was used in the manufacture of felt hats, and hatmakers who came into frequent contact with the material often developed mental instability such as timidity, especially in the presence of strangers.

The tendency for liquid mercury to vaporize at room temperature meant that mercury vapor often was inhaled by hatmakers. The fumes caused their gums to become inflamed, and a metallic taste to develop in their mouths. Hatters also often suffered from diarrhea, tremors and general mental derangement. This behavior is believed to have inspired the phrase, "mad as a hatter."

The uses for mercury today are much more diverse than hatmaking. Manufacturers of electrical apparatus use it, especially in battery cells, and it is also used in the production of chlorine and caustic soda and in mildew-proofing compounds. Substantial quantities of mercury are used in dental preparations, in general laboratory work, and in pharmaceuticals.

Agriculture uses compounds of mercury in insecticides and fungicides, while pulp and paper plants use it to control slime. Mercury is also used in the production of protective paints and as catalysts in the manufacture of organic compounds and pigments.

One of the greatest causes for concern about mercury is its relatively high toxicity. It is this toxicity, particularly in its methyl compounds, which makes mercury so dangerous when it is discharged into surface or ground waters.

Official recognition of the harmful effects of mercury dates back at least to 1922 when the Chief Surgeon of the U.S. Bureau of Mines said in a report that, "There is probably no industry, trade or art in which mercury is used but what has produced some cases of mercury poisoning."

"There is a wide individual variation in susceptibility to poisoning," the report adds, "which may be due to the fact that the tissues of some persons are able to store mercury in an innocuous form better than the tissues of other individuals." At any rate, the report cites the cause of industrial mercury poisoning as "the absorption and retention of small quantities of the metal or one of its many compounds over an extended period of time."

"Mercury may enter the body through the skin, the gastrointestinal tract or the respiratory

tract. When applied to the skin it is more readily absorbed if the person is perspiring or if the mercury is impure and dirty. . . While comparatively large quantities of metallic mercury can be taken at one time by mouth and yet not cause death, small quantities often repeated will lead to chronic poisoning due to absorption and accumulation in the body tissue."

Early symptoms of mercury poisoning were described in the 1922 report as "foul breath, salivation, and metallic taste in the mouth; this may be followed by receding of the gums, which become sore and swollen, together with loosening of the teeth and even ulceration of the cheeks and gums. The skin generally becomes yellowish white, similar to that found in some forms of malaria . . . "

Later symptoms include "bleeding from the intestines, feelings of nausea, colicky pains and sometimes retching." Some of this terminology may sound rather quaint after almost 50 years, but the results of mercury poisoning are just as serious today as ever.

An information circular published by the Bureau of Mines in November 1941, said that "With the increased demand for mercury incident to preparations for national defense . . . many small mines in the United States are now being worked that ordinarily would be unprofitable . . .As operating methods at most of these small mines are more or less crude the workers may be exposed to a serious health hazard from poisoning by mercury, especially in mines where there is an admixture of native quicksilver."

In April 1942, the Bureau said that the presence of quicksilver in mines producing mercury "has long been a source of trouble and danger to the workers. Men have been sickened and some of them have been disabled by exposure to the vapors present (even in workings that were well-ventilated by ordinary standards) and to contact with dust, dirt and moisture with which the finely divided quicksilver was mixed. Where the ore was rich and this exposure was considerable," the report said, "men were able to work only a few days or weeks; where the exposure was less they were weakened and subject to ailments often attributed to other causes."

The most serious incidence of mass mercury poisoning occurred in Minamata, Japan, between 1953 and 1960. Some 111 persons died as a result of eating fish which had been contaminated by mercury discharged into Minamata Bay by a plastics manufacturing plant. Among the 111 were 19 congenitally defective babies born to mothers who had eaten the contaminated fish and shellfish.

In 1965, another poisoning accident was reported in Niigata, Japan, and the same year mercury poisoning was found to have decimated many bird populations in Sweden. Subsequently, it was found that freshwater fish in the Scandinavian country contained large amounts of mercury. In these instances, methyl mercury was found to be the form of mercury most commonly involved.

Mr. Chairman, we started with metallic mercury and now we have been talking about mercury poisonings. How did we get from an inert metal to nationwide contamination?

Even the ancient Greeks and Romans knew of the toxic fumes from metallic mercury -- but that is a far cry from the sophisticated tests now necessary to discover the presence of mercuric derivatives in water in the billionths of a part.

A.) One of the steps away from metallic mercury is the result of the chlor-Alkali process, using a mercury cell. Some mercury is lost in the manufacturing process. Only strict housekeeping and reprocessing can keep the losses to a minimum. And the usage of mercury for this process doubled in the period from 1965 to 1969.

Mercury is also used as a catalyst in the manufacture of certain plastics. It becomes a spent catalyst and is discharged as waste.

Mercury has been, and continues to be used to remove process-slowing slime from the machines in certain papermaking processes and is then discharged in the waste water.

B.) A second step came when we learned that mercury sometimes appears as a phenyl.

It appeared as an ingredient in the fungicides applied as seed dressing to protect seeds -- the seeds with the ingredient mercury were eaten by hogs and birds and so introduced into the food chain. This brought about the hog incident in New Mexico this past winter when three children were reported to have gone blind and into comas after eating meat from a hog that had been butchered by their father. The hog was found to have eaten grain containing mercury-based fungicides.

As a phenyl, mercury is an ingredient in certain herbicides used as dressing on lawns and on golf courses. Excessive or continued use can lead to excessive amounts of mercury in runoff during heavy rains.

Mercury also appears as a methyl mercury compound and it is here, Mr. Chairman, that research has only recently shown what does happen.

There are certain bacteria in the muds of our lakes and rivers that operate on the metallic mercury heretofore thought to be inert. These bacteria change that metallic mercury into methyl mercury -- a mercuric compound that is water soluble and can be ingested into the food

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cycle via plants, algae, lower forms of animal life and then to fish -- or it can go directly from the water where it is present in the bodies of fish, through the gills or onto the slime of the fish bodies. An experiment in Sweden not only showed that this direct transfer was possible but also, and more importantly, that the concentration factor in the fish whether from direct or indirect ingestion could be 3,000 to 1 or more. In other words, the danger point is that fish so concentrate this methyl mercury within their bodies that a previously harmless situation in water becomes extremely hazardous in fish. The extreme concentrations in fish are first in the kidneys and liver, and second, in the edible portions. This does not mean that only methyl mercury causes this hazard in fish. Far from it — for experiments have shown that fish can biologically transform other forms of mercury into methyl mercury inside their bodies or in the mucus covering of their bodies. And from these contaminated fish, mercury moves along the food cycle into birds, and into humans. And as it moves, it concentrates further with each move.

The human factors are the most important. I have dwelt at length on the basic factors only because of the latent human factors which are now becoming well known.

First: Mercury is cumulative in humans. The exact factors of accumulation and/or excretion are not known yet.

Second: The places of concentration are the brain, the kidney, the liver and the fetus of pregnant women. Strangely enough, mercury also concentrates in the human hairs — at a ratio of 333 to 1 compared to blood. Tests for mercury in the newer hair on the nape of the neck can determine the time of last exposure to this heavy metal.

Third: Mercury kills the cells of the brain — by absolute destruction.

Fourth: Exposure to mercury causes tremors, loose teeth, ulcers of the mouth, a peculiar timidity and possible genetic birth defects due to chromosome breakage.

Fifth: Methyl mercury is the most dangerous form of mercury. It tends to associate with red blood cells and nerve tissue. It easily passes the placental barrier, becoming moderately concentrated in the fetus. It causes neurological damage, produces chromosomal aberrations and has teratogenic effects (malformations from genetic defects).

Sixth: While the alarms have been sounding as to extreme toxicity of mercury, tests have been made as to the ability to eat fish with a mercury content. Research thus far tells us that it is safe to eat approximately one-half (½) pound of fish per day if that fish does not contain more than one-half (½) part per million.

Seventh: The fantastic part of this entire story is that mercury can be biologically methylated into a much more toxic form; and that this conversion can take place in the muds or in the fish itself.

Eighth: The final result of accumulated mercuric poisoning is death.

Ninth: The proposed mercury standard for drinking water in the United States is .005 parts per million, or five parts per billion. It has been estimated that brain damage can result from 20 parts per million, and that this can start a process leading to paralysis and finally, death.

The symptoms in man of poisoning from alxyl mercury compounds as described in the "Report of an International Committee" (1969) on maximum allowable concentrations of mercury compounds are as follows:

> "Symptoms of methyl and ethyl mercury poisoning may occur weeks to months after an acute exposure to toxic concentrations. The symptomatology of acute and chronic poisoning from both compounds is similar, including numbness and tingling of the lips, of hands and feet, ataxia, disturbances of speech, concentric construction of the visual field, impairment of hearing, and emotional disturbances. With severe intoxication the symptoms are irreversible. The first epidemic of intoxication by ingestion of contaminated fish occurred in the Minamata district in Japan and, therefore, this type of intoxication is often called Minamata disease.
>
> In infants born to mothers with exposure to large amounts of methyl mercury, the symptoms are somewhat different, as would be expected. Most children had mental retardation and also cerebral palsy with convulsions."

One characteristic of methyl mercury is its tendency to accumulate in the human brain. According to the International Committee's Report, "Experiments in man with very small doses have shown that about 15 percent of the total body burden of methyl mercury is accumulated in the brain."

Lofroth, the Swedish worker, has noted that, "One of the observable effects of methyl mercury poisoning in man is the impairment of the coordination of muscle movement, etc., resulting from damage to certain brain cells." He further states, "As to the gross clinical symptoms one can state that a threshold mechanism is, however, not due to a methyl mercury threshold, but to a threshold in the number of damaged brain cells. After damage of one or a few cells, other cells may take over the net result showing up as no effect in the

clinical investigation. When too many cells have been damaged during a short time, the clinical results do show up early." He also states, "However, even a low frequency of brain cell damage, above the natural inactivation rate of these cells during a long time has an effect on the organism as the number of available cells for each brain function is limited. Such a damage may then have serious effects in later stages of life."

Recent surveys conducted by the Department of the Interior show that mercury contamination of the aquatic habitat is of national scope. There are contaminated rivers in Maine and Georgia, in New York and Louisiana, in Tennessee, in Kentucky, in Washington, in Delaware, in Alabama, in Texas, in North Carolina, and in West Virginia. We all know of the present contamination of 350 miles of the Wisconsin River, even though the sources of that contamination closed down in 1958, — twelve years ago.

Also because this is an intensive far-reaching, ever-continuing investigation, I shall not designate by name at this time the specific rivers, companies and States now being tested.

On July 14, Secretary Hickel said, "To insure immediate action, I have today designated a special investigating team of water quality and minerals experts from the Federal Water Quality Administration, and the U.S. Geological Survey, to pinpoint areas of mercury contamination and to provide the basic data needed of effective control." The Secretary further stated, "The Administration is developing hard evidence and will seek court action in any confirmed case of mercury pollution if corrective measures are not taken swiftly on local levels."

It is the belief of this Administration that the discharge of mercury as an artificial pollutant into our waters presents an intolerable threat to the health and safety of Americans. The discharge of this artificial pollutant cannot be tolerated. Therefore, such discharges must be eliminated.

Based on new techniques of discovery and detection so fine as to distinguish in the billionth parts -- new techniques that have only recently become available as the state of the art has improved -- the Interior Department was able to pinpoint discharges by making tests of effluent flows as well as upstream and downstream concentrations.

By these precise analytic techniques and through knowledge of the volume of discharge and stream flow, Walter J. Hickel, Secretary of the Interior, was able to refer the following cases to the Department of Justice on July 22, 1970, for immediate abatement by injunction:

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Allied Chemical Co. Solvay, New York
Diamond Shamrock Corp. Delaware City, Delaware
Diamond Shamrock Corp. Muscle Shoals, Alabama
International Mining and Chemical Co. Orrington, Maine
Olin Mathieson Chemical Corp. Augusta, Georgia
Olin Mathieson Chemical Corp. Niagara Falls, New York
Oxford Paper Co. Rumford, Maine
Pennwalt Chemical Co. Calvert City, Kentucky
Weyerhaeuser Co. Longview, Washington

While these cases are being forwarded for court action, other locations are being tested. The results will be made public as soon as they are verified.

Mr. Chairman, it is noteworthy that many states and many companies have already reduced the discharge or caused the reduction of the discharge of mercury. The first public cases brought immediate action from the Governors of Ohio and Michigan for abatement and elimination. These steps are being followed by their fellow governors in many instances.

In April, 1970, after a tour of the Baton Rouge area, I was moved publicly to commend Dow Chemical for immediate reduction of their discharge into the Mississippi. Their action is being followed by other industries throughout the United States.



The Water Quality Standards for all interstate waters provide as to toxicity: none in concentrations or combinations which would be harmful to human, animal or acquatic life. Naturally, mercury as well as other toxic substances would be included in the criteria.

These standards are based on artificially introduced pollutants. We are aware that there can be natural increments of mercury into waters from natural sources. The problem here as in all other pollutant factors is the addition of another man-made or artificial pollutant into our waters.

The crisis has been and remains a serious one. Nevertheless, this Administration has moved rapidly and forcefully to bring this threat under control. The Administration's leadership is being followed by states and industries. The Interior Department and Secretary Hickel will continue to focus on the problem until the danger point is passed, until the mercury threat has been removed from our lives and our waters.

Mr. Chairman, President Nixon has moved through the Interior and Justice Departments to protect the quality of life in the United States. Immediate action was essential and that immediate action was taken.

Thank you, Mr. Chairman

## *For the Homeowner*

# FESCUES ARE SHADY CHARACTERS

**Dr. Robert W. Schery, Director, The Lawn Institute**

The fine Fescues that come from Oregon in such elite varieties as Chewings, Illahee, Highlight and Pennlawn, are the turf world's shadiest characters. That is, they are the best of the fine-textured lawn grasses for planting in the shade. Tests in Michigan and elsewhere have confirmed that such varieties last longest and recover best, even in 95% shade.

Autumn is an especially good time to get fescue seed blends planted. Deciduous trees will soon be losing their leaves, providing an extra measure of sunlight. This and the crisp growing weather should sponsor a fine stand of grass under the trees before winter.

Although such fescues are remarkably tolerant of shade, keep in mind that it is not only shade that makes grass life under the trees difficult. If weather has been dry, tree roots will have absorbed most of the water in the topsoil. Certainly the trees will have drawn down fertilizer reserves. So, even though your grass seed mixture has a lot of fescue in it, give it the best possible start by scratching lawn fertilizer into the soil before or when seeding, and watering regularly until the stand of grass is well established.

# 12 trees and shrubs for summer color

*Following these recommendations for zones 4 through 7, you can escape greenery in the hot months.*

■ Visitors to tropical and subtropical gardens expect to see flamboyant flowering trees in midsummer, and they are not disappointed. Gardens in hardiness Zones 7 through 4, however, normally remain green through the hot months. Once the spectacular spring splurge of flowering cherries, crabapples, dogwoods, and similar species finish, flowers are limited to flower beds and rose gardens in great part.

Midsummer-flowering trees and shrubs for the harsher climates are available, however, and there is little reason not to feature their blossoms in public parks, on school grounds and in industrial plantings from June through September. At least 10 genera offer species suitable for growing in much of the north temperate belt of the United States.

If you are not sure of these trees and shrubs in your immediate area, check first with local arboreta and botanic gardens, or with the horticulturist at your state university department of horticulture. Your best information, of course, will come from trial and error, so fortify yourself with a few facts —a little basic information never harmed anyone.

Check references in garden encyclopedias, in Rehder's *Manual of Cultivated Trees and Shrubs,* and in botanic garden and arboreta handbooks. Be assured that if your local nurseryman does not stock the tree you want, you will be told that it does not survive locally. Ship one in, and plant it following the best recommendations of the experts.

*Albizzia julibrissin,* Silk-tree—Legume Family—Zones 6-5—Generally with a wide-spreading, flat crown, carried over a somewhat sinuous trunk with thin, silvery-gray bark, this tree carries powder-puff-like heads of flowers through much of the summer. High-growing in the south, near its northern limits the silk-tree seldom exceeds 30-ft. The tree is late to leaf out in summer; foliage is medium green, pinnately compound, with leaflets ½ to ¾-in. long. Flower color ranges from white to shades of pink and dark rose. Albizzia is erroneously called "Mimosa". At least one of the darker colored ones, *A. julibrissin rosea,* is considerably hardier than the rest of the species, though it may grow as a large shrub at the northern limits of its range.

*Clethra barbinervis,* Japanese Clethra—White-alder Family—Zones 5-4B—Most hardy clethras are shrubs; this seldom-grown species reaches to 30-ft., with spreading branches of considerable character. Blooming in late July, the tree bears 4- to 6-in. long racemes of small, fragrant flowers. The cinnamon-colored bark is ornamental the year 'round. Leaves of Japanese Clethra, borne alternately, are obovate, with serrate edges and a drawn-out tip.

*Evodia daniellii,* Korean Evodia—Rue Family—Zone 5—A small tree, upright-growing with a spreading crown. In midsummer, small flowers in 6-in.-across clusters appear, followed by reddish capsules that split to show the lustrous black seeds. Evodias all produce pinnately compound leaves; those of *E. daniellii* bear 7 to 11 leaflets, each 2- to 4-in. long. *E. hupehensis,* from China, is a taller tree, growing to 60-ft. The flowers are similar to those of the Korean Evodia; the wood is somewhat weaker.

*Maackia amurensis,* Amur maackia—Legume Family —Zone 4—Not particularly outstanding as foliage, (odd-pinnate, mid-green), or bark, which is smooth and yellowish brown, this tree is of value for its hardiness and for its July blooming period, when small, white, pea-like flowers are carried in short upright racemes. The flowers somewhat resemble those of the closely related Cladrastis, but lack fragrance. Maackia is upright-growing, reaching to 45-ft. in ideal conditions. Five other species are known in East Asia.

*Franklinia alatamaha,* Franklinia—Tea Family—Zone 5—Discovered on the banks of the Alatamaha river, Georgia, in 1790, the tree has never since been found in the wilds. It is an exceptionally choice specimen for the open lawn. It favors deep, rich soil in a sheltered site. Bearing cup-sized, white camellia-like flowers from September until frost, the plant often is in full flower when the foliage becomes red-orange. This tree, under optimum conditions, makes an upright growth to 20-ft. In the north it is shrubby, and may even die to the ground each year, coming up to bloom on spring shoots.

*Koelreuteria paniculata,* Golden-rain Tree—Soapberry Family—Zone 5—Growing to 40-ft., the golden-rain tree takes on great character with age, as its branches develop their characteristic gnarled and contorted appearance. Large, lacy leaves appearing rather late in spring are pinnately to bipinnately compound. There is no fall color. Most individuals bloom in late June to early July, but a few individuals flower as late as September. One of these has been registered as *K. paniculata* 'September'. The small flowers, bright yellow with a touch of scarlet in the centers, are borne in large, loose upright clusters. These are followed by pale green, papery pods of great ornamental value. Pods turn brown in the fall, and shed small, dark seeds that germinate readily. A sharply upright-growing form of *K. paniculata, K. p.* 'fastigiata' is available, and a showy southern relative is *K. formosana,* the Chinese flame-tree.

*Cotinus coggyria,* Smoke-tree—Cashew Family—Zone 5—Often grown in shrubby form, this European makes up into a fine, 15- to 20-ft. high, multi-stemmed specimen tree for the lawn. With oval to obovate egg-shaped leaves, and strong, upright black trunk, the tree is handsome the year 'round. In July, filmy upright panicles of tiny flowers appear, followed through August and September by billows of plume-like seed heads that greatly resemble puffs of smoke. The purple-leaved sorts are especially ornamental, and probably best known is the English strain, 'Notcutt Variety'. In the trade, this frequently is listed as "Rhus cotinus" and the purple forms bear the elaborate misnomer "Rhus cotinus foliis purpusis." The American native species is *C. obovatus* (*C. americanus*). With less of a summer show, this narrowly upright sort (to 30-ft.) is spectacular in the fall when the foliage flames orange and red.

*Sapindus drummondii,* Wild China-tree, Soapberry-tree—Soapberry Family—Zone 5—A large tree, rather like a green ash in style, the native soapberry-tree bears alternately compound leaves with more or less 12 leaflets that range from 1½ to 2 inches long. Small, creamy-white flowers carried in 8- to 10-in. panicles appear in late June or early July. These are followed by ½-in. diameter globe-

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shaped fruits, first yellow, then turning black. This is the only hardy species of a tropical genus. Note that some individuals develop a poison-ivy-like rash after handling foliage, flowers or fruits of the soapberry-tree.

*Sophora davidii,* Vetch Sophora—Legume Family—Zone 5—Sometimes called the *Sophora vicifolia,* this species usually develops as a high shrub, but it may be pruned to a multi-stemmed specimen for lawn use. With refined, pinnately compound leaves, the late June flowers range from bluish-white to lavender. This species grows on relatively dry, sandy soil. It is best used as a border shrub.

*Sophora japonica,* Japanese Pagoda-tree, Chinese Scholar Tree—Legume Family—Zone 4—In coastal regions, this tree grows much like, and in the magnitude of, a great American elm. Inland however, it is smaller, and inclined to deteriorate in 3 or 4 decades unless in a sheltered, fertile site. The alternate leaves are odd-pinnate, very refined, borne on bright green branchlets and branches. Large panicles of white, pea-like flowers are produced in midsummer. These are followed by shiny green seed pods that dry, turning yellow in autumn. The pods remain on the tree through the winter, creating an ornamental effect. A narrowly upright form, *S. japonica columnaris,* is known, and the handsome weeping sort, *S. japonica pendula,* is readily available. A select cultivar, 'Regent', with exceptionally good foliage, and blooming while quite young, is also marketed.

*Stewartia koreana,* Korean Stewartia—Tea Family—Zone 5—Pyramidal tree, growing to 45-ft., this tree often is shrubby at its northern limits. With bark that peels and shreds in handsome patterns, and with luxurious rather shiny, large leaves that turn scarlet in autumn, Korean Stewartia is showy the year 'round. The shallow, cupped white flowers, 3-in. across, are borne in late June and early July. This is a superior species for growing in high humus, lime-free soil that remains damp throughout the year.

*Stewartia pseudo-camellia,* Japanese Stewartia—Tea Family—Zone 5—With white, cupped flowers similar to the preceding species but slightly smaller, Japanese Stewartia is equally worth growing. The excurrent bark flakes away in bright red patterns. The autumn color is purplish red. The tree is pyramidal in habit, and requires conditions as listed above.

Other oriental Stewartias, ranging from 30 to 75-ft. in height, but hardy only into Zone 6, include *S. monadelpha* and *S. sinensis.* The American species *S. malacodendron* and *S. ovata,* usually grown as shrubs, are quite worthwhile, and *S. ovata grandiflora,* Zone 5, growing to 15-ft. is exceptionally beautiful.

**Attention to all Readers**

The purpose of the Massachusetts Turf Bulletin is to inform you on present problems and research in the turf-related field. Articles that may help a Golf Course Superintendent and topics of interest are also included in the Turf Bulletin. Criticisms, suggestions, items of interest, and articles would be greatly appreciated to make the Turf Bulletin a better magazine.

Address all mail to:
MASS. TURF and LAWN GRASS COUNCIL
RFD No. 2
HADLEY, MASS. 01035

—The Editor

*Answer to Photo Quiz*

**The picture is taken from the practice tee at Wethersfield Country Club after the Pros practiced for a few days.**

FROM

MASSACHUSETTS TURF AND LAWN GRASS COUNCIL INCORPORATED

RFD #2, HADLEY, MASS. 01035

## EDITORIAL

### TALKIN' TURFIE

A recent superintendent's newsletter mentioned the couple who is eating D.D.T. to prove it won't harm them. Somehow the editor omitted the fact that this husband and wife were past the stage of having children. That puts a different light on the situation — it is known that D.D.T. builds up in the food chain and affects the offspring of predator birds. This couple isn't even in the bird family. I suggest that they send exhaust fumes of carbon monoxide into their home. If they like to consume hydrocarbons, they might as well have some variety.

It has been another testing year for superintendents in New England. It started off with a cold spring, enabling Poa to get a big jump on the bents. A lot of Helminthosporium (leaf spot) was around in the spring and early summer. Then came the June and July dry spell and the irrigation systems got a work-out. The high humidity of August set in and the Poa was struggling — what's new?

Testing new fungicides on a green at Quabog C.C. proved less than fruitful — the only disease to invade Bob Healy's greens was Brown Patch.

Of the 47 varieties of bluegrass being evaluated at UMass, SODCO, Belturf, Prato, Warrens A-20 and NJE P-35 have shown superiority so far this season. Some of the big name bluegrasses have done less than well.

A new bacterial soil amendment is currently being tested at the University. It is supposed to increase pore space, raise water retention capabilities, and aerate hard soils. Results will be tested for this fall and next year. So far the product has shown merit in softening hard, clay soils.

College students are now contributing greatly to the production of oxygen by planting grass all over the countryside.

Frederick Guy Cheney

## Join Your Massachusetts Turf And Lawn Grass Council

**For more information write:**

Mass. Turf and Lawn Grass Council

attn.: Dr. Joseph Troll

RFD #2, Hadley, Mass., 01035

The Massachusetts Turf and Lawn Grass Council is a non-profit corporation. Its officers derive no benefits except the satisfaction of keeping Massachusetts and its neighbors first in turf. It was founded on the principle of "Better Turf Through Research and Education." We must support our University to accomplish this, and we can with a large and strong Turf Council.

Membership is not restricted to Massachusetts residents or turf professionals alone, all are welcome to take part. Write today.