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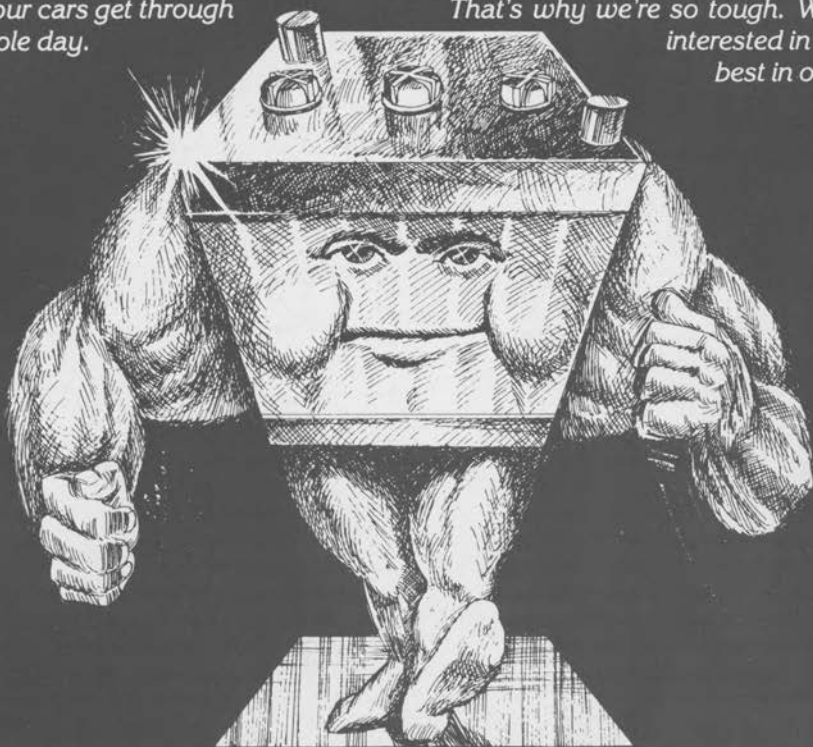
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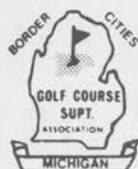
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# Late Season Nitrogen Research in Minnesota & What it Can Mean to You

Dr. Don White,  
Professor & Turf Specialist  
Department of Horticultural Science &  
Landscape Architecture University of  
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"Grass is the forgiveness of nature . . . her constant benediction . . . , harvests perish, flowers vanish, but grass is immortal."

John J. Ingalls (1833-1900), speech to Senate, 1874.

The beauty of the words by John Ingalls fails us on an occasional spring when a young man's fancy turns toward all sorts of things. But the golf course superintendent's fancy turns toward bringing the course back from another average Minnesota winter. Average in that there are no two alike.

We do lots of things to "bring the course back" after winter. We aerify, vertical mow, overseed, top dress, fertilize and hope no one really wants to know what happened. Some of the most productive things we can do, however, can be accomplished in the fall before winter. This is the time for us to be thinking about spring. It is the time when grasses develop roots and rhizomes and lay down storage materials

that will help carry the plants through the winter and winter-spring transition when most damage seems to occur.

Research here at Minnesota has shown that one of the most productive things we can do to help grass plants over-winter is to ensure that a late season nitrogen supply is available to the grass community. Late season meaning after October 15 in the Twin city area.

Until recent years the standard recommendation has been to stop fertilizing with nitrogen by 10-15 September. The concern was that the nitrogen would stimulate growth and not allow plants to "harden" for the winter. At the same time many superintendents were applying snowmold treatments mixed with organic fertilizer with excellent results. That was alright because everyone knew that the organic fertilizer would not release any nutrients because it was too cold to decompose. But still many of the greens treated in this manner came through the winter better than others. That was one of the reasons why we

*Continued Page 18*

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# The Art of Yesterday The Science of Today

by William H. Bengeyfield  
National Director,  
USGA Green Section

It is one of the fascinating paradoxes of our profession. Turfgrass management - for golf - is indeed both an art and a science. It was always meant to be so. The keeper-of-the-green profession has a heritage going back 400, perhaps 500 years. How much it has changed! Science has changed it. And yet, paradoxically, how little it has changed. It is still basically an art form. The thoughts that follow are mostly concerned with science, but my real message is about art.

## Science and the Earthworm

Back in the 1930's, Dr. John Montieth, then Director of the Green Section, recalled golfers of that day continuously complained about earthworm casts on

the surface of greens. Invariably, they told him, the casts would deflect their putts away from the hole. Now, from a scientific and statistical point of view, he felt surely a ball would occasionally be deflected into the hole. over the years, he never recd hearing one complaint about this occurrence!

Science has long ago solved the earthworm problem - and many more. Weed control, disease devastation, better machinery, better fertilizers - we are all better off because of turfgrass science.

## Science and the Stimpmeter

"Science" has even developed a little stick we now roll a ball down th test the speed of the green. The Stimpmeter is

*Continued Page 15*

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# PROPER TRANSITIONAL MANAGEMENT FOR NORTHERN GRASSES REDUCES DISEASES, PROMOTES EARLY GREEN-UP

Autumn's shorter days and cooler temperatures bring fewer golfers out on the courses, but this is the beginning of another critical time for superintendents: the transitional period.

"The worst is over, but transitional management for northern grasses such as bluegrass, bentgrass, perennial ryegrass and creeping red fescue is important," states Todd Cutting, TUCO Agricultural Chemicals technical field extension representative. "Proper cultural management practices during the transitional period (early September to freeze-up) pay off next spring in terms of fewer disease problems, healthier turf and earlier green-up."

This period poses as a dilemma for the superintendent. On one hand, he must maintain a good golfing surface through the late season. On the other hand, he

shouldn't do anything to cause excessive growth which can increase turf's susceptibility to diseases and winter injury.

"Many superintendents start off with exceptionally good disease control programs, but tend to slack off during the transitional period," notes Cutting.

"The available labor supply dwindles students return to school, the budget is nearly depleted and winter is fast approaching. However, what you do in the fall determines what you get next year."

To maintain good surfaces for fall play while preparing the turf for winter and ensuring healthy turf for the spring, Cutting recommends the following steps:

- 1) Continue the fertility program to

*Continued Page 13*



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## GOLF CORRECTING WATER USAGE IMAGE

Determined to correct the onerous and inaccurate image it has in the water usage area, the game of golf has initiated a nationwide 1982-83 campaign to remove itself from an often pictured villainous role within nature's water cycle.

To identify golf's vital place in the world's water supply cycle, a logo has been developed by a Research Task Force representing the national golf association community.

Man's survival depends on water. Less than one percent of the world's total water supply, 359 quadrillion gallons,

can be consumed by man. By the year 2000, the demand on the world's per capita water supply will increase by 33 percent because of greater population alone. It is imperative that alternative sources of water be identified and that nature's water cycle be understood by all, whether they play golf or not.

Golf Courses and other green areas play a vital role in the water cycle. Turfgrass serves as a filter which removes impurities that would otherwise find their way into our rapidly dwindling ground water supplies. It can also purify recycled water from factories and sewage treatment facilities and return it to underground aquifers.

According to James E. McLouglin, Executive Director of the Golf Course Superintendents Association of America, "What we are trying to get across is that golf courses recycle water, whether it's by using effluent water or simply by filtering water from natural sources. Golf should be looked on as one of the good guys in this scenario instead of part of the problem.

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## BIOLOGICAL CONTROL OF FAIRY RINGS

The most common cause of fairy rings in turfgrasses is *Marasmius oreades*. All isolates of this fungus are antagonistic to each other. (Have you noticed that fairy rings never overlap?) Biological control is based on this mutual antagonism. The steps in control are:

1. Strip the sod from two or more fairy rings.

2. Rototill the soil beneath the rings.
3. Collect and then thoroughly blend the dense white "spawn" from under the rings.

4. Spread the blended spawn back over the soil under the rings.

5. Rake or rototill the spawn into the top several inches of soil.

6. Rake or roll the soil level.

7. Replace the sod and water thoroughly until it is established.

*Continued Page 14*

## TEN QUALITIES OF A LEADER

1. He must be able to take criticism. No person in a position of authority will be immune from it. He must learn to sort out the constructive, from which he can learn, and the malicious which he must ignore.

2. He must learn to stand adversity. Things will not always go well. Failures will happen. A good leader will bounce back.

3. He must be able to delegate authority. He must be able to give up power, to trust those under him.

4. The leader must make decisions. The person who can not take a stand does not deserve to lead others.

5. The leader must be free from prejudices. "Prejudice," someone once said, "is a luxury only little people can afford."

6. He must learn to praise others, to

*Continued Page 14*

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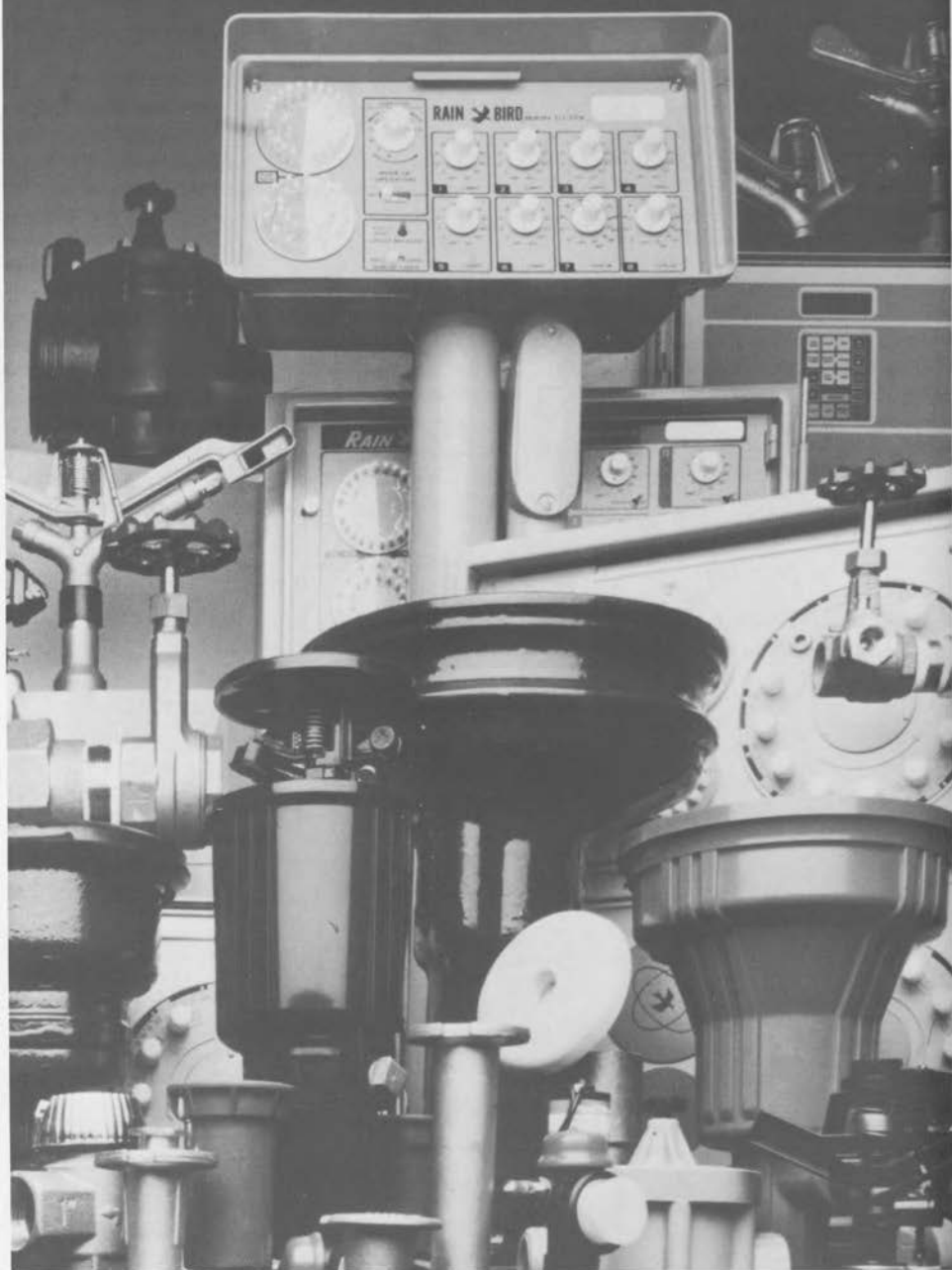
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#### **Proper Management, Cont.**

maintain adequate grass growth for good playing surface while not causing excessive growth.

"During the transitional period, turf begins replenishing depleted growth reserves by storing carbohydrates and sugars in its roots and begins making tillers instead of leaves. Tiller production is greatly increased by raising the supply of nitrogen, phosphorus and potassium" explains Cutting.

Cutting recommends using a balanced fertilizer containing ½ lb. nitrogen in early September. Nitrogen supplies nutrients for root growth and provides for dark green color in early spring. The more root growth that occurs in autumn, the greater tillering that can occur in early spring. Potassium helps prevent winter damage, regulate water retention and increase turf's hardness to heat, cold and drought.

2) Maintain watering program to ensure good surface playability while encouraging root development. "Overwatering interferes with root development and can cause lush growth which increases the plant's susceptibility to disease and tissue freezing. Excess water also favors development of common fall diseases such as leaf spot and dollar spot," notes Cutting.

3) Continue disease control program to reduce the numbers of overwintering sclerotia for dollarspot and spores for leaf spot, and also early snow mold. Cutting recommends two applications of Acti-dione RZ – the first in late October and the second in mid November. This fungicide contains the antibiotic Actidione and PCNB.

"Acti-dione knocks down any diseases that are actively working, and PCNB component provides a fungistatic barrier which prevents diseases from spreading," says Cutting. "PCNB is broken down by bacteria in the soil. Because these organisms become inactive at temperatures below 50 degrees F., PCNB remains in the thatch layer and suppresses disease activity until spring. Actidione RZ used on a regular basis establishes a barrier that continually suppresses the germination of fungal inoculum."

4) Dormant fertilizer when the grass is

*Continued Next Page*

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### Proper Management, Cont.

done growing. Depending on the course's location, Cutting recommends applying fertilizer which contains 1-2 lbs. nitrogen in late October to early December before snowfall.

By incorporating these transitional management tips into your disease control program, you can achieve disease-free turf as well as early spring green up.

### True Leader, Cont.

share the credit, and to give credit where it is due. If he tries to take credit for everything, he will not lead, he will only frustrate those under him.

7. A leader must be able to concentrate under difficult conditions, to keep the goal constantly in mind, to keep his head when all about him are losing theirs.

8. A true leader will assume responsibility for his own mistakes.

9. Nor will be trying to avoid responsibilities for the mistakes of others. He will, like Robert E. Lee, take the responsibility for the mistakes of his lieutenants.

10. A good leader will grow and learn. Stagnation is not leadership.

### Fairy Rings, Cont.

This biological control for fairy rings is superior to the "masking" of symptoms by deep coring followed by: (1) a recommended nitrogen plus iron fertilization program, and (2) saturating the soil in the green outer ring, up to 24 inches deep, using a tree-feeding lance or root-feeder attachment on a garden house. Keeping the soil more saturated for several weeks is suggested since fairy ring fungi are severely inhibited in high moisture soils. Also remember that there are NO chemicals that will kill out fairy ring fungi in the soil without killing the grass when it is left in place during treatment.

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## Art & Science, Cont.

designed to establish speed criteria - not to make every green lightning fast, virtually impossible to putt off to maintain a healthy turf. Man did that! Those who condemn the Stimpmeter overlook the fact that there is an art in using it. The speed of any particular set of greens must surely be at that level best suited for the membership and the conditions that prevail.

## Science and Soils

Science has given us specifications for putting green construction. The Green Section Specifications, written in the early 1960's, are officially entitled, "A Method of Putting Green Construction." No one in a responsible position with the Green Section ever said or claimed they would produce the perfect foolproof green. Someone else said that. But science produced the data. It is up to us to execute, to use the data, to make it work. An artist does that.

## Science and Research

Now a new era of research, to be sponsored by the USGA Green Section, lies just ahead. Conceived by Al Radko, a long-range, multi-million-dollar research project on minimal maintenance turfgrasses will soon be underway. The objective is to develop turfgrasses that will have greater winter hardiness, wear resistance, drought and temperature tolerance, disease and insect resistance, salt tolerance, require lower fertility levels, and still produce superior playing qualities. Grass plant selections in Asia and South Africa are now underway by U.S. scientists, sponsored by the Green Section. Once the work is complete, an intensive plant breeding program will begin. Genetic selections will be made by advanced computer analysis that cuts years off of previous plant breeding techniques. The full study will take at least 10 years. It will require an estimated outlay of \$5 million. It is an exciting undertaking, the largest of its kind in history! It will need your help and your support.

## Science and Computers

Computers have been mentioned and they are indeed a new "science". They are going to affect our professional and

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### Art & Science, Cont.

private lives immeasurably in the immediate future. Dr. V.B. youngner, University of California, Riverside, recently said, "Computers are an unbelievably fast and unbelievably accurate machine. they are also incredibly dumb. Man, on the other hand, is an extremely slow and inaccurate machine. However, he is brilliant! Bring these three forces together, i.e., speed, accuracy and brilliance, and there is no limit to what may be accomplished."

Notice, if you will, it is man's brilliance, his art that makes the difference. he makes the computer work.

And so it is in turfgrass management, in cooking, in driving an automobile, in just about any pursuit in life. You can have all the science in the world, but if you don't have that certain ability, that perception, that art, to bring it all together in the right manner:

If you don't have that "touch,"  
You don't have very much!

### Science and Irrigation

Science has also given us improved methods of irrigation. Now here is a topic we can all relate to as a science and an art. Who among us will disagree that automatic irrigation is not AUTOMATIC? Any type of irrigation is, at best, an inexact science. There are so many variables: wind, cloud cover, temperature, soil types, humidity, cutting height, type of grass, shade factors, etc. The more variables one must deal with, the greater the "art" becomes. Good irrigation is indeed an art.

### Science and Us

Perhaps one of the greatest gospels you and I can preach today in turfgrass management is that "green does not necessarily equal good." This story should be told over and over again, especially to American golfers.

Now, I have heard the quick voices of dissent among us regarding this philosophy. There are always quick voices of dissent. But before we agree to argue about it, let's first be sure we understand what is being said. No one has said, "Green golf courses are bad!" That's foolishness. But the demand by some for a green, green, green golf course, overly watered, overly fertil-

ized, not properly mowed for good playing conditions (but mowed instead for a good green appearance) does NOT make it a good golf course for golf.

Our concern, our job today is much the same as it was for the "keeper of the green" 500 years ago. It is to provide the best possible playing surfaces for the game of golf, not necessarily the greenest ones.

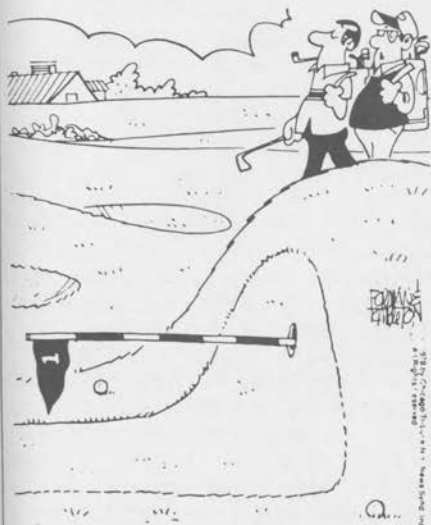
Science will help us immeasurably in our work. But it takes more than science. It takes that special, magical ingredient known as YOU. It is you who make it all come together. You make it happen. You are the artist. Please don't ever forget that!

### Golf Digest Reinstates Oakland Hills in Top 10

The Augusta National was replaced by Oakland Hills in the **Top 10** ranking, according to the panelist because they failed to place a premium on accurate driving. Augusta's wide fairway and sparse rough give any undue advantage to the long hitters.

Oakland Hills, often dubbed the "monster," has been the site for many major championships, - the latest in the U.S. National Senior Open last summer.

### The Sporting Life



"By the way, did the course manager ever give the greenskeeper the raise he demanded?"

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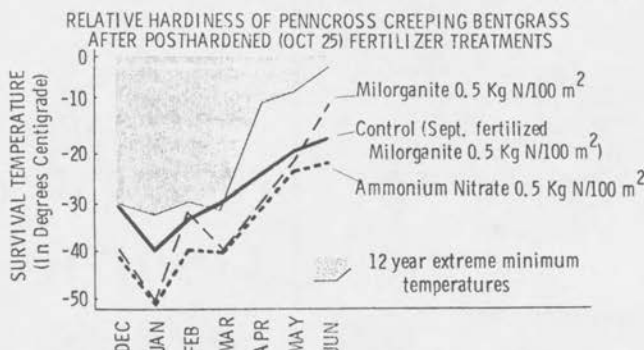
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### Late Nitrogen Research, Cont.

started to research late season nitrogen nutrition in the 1960's. One of the first things we found was that nitrogen was released from the organic fertilizer even with late applications.

We have been conducting experiments every year since then, investigating nitrogen effects on growth, overwintering and hardiness. In fact we have done many things like applying nitrogen weekly during the fall to try to influence hardiness in the turfgrasses. Results from these experiments have clearly shown that late fall nitrogen applications in the proper amounts do not affect the grass plants ability to harden in the fall. Indeed the late fall fertilized treatments always turned out at least as hardy as the regularly fertilized turves which did not receive nitrogen after September 10. (See Figure 1)



Benefits that have resulted from the late season nitrogen application are: 1) more green leaves and stems overwinter; 2) earlier growth initiation in the spring; 3) better recovery from winter diseases; 4) more moderate growth pattern in the spring (no flush of growth as is usual with spring applications); 5) no need for a spring nitrogen application until June; 6) and in many cases a reduction in yearly total nitrogen while maintaining quality.

Our experiments show that the results are associated with late season (October 15-November 10) applications of one pound of nitrogen (actual) per 1000 square feet, of a soluble nitrogen source such as Ammonium nitrate or Urea or an organic such as Milorganite. the results have often favored the ammonium nitrate over the

years but results have been similar with all three sources. If you are on a slow release nitrogen source program, results have been more comparable if the fertilizer is applied two to four weeks earlier than the soluble fertilizers, around the end of September. Remember to be sure the grass is dry when you apply a soluble nitrogen fertilizer if you cannot water it in.

If you decide to try it this year, now is the time for you to plan your program, order your fertilizer and prepare for making the application. If you decide not to try it, I suggest that you identify a small area on the course where you can experiment and put out your own plots.

In summary our research shows that late season nitrogen applications:

- (1) do not adversely affect hardiness.
- (2) result in more green matter carried overwinter and an earlier start in the

spring with higher quality turf.

- (3) better recovery from winter diseases.
- (4) moderate growth patterns in the spring.
- (5) a reduction in the total amount of nitrogen needed over the year.
- (6) the soluble forms of nitrogen have a long lasting effect in the spring often maintaining quality to mid-June.

Best wishes for the end of another good season and a better year in 1983.

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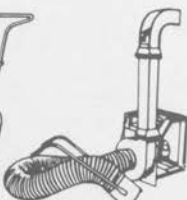
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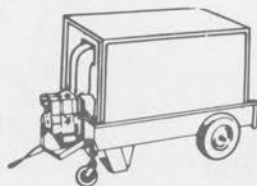
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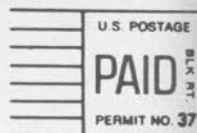
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