

The following article and charts were prepared by Dr. Harvey Meredith of the Department of Soil Science, University of Minnesota and made available to Hole Notes by Dr. William P. Martin of the Soil Science Department, University of Minnesota. We wish to express our sincere thanks to these two gentlemen for their kindness in furnishing this very interesting and educational article.

Dr. Martin also enclosed a bulletin, in fact it is a 23-page booklet, entitled "Recommended Chemical Soil Test Procedures for the North Central Region." This region includes Minnesota. A copy of this booklet is available to anyone interested. Contact Dr. John Grava of the Soil Science Staff and the Professor in charge of their Soil Testing Program. We strongly recommend that each Superintendent secure a copy.

FERTILIZER ARITHMETIC
by H. Meredith

Fertilizer is sold on an N-P₂O₅-K₂O basis. Example: The label on a fertilizer bag gives the analysis as 8-16-32. In 100 pounds of material there are 8 pounds of N (nitrogen), 16 pounds available P₂O₅ (phosphorus) and 32 pounds of water soluble K₂O (potassium).

A ton of 8-16-32 would be made up of 20 one hundred pound bags (20 x 100 = 2,000 pounds or one ton). If you want to determine how much N-P₂O₅-K₂O in a ton, multiply each number by 20. In the above fertilizer analysis a ton of 8-16-32 would contain 160 pounds of N, 320 pounds of P₂O₅ (phosphorus) and 640 pounds of K₂O (potassium). If you are buying a single analysis as 34-0-0 you have an easier time of it. If you are buying ammonium nitrate the analysis would be 34-0-0 (N-P₂O₅-K₂O). This means the material is 34 percent N. In 100 pounds of ammonium nitrate there are 34 pounds of N, no phosphorus and no potassium. In one ton there are 680 (34 x 20) pounds of N. If you buy 18-46-0, you have 18 pounds of N (nitrogen), 46 pounds of P₂O₅ (phosphorus) and no potassium per one-hundred pounds. Multiplying by 20 cwt. there would be 360 pounds of N (nitrogen) and 920 pounds of P₂O₅ (phosphorus).

Salesmen often wish to add sophistication to conversions by using the term units instead of pounds. The term unit is used in fertilizer discussions to mean 20 pounds. In a ton of 18-46-0 there are 18 units of N (nitrogen) and 46 units of P₂O₅ (Phosphorus). Since a unit is 20 pounds, multiply units by 20 and we have pounds per ton. In a ton of 18-46-0 there are 360 pounds of N and 920 pounds of P₂O₅ (phosphorus). When we mean pounds per acre we should say pounds per acre. When we discuss price per pound, remember there is a vast difference between price per pound and price per unit. The difference is a factor of 20. Table 3 and 4 are helpful to the understanding of fertilizer analysis and price per pound of plant food.

(H. Meredith is an Area Director, TVA, and Research Associate, Department of Soil Science, University of Minnesota, St. Paul, Minn. 55101).

A LISTING OF SOME COMMON FERTILIZER GRADES

	<u>Lbs. per 100 Lbs.</u>			<u>Lbs. per ton</u>		
	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
34-0-0 (ammonium nitrate)	34	0	0	680	0	0
0-46-0 (csp) (Concentrated-super-phosphate)	0	46	0	0	920	0
18-46-0 (DAP) (Di-ammonium-phosphate)	18	46	0	360	920	0
Potash (60% K ₂ O)	0	0	60	0	0	1200
Urea (46% N)	46	0	0	920	0	0
29-14-0	29	14	0	580	280	0
28-0-0 (Liquid)	28	0	0	560	0	0
10-34-0 (Liquid)	10	34	0	200	680	0
82-0-0 (Anhydrous)	82	0	0	1640	0	0
20-0-0 (Aqua-liquid)	20	0	0	400	0	0

Cost of Fertilizer

F.O.B. Plant (March 10, 1975)

	\$/Ton	Cost per lb.		
		<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
18-46-0	240	11.1 ¢	21.8 ¢	-
0-44-0	192	-	21.8	-
34-0-0	162	23.8	-	-
46-0-0	196	21.3	-	-
10-34-0 (liquid)	200	14.6	26.7	-
28-0-0 (liquid)	140	25	-	-
29-14-0	195	23	21.8	-
25-25-0	213	20.8	21.8	-
20-10-0 (liquid)	144	22.6	26.7	-
18-18-0 (liquid)	170	20.5	26.7	-
82-0-0 (anhydrous)	240	14.6	-	-

(continued on page 6)

MAY BOARD MEETING AND MAY MEMBERSHIP MEETING

- The Board and Membership meetings for May were held at the beautiful Tartan Park Course in Lake Elmo, Minnesota, Monday, May 12, 1975.
- President Rich Rannells called the Board meeting to order at 11 a.m.
- It was reported that there are several delinquent members and a motion was made, seconded and passed that if any delinquent member has not paid his dues by June 1, 1975, he would be dropped from membership. If you are one of these members, please get your dues in so it can be reported paid at the next meeting and avoid being suspended.
- George Ostler, Chairman of the membership committee, reported that his committee is about ready to have a new 1975 Roster printed and he was authorized by the Board to proceed with the printing and have the work done by the Print Shop of Edina.
- George also advised that he had completed his investigation of the applications of Grant Wenkstern, Red Oak Golf Club; Nathan Dunn, Hazeltine National Golf Club; Thomas Brown, Somerset Country Club; Randall Nelson, Owatonna Golf Club and Richard Williams, Wayzata. He will present their applications to the membership to be voted on. George announced that Burton Grannes, Normandale Golf Course, an applicant for membership would be introduced at the membership meeting.
- Mr. Lowell Bloom, a representative of the Anoka Tech Center, announced that the school is looking for a full-time turfgrass instructor and anyone interested should contact him at the school.
- After the Board meeting the members were the guests of the Tartan Park Golf Course, Ray Moris Host, to a game of golf and about 40 members took advantage of the opportunity, and what a beautiful day it was for golf. They all reported an enjoyable afternoon and we did not spoil it by asking about scores. Several of those that did not play just went out on the course and walked around and looked it over and reported that Ray had the course in excellent shape.
- After golf, cards, etc. President Rannells called the membership meeting to order. Rich reminded the members about the 1976 GCSAA Conference and Show to be held in Minneapolis during February, and that there is a lot of work to be done and we will have to start bearing down as we want this to be the best show the GCSAA has ever had.
- President Rannells presented John Lightfoot his Certified Golf Course Superintendents Association plaque and congratulated John and all the members present joined Rich in his congratulations and best wishes to John.
- The applicants whose applications were read at the Board meeting were introduced and their applications voted on and all were accepted into membership. We congratulate them and hope they will all be active members.
- The application of Burton Grannes was presented and will be voted on at the next meeting.



MEETING SCHEDULE

- | | | |
|-----------|----|--|
| June | 9 | - Picnic, Pierz Golf Course, Pierze, Minn. Bring the Ladies. |
| July | 14 | - Stillwater Prison, also a picnic - bring the Ladies. |
| August | 11 | - Daytona Golf Club. Note this is a change from White Bear Yacht Club. |
| September | | - Open. Will have definite information for you in the July issue. |
| October | | - White Bear Yacht Club. |
| November | 10 | - Hanson House, Long Lake, Minnesota. |
| December | 4 | - Annual Meeting, Normandy Hotel. More later. |

- After the meeting the members enjoyed a great steak dinner and we express our sincere thanks to Host Ray Moris and the Tartan Park Golf Club for a great afternoon and evening.

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FERTILIZER ARITHMETIC (continued from page 3)

During the past 15 years Minnesota has witnessed a phenomenal growth in fertilizer consumption. Total tonnages increased from 236,000 tons in 1960 to 1 million tons in 1974. Nitrogen and potash were used at roughly half the rate of phosphorus in 1960 whereas in 1974 the relative rate of use was 410-268-322 thousand tons for N-P-K, respectively.

SOURCES OF N USED IN MINNESOTA - 1974

<u>Source</u>	<u>%N</u>	<u>Tons</u> (1000)	<u>% of Total N</u>
Anhydrous ammonia	82	279	56
Blends	10 ^{3/}	748	22 ^{3/}
Ammonium nitrate	34	117	9.7
Nitrogen solution	30	90	6.5
Urea	45	40	4.3
Other	25	9.4	0.6 (Includes organics)
Ammonium phosphates	15 ^{3/}	13.6	0.5
Aqua	20	8.7	0.4
Ammonium sulfate	24	4.9	0.3

^{3/} Estimated

Now that you have read this very interesting article and studied the charts you should be in the mood to sell your club, if you have not already done so, on supporting the MGCSA Research Program. Many of the clubs have already sent in their contribution and they are greatly appreciated. However, this is a program that is beneficial to all clubs and their members and we therefore urge 100% support. Have your club make their check payable to the MGCSA and mail it to Keith Scott, Secretary-Treasurer % Oak Ridge Country Club, 700 Highway 18, Hopkins, Minnesota 55343. If you are wondering what amount your club should contribute, a good gauge is 50¢ per member but any amount your club feels they want to contribute will be thankfully accepted.

GREEN CLIPPINGS

With the article on "Fertilizer Arithmetic" we made mention that Dr. Martin enclosed a booklet on Recommended Chemical Soil Test Procedures for the North Central Region and we advised this booklet was available by contacting Dr. John Grava, Department of Soil Science, University of Minnesota, St. Paul, Minnesota 55101. We are listing the contents for your information:

Introduction.....W. C. Dahnke
 (This contains valuable information including some history)
 Soil Sample Preparation.....Kalju Eik, E. L. Hood and J. J. Hanway
 A Standard Soil Scoop for Soil Testing.....T. R. Peck
 Recommended pH and Lime Requirement Tests.....E. O. McLean
 Importance of Soil Extraction Techniques.....John Grava
 Recommended Nitrate-Nitrogen Tests.....P. L. Carlson
 Recommended Phosphorus Soil Tests.....D. Knudsen
 Recommended Potassium Tests.....P. L. Carlson
 Micronutrient Tests.....David A. Whitney

Just a list of the contents indicates the value of the booklet.

(continued on page 8)



FIELD DAY

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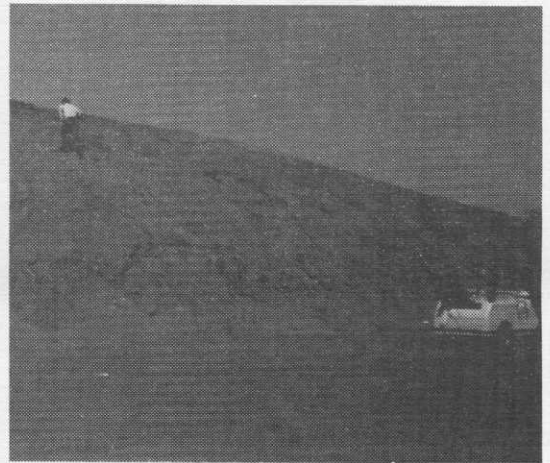
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Vo-Tech High School
- ROCHESTER, MN. Tuesday, June 17
Mayo City Park
- NEW ULM, MN. Wednesday, June 18
Johnson Park
- ANOKA, MN. Thursday, June 19
Vo-Tech High School
- ALEXANDRIA, MN. Monday, June 23
High School
- MOORHEAD, MN. Tuesday, June 24
Vo-tech High School
- GRAND RAPIDS, MN. Wednesday, June 25
City Park
- ST. PAUL, MN. Thursday, June 26
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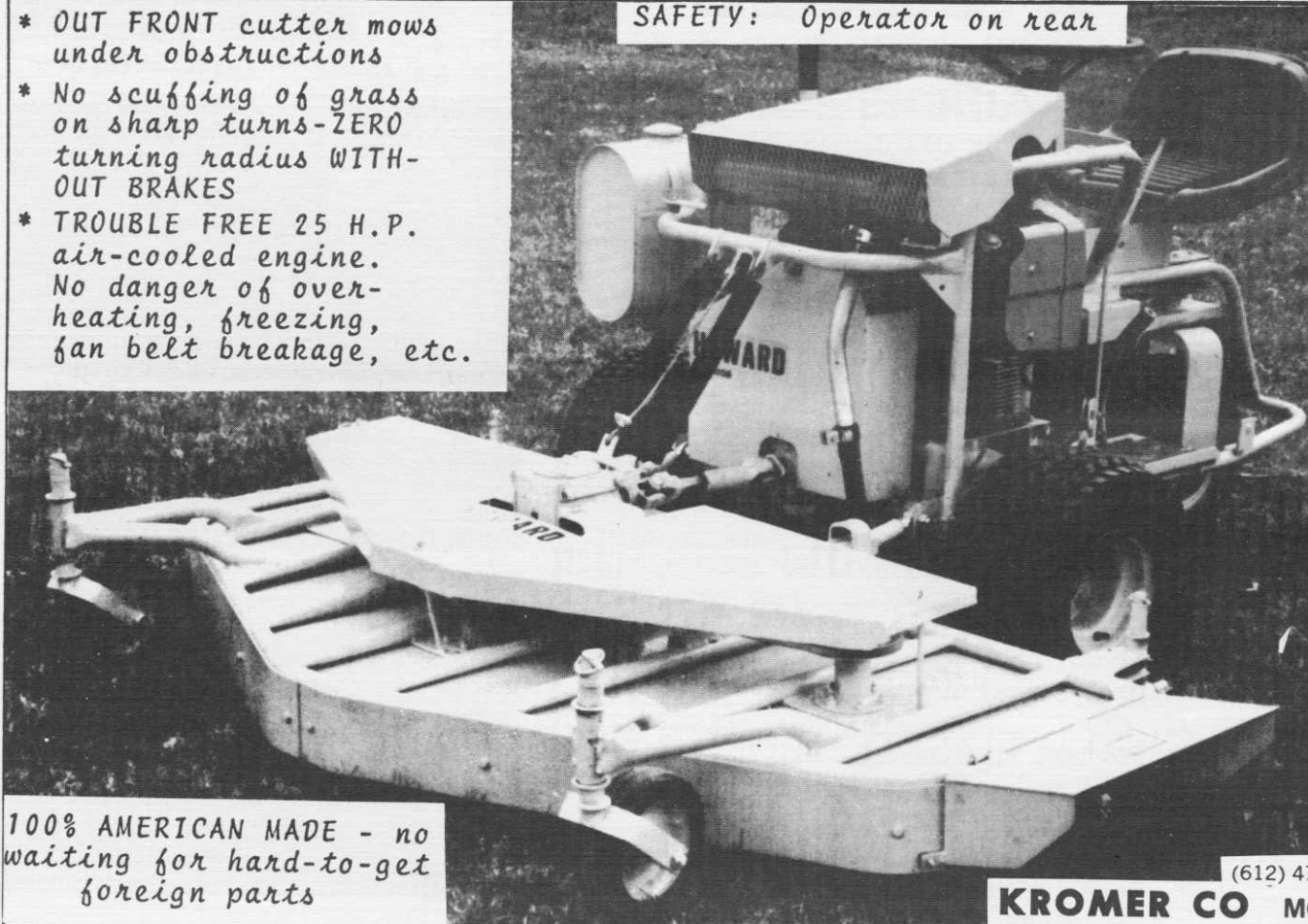
GREEN CLIPPINGS (cont'd from p. 6)
THEFT OF EQUIPMENT - We have previously reported the theft of equipment of various kinds, including items as large as golf carts. We have now learned of the theft of a couple of Hahn Triplex Greens Mowers including attachments such as 3 Verti Cuts, 3 Greens Reels; these were stolen from the Winthrop Golf Course in Winthrop, Minnesota and had a value of \$5000. Another one was stolen in the Detroit, Michigan, area (this was a new one) and would be of greater value. The owner of the Winthrop equipment did not have the serial numbers registered or

shown on the equipment, which will make it more difficult to identify. We do not have the information on the Detroit equipment. We suggest important information such as serial number, name of club, phone number etc. be punched into the frame of your equipment so that it cannot be erased without replacing the part; if it is stamped in the frame, for example, it would be difficult to erase. By just putting the information on a plate and attaching the plate to the equipment is not enough as a plate can be taken off fairly easy. Please do not purchase any equipment, new or used unless you are sure the seller is the rightful owner.

ATTENTION - Don't lose track of the fact that we in Minnesota are the Hosts to the 1976 GCSAA Conference and Show. We will have more definite information for you in future Hole Notes. (continued on page 9)

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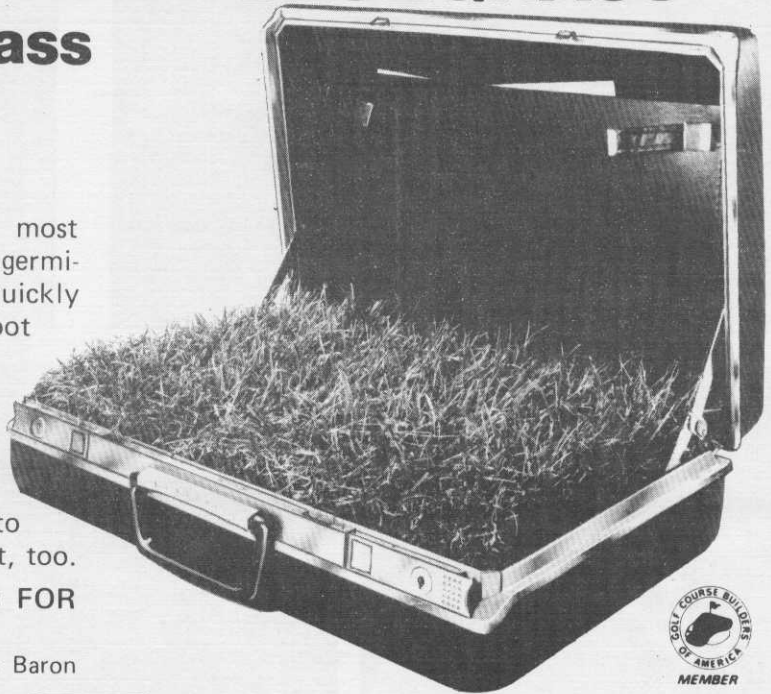
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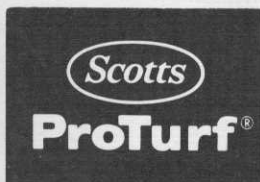
*U.S. Plant Patent #3186, Dwarf Variety

GREEN CLIPPINGS (continued from page 8)

Tartan Park proved to be a popular spot for the May meeting. Among those playing golf were Dr. George Blake and Dr. William Martin, both from the Soil Science Department of the University of Minnesota. There were also several from outstate points as far distant as Cloquet, represented by John Lightfoot, Clif Vohs from St. Cloud and there was an entire foursome from Rochester, and these are only a few, there were many others from various locations. Keep it up, it is nice to have you attend the monthly meetings and get in a little golf, visiting with old friends and meeting new ones.

The May meeting was also known as Cushman Motor Day and Jerry Commers had a very nice and interesting display of his equipment. He also had some gifts, such as pens, flags and world globes; the flags and globes were given as door prizes – and don't forget, nice cold beer and soft drinks that were boosters on a warm sunny day

(continued to page 11)



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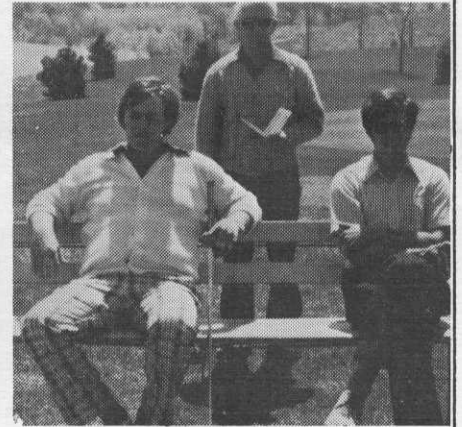
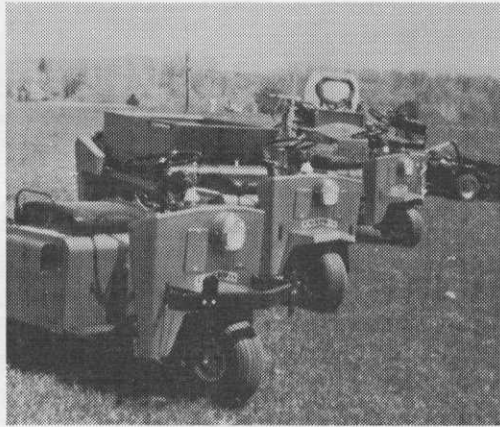
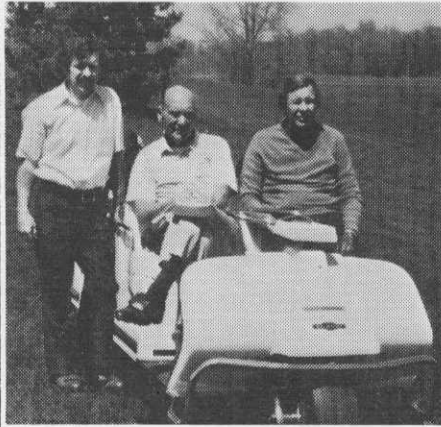
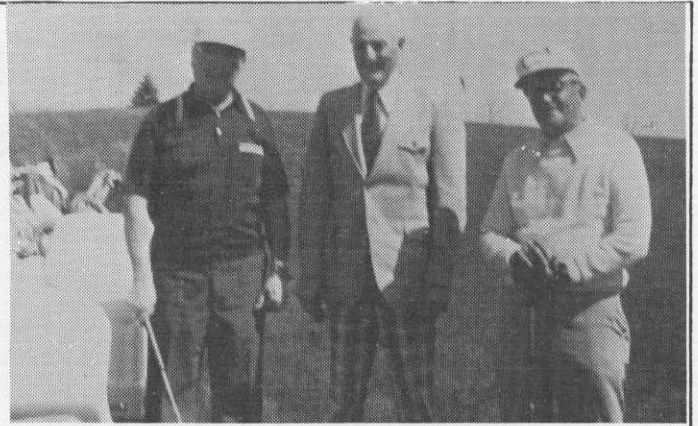
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Pictures taken at Tartan Park

