Australian Air Force radio operators and rescue fliers were amazed when the plane came in safely and coughed out its last drops of gas.

During the four-month tour the Hahns performed under conditions that most of us would regard as impossible. In 1929 Walter Hagen and Joe Kirkwood made a six-month tour of Japan, Australia and a couple of courses in India, and Joe did his trick shots, but there's been nothing anywhere that's come close to the Hahns' feat.

Arthur Hills of Toledo is architect of the Giant Oak course being built at Temperance, Mich., a few miles north of Toledo. Temperance doesn't sound like a name that fits a golf course site, considering that bar revenue at many clubs exceeds green fees and car rentals and usually makes a larger net profit than any other element of country club operation. But temperance was a political factor in that part of the nation. John Morely, first president of the National Assn. of Greenkeepers, as a young man in Ohio, was secretary of the Temperance Party.

Hills is typical of the younger group of successful architects who got started in golf working for inspiring superintendents. He began as a youngster working for Andy Bertoni on the Meadowbrook course in suburban Detroit. He fell in love with golf courses, studied landscaping, was a fair golfer and wanted to express himself artistically in golf courses.

Tommy Armour said, "I know we've got some great golf architects but where are the great golf courses?" That question bothered me until I realized what architects are up against in handling the problems of land on which they are expected to create masterpieces. Complexities are added when the course is to be used for selling adjacent home sites.

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The HENRY GOLF BALL WASHER

Used On Leading Golf Courses Throughout The World

You get more ball washer for the money with The Henry. It costs less initially. Course Supts' will find it requires minimum upkeep. Golfers throughout the world have found that The Henry, with its rubber squeegee and gasket, cleans their balls faster and more efficiently.

DEALERS IN ALL PRINCIPAL CITIES

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with each vendor purchased

New, tough, strong and highly absorbent disposable TERI® Towels are now available in vended form. Selling 3 to a sleeve (25¢ coin slot), TERI Towels are nylon reinforced, white and lint-free. Golfers will buy them to clean muddy clubs, dry golf balls, wipe their hands and face, and dry off sweaty grips. Weather tight vendor mounts easily outside starter's shack or pro shop.

ORDER NOW AND SAVE!!!

During a limited introductory period, we are offering a FREE 200-package case of disposable TERI Towels (a $50.00 retail value) with each vendor purchased.

The TERI Towel vendor is made of rust resistant steel and features fully hinged doors, completely dry interior, double locks and a trouble-free dispensing mechanism.

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Commercial Products Dept.
Neenah, Wisconsin 54956

Yes, I'm interested in your introductory TERI Towel Vendor offer. Have salesman call.

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STATE
ZIP

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  - STRONG, HAND CRAFTED CONSTRUCTION
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  - PROVEN DEPENDABILITY, THOUSANDS NOW IN USE

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PAR 4

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12
440 YDS
PAR 4

G-92 Green • Yellow • Black

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Colorful Hole Numbers, attractively designed in two exciting styles. On strong 18 gauge steel, with weatherproof baked enamel finish...size 12" x 18". Just send us your scorecard, with correct yardage, indicate style wanted and we will custom make in just three weeks! Sturdy 5½' channel posts $1.50 each.

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For more information circle number 238 on card

What are the nutritional requirements of annual bluegrass?

Nutritional Requirements of Poa Annua L.

The objective of this study was to determine the effect of nitrogen, phosphorus, potassium and soil pH on the growth of annual bluegrass roots and shoots. It was conducted under greenhouse conditions with the annual bluegrass plants maintained at a cutting height of 1.5 inches. Two levels of nitrogen, phosphorus, potassium and lime were incorporated into the root zone of two soils, a loamy sand and a silt loam. Data collected included the amount of shoot growth, weight of crowns, amount of roots produced and the number of seedheads formed.

The higher level of nitrogen fertility stimulated shoot and root growth to the greatest extent followed by the higher level of phosphorus. Potassium had very little

Continued on page 24
TORO took 8 years to perfect this oil-sealed gear-drive pop-up rotary head. A 30 minute demonstration will prove it was worth it.

The gear drive is the only true, continuous power source for rotation of a pop-up rotary sprinkler. Because it is a constant drive, you get uniformity of spray that "cam" and "impact" drives can't begin to match. But the problems of sand and dirt and backwash are common to all systems. Except TORO's. Our entire mechanism is specially sealed on top where it can't be touched by water, dirt or debris. We know. We torture-tested with sand tanks that pumped 100 lbs. of sand into the sprinkler every 20 minutes. Proved that our oil-seal worked. Also discovered that brass risers scratched. So we switched to super-hard DELRIN®. It took 8 years, but we learned all this and a lot more. You can learn all about it in a 30-minute demonstration. Call your nearest TORO distributor (he's in the Yellow Pages) or write Marketing Manager, Toro Mfg. Corp., 8111 Lyndale Ave. S., Minneapolis, Minn. 55420.

Fig. 1 Large Turf Areas Golf Course Fairway

Fig. 2 Golf Green

Fig. 1 Single row (in-line) two speed sprinklers eliminates puddles and run-off in overlapping patterns, reduces water costs and smooths out precipitation.

Fig. 2 Another TORO exclusive—two-speed 180° pattern for pop-up sprinklers around golf green, double row fairway football field, park grounds. Nozzle rotates at normal speed on the over-lapped areas, slows down when watering bunkers or non-over-lapped areas.

TORO Automatic Turf Sprinkler Systems

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effect on the rate of shoot growth. Growth was more favorable when a balance in the levels of nitrogen, phosphorus and potassium was utilized. Shoot growth of annual bluegrass was greater at a soil pH of 6.5 compared to 4.5. Seedhead production was less at a soil pH of 4.5 than at 6.5.

The authors concluded that annual bluegrass can produce more acceptable growth under relatively infertile soil conditions compared to Kentucky bluegrass. However, annual bluegrass is responsive to increased levels of fertility or higher pH levels, particularly on poor, coarse textured soils.

Comments: One approach to controlling weeds is the modification of cultural practices, such as fertility and pH, to the extent that conditions are unfavorable for growth of the weed. The results of this study indicate that control of annual bluegrass by manipulation of the soil pH or the nitrogen, phosphorus and potassium fertility levels is not promising since the optimum levels for growth are quite similar to the optimums for the desirable species. It should be indicated that there are other cultural practices which influence annual bluegrass growth and competitive ability substantially. For example, (a) frequent or excessive irrigation or (b) a close cutting height will favor annual bluegrass growth.

**Other papers of interest:**
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Harley-Davidson
NITROFORM is your best organic fertilizer buy.

For proof, complete this chart.

<table>
<thead>
<tr>
<th>Nitrogen Source</th>
<th>Percent Nitrogen (N)</th>
<th>Cost/Ton</th>
<th>Cost/Unit of (N)</th>
<th>Percent Win</th>
<th>Cost/Unit of Win</th>
<th>Percent of Total (N) Available in First 15 Weeks</th>
<th>Cost/Unit (N) Available in 15 Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITROFORM® Organic Nitrogen</td>
<td>38%</td>
<td></td>
<td></td>
<td>27%</td>
<td></td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>NATURAL ORGANICS</td>
<td>2% to 12%</td>
<td></td>
<td></td>
<td>1 1/2% to 10%</td>
<td></td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Dried Blood, Fish Meal,</td>
<td>5% to 6%</td>
<td></td>
<td></td>
<td>5% to 5 1/2%</td>
<td>Approx.</td>
<td>51%</td>
<td></td>
</tr>
<tr>
<td>Peanut Hulls, Etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Ask your Turf Specialty Supplier for the cost to you.
- Write cost per ton in Column B opposite the indicated product.
- Then, divide the cost per ton in Column B by the percent of nitrogen shown in Column A. Place this figure in Column C. Compare with NITROFORM.
- To find cost of water-insoluble nitrogen (WIN), divide the cost per ton in Column B by the figure in Column D. Place this figure in Column E. Compare with NITROFORM.
- And finally, to find the cost of nitrogen the turf actually receives in a fifteen-week growing period, multiply the figure in Column F by the figure in Column A. Divide this figure by the cost per ton in Column B. Place this figure in Column G. Compare with NITROFORM.

These figures speak for themselves. Any way you figure it, NITROFORM gives you more nitrogen for your money.

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FOR LOW-COST CRABGRASS CONTROL, THERE IS NOTHING LIKE AZAK®.

Azak® herbicide is designed for pre-emergence application on established turf areas. Applied prior to germination, it effectively prevents seed germination and initial growth of crabgrass. A single 12½-pound bag will control crabgrass in an acre of land...43,560 sq.ft.

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Ford LCG (low center-of-gravity) tractors can help you beat the push for time and reduce operating costs. Ford offers a choice of power sizes, with two models, 30 and 52 PTO hp, gasoline or diesel.

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The Greenskeeper’s Lament

O give me a course
Where no patches of brown
Mark the grave of changeover grass.

O give me a course
Where no golfers frown
On greens “as slick as glass.”

O give me fairways evergreen,
Let my Eden grow,
One bad lie on all eighteen
Can make a temper blow.

O let my course so verdant be,
So manicured and trouble-free
That someday some great sport will say,
“’Tis not your fault
I shot a hundred and three.”
Q's and A's

Q.—Our soils are made up of very well-drained glacial material. Specifications for our new greens call for drain tile. Do you think that tile drainage is necessary?

(Vermonl)

A.—With the excellent drainage characteristics of your glacial material I would consider tile drainage superfluous. Tile is specified where the subsoil tends to be impervious or where the drainage is too slow. You don't need tile.

Q.—Our budget has not allowed us to use crabgrass preventive chemicals and, of course, we've had plenty of the weed. We do some reseeding. My question is, should we aerify our fairways in the spring ahead of reseeding?

(Maryland)

A.—In your case I would not aerify in the spring. There is no sense in stirring up all those crabgrass seeds. By eliminating spring over-seeding you could afford to use a preemerge chemical on at least part of the course. Save your over-

Continued on page 32
“Powering up to a 15-hp. Cub 154 Lo-Boy mower brought multiple benefits.”

FEMIC six-acre lawn being groomed by International Cub 154 Lo-Boy mowing tractor.