Light touch, with turf tires or without.

Myers TurfLine Sprayers give you a "light touch" all over the course in models with tires or without. The TL12TMG (shown above) is our versatile, new, tractor mounted boom sprayer. It features Myers 12 GPM Du-All Piston Pump, a 100 gallon fiberglass tank and 21' fairway boom. Tank also has sight gauge and paddle agitator. This "light touch" sprayer, without wheels, is only one of many Myers TurfLine units that are especially designed for golf course maintenance. Other Myers TurfLine sprayers with wheels are available with high flotation tires in dual wheel and four wheel models. For details, call your Myers TurfLine dealer or send coupon for free catalog. Myers TurfLine Sprayers. To make your job easier, help speed up your work, keep the course looking great and let you stay within budget.

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Yes, I'd like to learn more about the Myers TurfLine Sprayers. Please send catalog.

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The F. E. Myers & Bro. Co.
Ashland, Ohio 44805

For More Details Circle (118) on Reply Card
When cleats dig in with the pressure that a 285 lb. player can exert, turf would come up unless anchored by good turf systems. Action like this (at left) puts any kind of turf under rough treatment. The U.T.C. fans and players expect to see turf like this (middle) all the time. We had the gridiron in excellent condition for the Homecoming game. Bermudagrass

WITT COVER STORY

By CHARLES PYRON
Superintendent of Campus Services
Univ. Of Tennesse At Chattanooga

THE U.T.C. MOCCASINS expect turf on Chamberlain Field for home games and they were not disappointed in 1973. Homecoming and our first home game was Saturday afternoon, October 6. The grass turf was like a Bermuda carpet, without a weed or bare spot in sight. The markings were clearly visible and new goal posts were being used for the first time. This year's homecoming brought Southern Mississippi to challenge the Moccasins, which they did very successfully with a score of 42-7.

The newly spruced-up stadium was full, the field was painted with new designs, and Joe Morrison, a former New York Giant, made his debut as coach.

The near perfect condition of the grass was the culmination of a three year program to develop the best sports field possible. When I came to U.T.C. in August of 1970, this field was still trying to recover from its 1968 renovation. And, artificial turf had been ruled out because of cost.

A transplanted cotton grower with degrees in agriculture (B.S.), ornamental horticulture (M.S.), with special emphasis on landscape design and nursery management, I learned to grow grass when I was working in the landscaping business. To be sure that I used current technology, I sought the services of a turf consultant. Jim King, of Regal Chemical Company in Atlanta, has been instrumental in setting up our fertilization and weed control program. He also advised us on cultural practices and equipment purchases.

Common Bermuda is a good grass for the Chattanooga area. Even with our elevation, we get too much heat in July and August for the blue-grasses. Bermuda hybrids do not recover fast enough to take the rough beating of home games over a two month period. And, sometimes local high school games are played at night after the afternoon U.T.C. games.

Since Bermuda turns brown after the first frost, which can be anytime after October 15, we color the grass to keep it looking naturally green for the remainder of the season. Our field is 1¾ acres or 56,000 square feet. Eight gallons of Vitalon will cover the field using one gallon of colorant for every 25 gallons of water. The coaches, players, and fans have expressed their appreciation of the field.

The photographs with this story were taken on October 6, before the frost discoloration, and the grass is shining in its natural color. The field is decorated with a typical latex-based paint mixed special for our school colors. It is applied on a one-to-one basis when the grass is wet, and to dry grass on the basis of one gallon of paint to two gallons of water. We have never experienced any noticeable damage to the grass from either the dye or the latex paint.

Normally, the latex paint is applied only once at the one-to-one basis and touched up if needed before each game at the two-to-one rate. In 1972, I had to change the center design. Even after blocking out the original one and painting a new design over it, the grass looked good as new the following year. Normally, the field is dyed at least twice after frost discoloration begins.

That is enough about the show. Now, to the details of my turf management program.

THE ROOT SYSTEM HOLDS THE TURF

There would not be much to look
turf takes punishment, but comes back quickly. Our yardage lines are marked with a machine like this (right). Just prior to a big game we make a final check to see that all likes are marked. Careful attention to details results in a playing field that beckons for action.

FOR BERMUDA GRASS

at unless proper attention was given to what happens in the soil. Without a deep root system, shoe cleats would lift out too much grass and leave the field a mass of bare spots. Or, the action would damage the surface to the extent that the shallow rooted grass could not recover.

A soil analysis is made every February so that we can determine early our maintenance needs for the year.

Even though 6.0 to 6.2 is considered a good pH range for Bermuda, we find that our grass continues to perform well even though the pH has been around 7.0 for the past two seasons. For this past season our soil analysis indicated an adequate level of phosphorus (P) and potash (K). For that reason, we used only nitrogen as Nitroform 38-0-0 in June, July, August, and September at the rate of 200 pounds per acre or an equivalent of about seven pounds of N per 1,000 square feet. Our peak growing periods for Bermuda are July and August, consequently, by the middle of September the grass is thick and green—ready for the first home football game. Nitroform has been successfully applied without any damage to the turf due to the slow release quality.

Equally important as nitrogen to grass color and health are the micro-nutrients, especially iron. We apply these so called vitamins in liquid form during the latter part of the growing season for a green-up before the football season. Iron is essential to root growth in combination with nitrogen. Multigreen happens to be the one we usually use because of its iron content; and it also contains sulphur, copper, manganese, and zinc.

To relieve soil compaction and to improve water and air movement the Jacobsen Core Aerifier is used monthly June through September. The nitrogen is applied after aerification. The cores are dragged in, using equipment fashioned from chain link fencing. Core aerification not only assures better fertilizer coverage, it moves the nitrogen into the root zones faster. It also gives the effect of sprigging by broadcasting the cores. Since Nitroform is nonleaching, we think this gives us quicker green-ups.

With 50-52 inches of annual rainfall, water is a problem most years only in July and August. We use two-inch aluminum pipe irrigation system and put down 1 1/2 to 2 inches of water when needed. We believe it is better to water thoroughly once rather than lightly and more often. Deep water penetration encourages a deeper, stronger root system.

SPRING IS THE TIME TO RENOVATE

The Blue and Gold game winds up spring football practice about April 20. At this time, spring renovation begins which is the first step in putting the turf in top condition for the fall season. The practice field is used for the spring football workout except for the intra-squad game.

Since soil tests are made in February we already know pH and nutrient requirements. First we dethatch to get the dead matter away from the soil surface. When mowing, clippings are not collected, consequently, thatch buildup can be quite heavy. Top dressing follows to smooth up the soil surface.

We lose some turf every season, so bare spots are filled in with grass plugs. The practice field, on another part of the campus, supplies the needed sod. We roll lightly so as not to add to compaction.

This is the time of the year we would add balanced fertilizer if the soil test indicates a need for P and K. Also, it is the time we would cor-

(continued on page 62)
DURING the past decade, much effort has gone into the struggle to halt Dutch Elm Disease. It now becomes obvious that there is no shortcut to a solid, well-rounded program of diseased wood eradication, preventive insect and fungus control and an alert system of detecting and treating trees which have recently been infected.

Highly qualified and motivated plant pathologists concerned with this disease recognize the complexities of the task. Indeed, it is these complexities which do not lead to quick statistical conclusions. Although great progress has been made, proof of control still lies in the predictability and repeatability of tests.

In order to add perspective to current ideas about chemotherapy (the treatment of internal disease by chemical reagents) for trees by trunk injection, let’s review what has already taken place. More than 25 years has gone into the development of the Mauget Tree Injection Process.

The January 1958 issue of WESTERN FRUIT GROWER carried an article “Forced Feed For Trees” by J. J. Mauget. He was an affable agricultural consultant specializing in the feeding of plants. He became interested in the possibilities of plant injection feeding after receiving intravenous nutrition in a hospital. Although he later learned that this idea had been around for 500 years, he set about to produce a simple yet effective injection process. The magazine article illustrated both gravity and pressure (up to 40 psi) equipment utilizing feeder tubes. Nutrients were introduced into the xylem tissue without removing tissue by drilling. It was also pointed out that better control of dosage level was needed to avoid defoliation.

In the early sixties, a Mauget capsule was developed. This capsule was pressurized up to 8-10 pounds by compression at time of use. It was placed at intervals of four to six inches around a tree’s circumference. Tests showed that a greater amount of nutrients and other systemic materials could be introduced without defoliation or leaf burn than when introducing smaller amounts of material at fewer injection points.

Bidrin Capsules for control of Elm bark beetle, the vector of DED, were registered for a closed system pressure capsule in 1964. This was to be used as a preventive measure. As with many things for which there is a choice between life and death, missapplications appeared. In many cases this preventive measure was frequently used on diseased trees without tissue testing first.

Seven or eight years later it was possible to determine who had continued to use this insecticide application and why. Through these users and their results, we can now demonstrate insect control against a broadening range of insects.

Today, the pharmaceutical approach to tree care is under the careful scrutiny of the Environmental Protection Agency. As a small company, we find delay in registration a heavy burden. But you learn to recognize that EPA has an awesome responsibility. As an example, it took seven years of field testing and restricted marketing of one of our products before full registration was granted. During that time, we were asked to provide data where product use on the same trees was accomplished three or more consecutive years without permanent damage. This careful analysis is the same type as the Federal Drug Administration takes in evaluating a compound for human medication.

Much of the current status of the use of benomyl fungicide for combating DED has been widely reported. The only presently approved method of trunk injection is a water suspension of the fungicide placed in a 65 ml (2 oz.) non-pressurized Mauget capsule. It in turn is connected to a feeder tube spaced at a two inch interval to another feeder tube — around the circumference of the tree.

The initial object was to evenly distribute the fungicide to the upper branches and twigs without permanent damage. Dr. Eugene Smalley, plant pathologist, University of Wisconsin, arrived at this procedure. Reasonably broad field testing was accomplished in 1971. The results justified registration and usage on a broader scale in 1972 and 1973. This was the initial step, one that would ultimately result in a more refined and effective method.

Utilizing the decade of experience, the Mauget Company has now developed a solubilized form of benomyl. It has been field tested on a broad range of pathogens and trees with particular attention to the observation of any phytotoxic effects. Although it is currently not available, this product has been issued the trademark Fungi-Sol systemic fungicide. When approved, it will be packaged at controlled dosage levels in the regular Mauget closed system pressurized capsules. Concentrations of active ingredients (continued on page 49)
The gypsies are coming
--ready or not!

Be ready this year with THURICIDE—the proven microbial insecticide!

WIDELY USED AND PROVED—Thousands of forest acres in the northeastern United States area have been treated with Thuricide for control of gypsy moth larvae. Professional arborists and nurserymen have used it with outstanding success. It is the leading microbial insecticide—worldwide—for protection of agricultural food and other crops.

COMPATIBLE, READY-TO-MIX LIQUID—Thuricide comes to you in concentrated liquid form. There are no tedious mixing problems, no danger of nozzle clogging. Thuricide is highly stable, non-phytotoxic to foliage, and can be mixed with other insecticides.

THURICIDE IS SCIENCE’S ANSWER to the professional tree man’s problem of gaining effective control over gypsy and oak moth larvae—without affecting other forms of life. Thuricide’s powerful active ingredient (Bacillus thuringiensis) is derived from nature herself. It brings sure death to leaf-eating worms, yet there is no risk of toxic drift or residues.

ATTACKS WORMS’ GUTS—Once worms ingest Thuricide-sprayed leaf, their digestive systems are quickly destroyed, feeding stops, and death is inevitable. Even if worms seem to hang around after spraying, no worry, they’re actually starving! Man, birds, beneficial insects and pets, however, are left untouched by Thuricide’s unique and selective “target action.” For full particulars, see your Thuricide distributor. Or write Sandoz-Wander, Inc., Crop Protection Dept., Homestead, Florida 33030. Or call (305) 248-4871 collect.

USED NATIONWIDE BY ARBORISTS FOR CONTROL OF THESE LEAFEATERS, TOO!

OAK MOTH LARVAE
Cankerworm (inchworm)
Red-humped caterpillar
Fall webworm
Tent caterpillar

Thuricide
Number One Name in Microbial Insect Control!
Buy a Chipco® something, get a Chipco® something else absolutely free.

Why are we doing this?
To help you save money. But, we have something else in mind, too.
Chipco is the best group of products you can use for an effective turf management program.
And we know once you use Chipco anything, you’ll soon be using Chipco everything else.

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<th>If you buy:</th>
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<tr>
<td>24 lbs. Chipco Spot Kleen</td>
<td>1 gal. Chipco Turf Herb. MCPP ($ 9.85 value)</td>
<td>30 gal. Chipco Turf Herb. MCPP</td>
<td>1 gal. Chipco Buctrii ($18.54 value)</td>
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<td></td>
<td>Or 6 lbs. Chipco Thiram 75 ($ 6.84 value)</td>
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<td>Or 3 gal. Chipco Turf Herb. D ($13.62 value)</td>
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<td></td>
<td>Or 1 gal. Chipco Spread Act. ($ 6.70 value)</td>
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<td>Or 15 lbs. Chipco Thiram 75 ($17.10 value)</td>
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<td></td>
<td>Or 1 gal. Chipco Turf Herbicide MCPP ($9.85 value)</td>
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<td>Or 1 gal. Chipco Turf Kleen ($7.52 value)</td>
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<td>Or 6 lbs. Chipco Thiram 75 ($6.84 value)</td>
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<td>10 gal. Chipco Microgreen Liquid</td>
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Chipco Buctrii controls broadleaf weeds in newly planted grasses for sod or seed production.
Chipco Turf Herbicide MCPP controls clover, chickweed, knotweed and other surface creeping weeds and is safe and effective for use on most bent grasses.
Chipco Turf Kleen controls broadleaf and surface creeping weeds with a wider margin of safety around trees and shrubs.
Chipco Spot Kleen is a new systemic fungicide for control of dollar spot, Fusarium blight, large brown patch, copper spot, and stripe smut.
Chipco Thiram 75 prevents and controls large brown patch, dollar spot and snow mold.
Chipco Microgreen Liquid provides long lasting deep green color, more root growth and less desiccation.
Chipco Turf Herbicide D is a general purpose broadleaf herbicide ideally suited where economical control is desired.
Chipco Spreader Activator is a superior adjuvant to increase the efficiency and effectiveness of turf chemicals.

Note: offer expires April 1, 1974.
Chipman Division of Rhodia, Inc., 120 Jersey Avenue, New Brunswick, N.J. 08903
Lifetime membership plaques were presented to 14 members of the Arborists Association of New Jersey. The following have completed 25 years membership with the association which was founded in 1937. They are: (l-r) Harry J. Banker, Harold Kendall, Everett Dyer, Leonard Anderson, Ernest Ricca, Harry L. Birdsall, Howard Voorhees, Walter Whitham, George Henningsen, Andres Knof and Paul Vadnais. Not present are Stanley Knof, Victor Brydon and Charles L. Post.

A deadly disease of elm trees, called elm phloem necrosis, has been found for the first time in New Jersey, according to Dr. Paul V. V. Weber, chief, bureau of plant pathology, New Jersey Department of Agriculture.

The disease has long been prevalent throughout the South and Midwest and in 1971 was discovered in Pennsylvania and New York State. It is caused by a mycoplasm, an organism smaller than a bacteria, but somewhat larger than most viruses. The mycoplasm is believed to be spread from tree to tree by the white-banded elm leafhopper or by root graft transmission when the roots of a diseased and a nearby healthy tree join by natural grafting of the roots.

As the foliage droops, curls and wilts, it takes on a rather uniform yellow color. At this stage, the innermost layer of bark at the base of the tree and in the roots turns the color of butterscotch. If small pieces of this butterscotch-colored bark are placed in a closed jar for a few minutes, an odor of wintergreen can be detected.

There is no cure for infected trees and there are no research-proven control measures.

Rental Equipment Mfg. Co., of Englewood, Colorado, has changed its name to BlueBird International, according to Doug Zehrung, president.

"The name change was a natural result of our gradual increase in business activity in other countries over the past several years," Zehrung said. "And since we're now marketing BlueBird lawn combers in thirteen countries, with the strong probability that we'll be adding still more countries to our marketing area, it was both logical and desirable to make the change. Desirable because most people call us BlueBird anyway, and the shorter name should be easier to remember for the new young people entering our industry."

The great Greensmaster 3 still has no equal.

And now it's the best spiker and thatcher, too.

1 AS A GREENSMOWER, the high capacity Greensmaster 3 is the basic machine in the Toro greens maintenance system. Exclusive features like the balanced, fully floating cutting heads—isolated from the traction unit and the grass baskets—give a uniform cutting height, appearance and playing characteristic to each and every green. Proven history of performance on fine greens all over the world lets you be confident of the real value of Greensmaster 3. (See back of page for complete features, benefits and specs.)

2 AS A SPIKER, the Greensmaster 3 is actually superior to specialty machines. Spiker units replace the three cutting units, penetrate turf up to 1 1/4 in. deep to relieve surface compaction, deliver water, fertilizer and chemicals quickly to root zones, and slice stolons and/or rhizomes—encouraging the production of new, young shoots. 57" working width makes spiking practical and efficient for the first time. Toro blade design doesn't ruffle turf. Greens are playable right after spiking.

3 AS A THATCHER, the Greensmaster 3, once again, does a better job than specialty or accessory units. Three thatching units easily replace cutting units. Tempered steel blades are arranged in a spiral pattern to do more work with less power. Variable blade spacing (as close as 1/2 inch) permits adjustment to meet varying turf conditions. 59" working width makes vertical mowing practical and efficient for the first time. Result: grain control and elimination of thatch buildup for healthier greens and more consistent playability.
1 AS A GREENSMOWER, the features and benefits include:

Balanced, fully-floating cutting heads — isolated from the traction unit and grass baskets — give uniform cutting height from first green to the last (a Toro exclusive). Low pull point on all cutting units for straight, even tracking, 15-inch turning radius for greater maneuverability, faster handling. Low-noise fully-hydraulic drive is smooth and easy on the greens. Maximum operator visibility and ease of control. Exclusive interchangeable wheels, cutting units, baskets, reel drive motors save time, money invested in stocking parts. Customizing accessories for varying conditions — including a simply engineered and easy to install individual reel shut-off kit that controls the front two cutting units to give a variable track on the clean-up run. Optional reel roller scrapers minimize grass build-up for a beautiful appearance even on wet turf. Proven history of performance on fine greens all over the world lets you be confident of the real value of Greensmaster 3.

SPECIFICATIONS* 
Model 04311
Engine: 12 hp, 29.07 cu. in., dynamic balance, 4-cycle with dry paper element air cleaner, 4 pint lubrication system, electric starting with 12 volt lead-acid battery, and 5 gallon fuel capacity. Hour meter is standard equipment.
Configuration: Tricycle vehicle with front two wheels providing drive and rear wheel steering. Operator sits over driving (front) wheels and No. 1 cutting unit, with No. 2 and 3 cutting units in front of vehicle.
Traction Drive: Direct driven hydraulic pump through stack valve to orbital gear motors which directly drive wheels.
Cutting Unit Drive: Belt driven hydraulic triple pump through stack valve to gear motors which directly drive reels.
Speeds: (approx) (3300 RPM Engine) 1st — 3.7 m.p.h., 2nd — 7.0 m.p.h., Rev. — 3.7 m.p.h. Reels — 1800 RPM.
Clutch: 27 approx.
Brakes: Two 6" drum type mechanical with pawl and ratchet lock for parking.
Tires: (3) 18 x 9.50 x 8, 2-ply pneumatic tubeless demountable and interchangeable.
Tire Pressure: 8 psi front; 12 psi rear.
Oil Reservoir: 6 gal. capacity with diagonal baffle to separate suction side from return side.
Cutting Units: Reel diameter: 5", Height of cut: 1/4" to 1 1/8" (1/4" with thin bed knife).
Optional Equipment: Full Roller Kit (Model 04412), Wiehle Roller Kit (Model 04413), Swedged Roller Kit (Model 04414), Rear Roller Cleaners (Model 04417), 1/4" Height of Cut Bedknives, Individual Reel Shut-Off (2 reels only).

2 AS A SPIKER, the features and benefits include:

Special Toro profile-tooth spike blade that spikes cleanly without ruffling turf (greens are playable immediately after spiking — no rolling or cutting needed). Power driven reels with one-way slip clutch give added traction on sloping greens. Adjustable transfer spring transfers weight from traction unit to spiking reels deliveries up to 650 lbs. of weight across 57 inch width for maximum 1/4" inch penetration. Wide spiking area gets more done in less time — you can spike as fast as you mow. And the spikes are less than 2 inches apart. A depth measuring tool is included with each set of spiker units to insure effectiveness of treatment under varying conditions.

SPECIFICATIONS* 
Model 04420
Unit Working Width: Effective width per unit — 19 inches; overall width of set of 3 units — 59 inches.
Depth of Penetration: Invariable, up to a maximum depth of 1/4".
Reel Construction: Flat hardened steel blades spaced between various combinations of 3/4" spacers. Spacings between blades to vary from 3/4" to 1 1/2", Set at 1/2" spacing at factory.
Power: Hydraulic motor splined to thatcher reel shaft.
Bearings: 1-inch shaft ball bearings re-tinned in cast iron bearing housings.
Reel Adjustment: Pivoting shaft in slotting for adjustment to reel to regulate throw of thatching and throwing of thatch into basket. Adjustable gauge wheels tailor cut to various turf conditions. Variable blade spacing (as close as 1/2 inch — depending on the need) permits adjustment to meet varying turf conditions. Gauge plates are provided for easy bench setting of penetration depth, 59" working width makes vertical mowing practical and efficient for the first time. High strength blades are made of blue-tempered high carbon steel — and they’re reversible for double the life.

SPECIFICATIONS* 
Model 04416
Reel Diameter: 5".
Unit Working Width: Effective width per unit — 20 inches; overall width of set of 3 units — 59 inches.
Reel Construction: Flat hardened steel blades spaced between various combinations of 3/4" spacers. Spacings between blades to vary from 3/4" to 1 1/2", Set at 1/2" spacing at factory.
Power: Hydraulic motor splined to thresher reel shaft.
Bearings: 1-inch shaft ball bearings re-tinned in cast iron bearing housings.
Reel Adjustment: Pivoting shaft in slotting for adjustment to reel to regulate throw of thatching and throwing of thatch into basket. Adjustable gauge wheels tailor cut to various turf conditions. Variable blade spacing (as close as 1/2 inch — depending on the need) permits adjustment to meet varying turf conditions. Gauge plates are provided for easy bench setting of penetration depth, 59" working width makes vertical mowing practical and efficient for the first time. High strength blades are made of blue-tempered high carbon steel — and they’re reversible for double the life.

SPECIFICATIONS* 
Model 04410
Reel Diameter: 5".
Unit Working Width: Effective width per unit — 19 inches; overall width of set of 3 units — 59 inches.
Reel Construction: Flat hardened steel blades spaced between various combinations of 3/4" spacers. Spacings between blades to vary from 3/4" to 1 1/2", Set at 1/2" spacing at factory.
Power: Hydraulic motor splined to thresher reel shaft.
Bearings: 1-inch shaft ball bearings re-tinned in cast iron bearing housings.
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3 AS A THATCHER, the features and benefits include:

Reels cut in forward rotation for efficient vertical mowing. Spiral pattern of thatcher blades means less wear on drive motors, more efficient thatching and throwing of thatch into basket. Adjustable gauge wheels tailor cut to various turf conditions. Variable blade spacing (as close as 1/2 inch — depending on the need) permits adjustment to meet varying turf conditions. Gauge plates are provided for easy bench setting of penetration depth, 59" working width makes vertical mowing practical and efficient for the first time. High strength blades are made of blue-tempered high carbon steel — and they’re reversible for double the life.

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