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At The International Turf-Grass Conference and Show

Our Booth is 110 at the San Francisco Hilton, Feb. 18-23—and we're looking forward to greeting many of our old friends there!

We'll have news for you, too—about our remarkable new FUNGICIDE—about the almost countless successes of the AGRICO Turf-Grass Programs—about continuing new developments that have kept AGRICO the First Choice of Professional Turf Men for so many years.

It will be great to see you! And maybe we can contribute some ideas that will help make your trip worthwhile.

AGRICO Country Club Fertilizers ...

at the roots of the best turf in America!

For more information circle number 149 on card

Answers to turf questions

by Fred V. Grau

Lime is a commonplace, ordinary material, quite devoid of glamour and often applied without visible results. The commonplace often is neglected for the spectacular. Perhaps many of us can use a "reminder" about the need for using lime.

Aglime is a term adopted to cover the unwieldy, "pulverized agricultural limestone." The National Limestone Institute, Inc., 702 H St., N.W., Washington, D.C. 20001, has published a summary of Aglime used in the U.S. (by states) compared with the tonnage *needed* according to soil surveys and tests. The results for 1966 show 30,461,488 tons used, 80,142,193 tons needed. We wonder how a similar survey might look if it were conducted on the turfgrass areas of the U.S.

So, when were the last samples submitted to your soil-testing laboratory? There is still time, and most labs have installed greatly improved equipment and techniques. Some have computerized the findings to reduce the human error. Now, who should use lime—and why?

Most grasses will benefit from the application of lime when the pH value of the soil drops below 6.0 (7.0 is neutral). Most authoritites acclaim pH 6.5 as a commendable goal. Some turf managers "run scared" when soil pH values rise above 7.0 or 7.5. Research has proved that turfgrasses that do well at pH 6.5 will continue to do well at pH 8.5 if nutrients are kept in balance.

Lime applied to turf can be expected to do several things:

a) Reduce soil acidity (H ions are replaced by Ca and Mg ions).
b) Supplies calcium and magnesium (see a), which are needed in building cell structure (stronger plants, more resistant to wear).
c) Counteracts the acidifying effect of nitrogen—(the more N used, the more lime is needed).
d) Release phosphorus and many other plant food elements that may be locked in the soil.
e) Minimizes aluminum and manganese toxicity.
f) Stimulates desirable microbial activity which helps to "mellow" soils, to reduce thatch accumulation and to minimize injurious effects of chemicals.
g) Reduces severity of many disease attacks. Undoubtedly there are other benefits that have not been included here.

What forms of lime are best for turf? For general use the Aglime is considered the most satisfactory. It is not caustic, it is inexpensive, it is slow to release and react and it is long lasting.

Burned lime (or burnt lime) is the product derived from heating limestone rock which drives off CO_2 ($CaCO_3 + \Delta \rightarrow CaO + CO_2$). This is *not* a good form to use on turf. It is highly reactive with water, it cakes on the surface and it will burn vegetation severely. Burned lime can be used effectively in seed beds when it can be incorporated at once.

Hydrated lime is the powder-fine product resulting from adding water to burned lime (much heat is released). It reacts quickly and is dangerous to use in connection with soluble N fertilizers (ammonia is produced). Hydrated lime on turf is most useful when applied as a spray at low rate (½ to 2 lbs./M) to revive "sick" grass and to relieve certain disease disorders. It is safe to use with ureaforms.

When is lime used to best advantage? Simply—when it is needed. As to seasonable use, apply it when the soil is most likely to absorb it. In fall, it will work its way into the soil with freeze-thaw cycles when the course has the least play.

When soil has been opened with cultivating tools, a high percentage of applied lime will be washed into the holes. Lime performs best when it is *mixed* with soil particles. Layers of lime can be harmful.

Impurities in Aglime can be plus values But, 65% $CaCO_3$ equivalent is the lowest acceptable grade in any state. Highest quality lime may run 109% $CaCO_3$ equivalent (magnesium in dolomitic types weighs more than Ca).

Color is not the deciding factor in Aglime. In one quarry, there were three predominant colors of limestone:

1) off-white—82% $CaCO_3$ equivalent.
2) grey—89.5% $CaCO_3$ equivalent.
3) red—95% $CaCO_3$ equivalent.

All were ground to the same fineness. Farmers would accept only white or grey; the red was refused (prejudice) even though it represented the best value. Prejudice and personal preference

Continued on page 14

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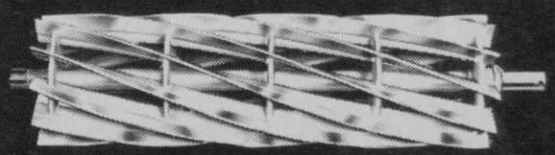
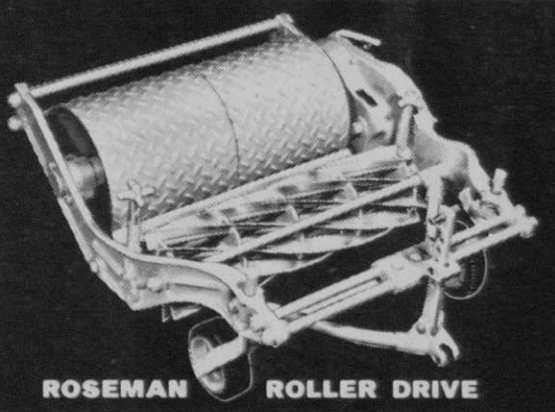


ROSEMAN 7½" DIAMETER REEL WITH 10 CHROME-NICKEL ALLOY STEEL BLADES



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For more information circle number 141 on card

GRAU *Continued from page 12*

should defer to neutralizing value ($CaCO_3$ equivalent.)

Particle size (fineness of grind) is a valid consideration. The finer the particles the sooner one obtains results. A good threshhold value for turfgrass use is 80—90% passing 100-mesh. Consult your supplier on what he can deliver.

Q. We plan to convert from sand greens in the near future. Can you suggest books or other publications that would help us in the conversion and would help our course caretaker to recognize green problems? (Missouri)

A. Converting from sand to grass is a major operation that merits even more consideration than building new greens from scratch. First, secure the services of a qualified golf course architect to design the greens and to develop specifications regarding irrigation, size of greens, drainage, contours, bunkering, soil mix, fertilization and selection and planting of the best grass.

The architect can guide you in selecting the proper maintenance equipment. Equipment firms have field representatives that instruct users in maintenance and operation of machines. They also represent chemical firms and will help select the best materials for pest and disease prevention. Some firms have excellent instructive literature.

Golf course superintendents skilled in turfgrass management can give valuable guidance. Some associations have committees organized for the purpose.

State Experiment Stations in your state and in surrounding states should be contacted for useful literature and helpful visitations. By attending turfgrass conferences and visiting other courses, your caretaker will learn a great deal about the management of grass greens. But be patient. He will make mistakes. Many golf course superintendents have gone to college to learn about grass. Your sand-green caretaker can't learn it overnight.

Q. I have run into a problem on my course and I need help. The

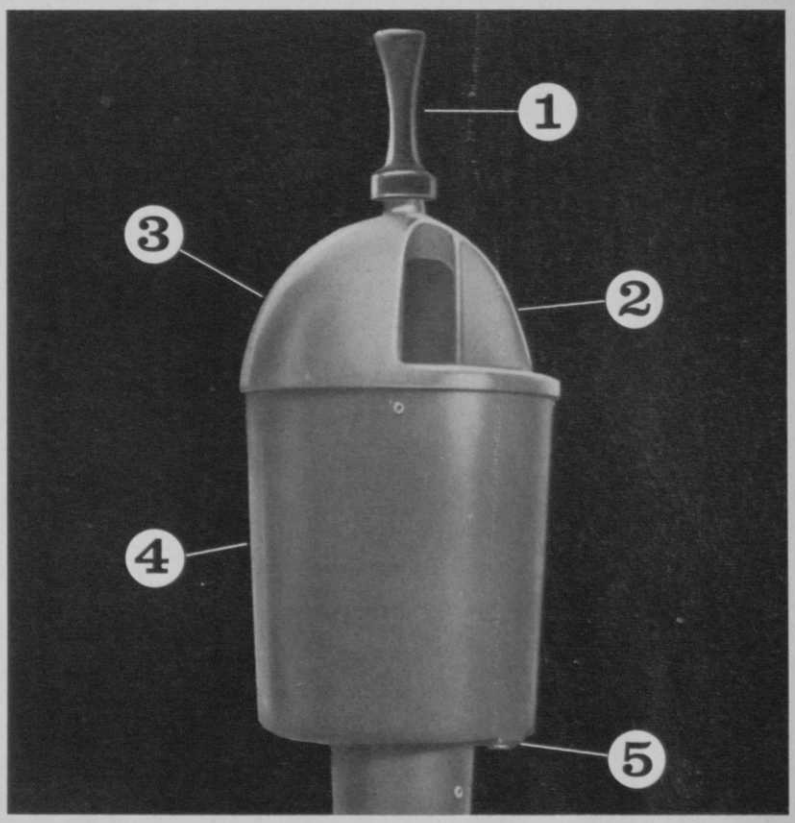
Continued on page 63

ANNOUNCING

NEW budget-priced ball washer!

Combines long life with low maintenance

New Lewis aluminum-fiberglass housing with stainless steel, rubber and nylon fittings assures rust-free dependability and trouble-free operation.



LEWIS LEADS AGAIN! You asked for a Ball Washer combining trim design with smooth operation and minimum maintenance . . . at a modest price. Lewis engineers achieved this with the remarkable new GF-68 Washer, combining aluminum and fiberglass. Its functional design and smooth, splash-free cleaning action pleases players from the first insertion of the ball to its final automatic transfer to the holding tray.

Greens Superintendents recognize these top quality features . . .

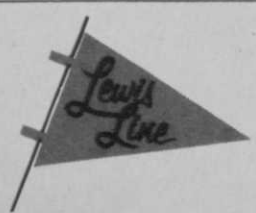
Lewis fine quality materials assure long life and easy maintenance:

(1) Tough phenolic grip holds solid stainless steel plunger shaft firmly, permits 360° swivel. **(2)** Oversize opening directs ball to nylon paddle for spin-action cleaning. Exclusive design automatically ejects ball into receiving "tray". **(3)** Cast aluminum top is designed for rough use. Easily removed to replace brushes after 3 to 5 years of normal use. **(4)** Molded fiberglass base forms large water chamber. Washer can't become rusted to post. **(5)** Outside drain plug for easy flushing.

New Fluorescent Flagpole features high visibility . . . pinpoints cup on green from 100-150 yards out. Ken Voorhies, Columbine C.C., Denver, Colorado, shows vertical stance of pole with new chamfered ferrule and chamfered cup.

Lewis Deluxe GF-555 Tee Stations are used by Wade Flatt on all eighteen tees of his Skyline Country Club at Wichita Falls, Texas. He uses Lewis Line equipment exclusively because of its dependable service.

20-55



Lewis Line GOLF EQUIPMENT

Cup Cutter • Cups • Flags • Flagpoles • Tee Markers • Tee Stations • Ball Washers
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Accent on management

by Ken Emerson *Executive Director, National Club Association*

The ability of privately owned golf courses to remain independent is being severely taxed, in the most literal sense of the word.

Already challenged for living space by urban development and a growing suburbia, private golf now faces yet another peril—an effort by some misguided and short-sighted states and local governments to saddle their few remaining acres of recreational land with a new real estate tax geared to the "highest and the most profitable use" of the land possible.

Should the move succeed to the point where it becomes a general trend, it may well prove a final, fatal blow to many of the country's already hard-pressed private courses.

There is no doubt that local communities face a difficult problem in their need to discover new revenues to satisfy the growing demand for increased public services. Doubtless, too, the privately owned golf course and small country club appear to be the most likely and least vocal sources for such revenue, at least, on the surface.

Such is not the case!

Though bedeviled by rising costs and operational expenses, the private golf course maintains an often extensive recreational facility on anywhere from 90 to 200 acres of increasingly rare, green, landscaped, open space at no cost to the community where it is located.

It fully expects to, and does, pay a full tax load on all its buildings, its swimming pool, and other improvements. It also expects to pay a fair and proportionate tax on its open land. In New York State alone, 210 golf clubs already pay more than $5 million annually in property taxes. And it adds to community coffers in many other ways.

Because they are in the neighborhood of a well-kept golf course, the value of surrounding homes is considerably above that of other residential areas. The higher taxes realized from the increased valuation are a measurable part of the community's financial resources.

To maintain its facilities, the private course spends all, or nearly all, its income with local concerns; depending on its size this represents from $100,000 to $1 million to local businessmen. In addition, the club supports a payroll that often exceeds $100,000, representing jobs as well as purchasing power.

Tax the open, strictly recreational land of this golf course at its "highest and most profitable use" rate and the club's already strained financial resources may leave it only two alternatives.

Move—or dissolve!

Because a golf club contemplating a move faces an immediate outlay of $1 million or more for property and buildings, the temptation is to dissolve, but either decision means that the community will lose taxes, jobs, and purchasing power.

More particularly, the individual citizen is a loser. Golfer or non-golfer, the departure of the club means not only the loss of another recreational area, but *higher taxes* as well. In fact, the legislature which seeks to raise additional funds by taxing golf courses on a "highest and best use" base may well find itself in the position of the snake which sought to satisfy its hunger by consuming its tail.

How does this happen? Consider this statement from the Planitorial, "Taxation Without Consideration" in a recent issue of *Urban Land*.

"By reason of its sheer value as open space, a golf course creates value for the surrounding property. The value from the presence of the golf course accrues to the surroundings, not the reverse. If the golf course were to be assessed at a market value represented by the surrounding improved lots it would be quickly taxed out of existence. Under all this too common practice, the golf course disappears and the values previously assignable to its presence disappear with it. A net loss to the community results. For real estate tax purposes the golf course should be assessed at its value as a golf course and not for its value as house sites."

This statement was underlined by a California study which showed that where golf courses have moved, the adjacent property immediately decreased in value.

The study also pointed up an additional factor which *adds* to a community's tax burden. Replacing a golf course with housing, especially multiple housing, creates an equivalent need for paved streets, sewers, utilities, schools, police, and the other public services required by the addition to the population. And new, or higher taxes to support them!

Even maintaining the course as a municipal enterprise is not a satisfactory answer. Taxes are lost and the course must be supported by additional taxes paid by golfer and non-golfer alike. Greens fees alone cannot do the job.

While expressions of concern and requests for help are coming in from many parts of the country, some states *are* taking a hard, new, look at the problem—and are acting. Maryland, California, and Florida, in particular, have enacted specific legislation to ensure the future of recreational land for their citizens' benefit.

Continued on page 63

Why in the world should you be carrying Pepsi-Cola?

Here are three good reasons:

1. Half the country is now under twenty-five. One hundred million thirsty people. A generation explosion: the one we named the Pepsi Generation. More young golfers every day. You've seen them on your course. We talk their language. Our advertising is aimed directly at them, plus all the rest who "think young." Interested in exploding profits? Keep enough Pepsi on hand.

2. Pepsi adds a bonus to your sales. Diet Pepsi, the most famous name in diet colas. It's the one your distaff golfers favor. Pepsi-Cola and Diet Pepsi...two great colas for two great markets.

3. Pepsi service is a one-phone-call operation. From syrup to installation of equipment, to a discussion of better ways to use your space, your local Pepsi-Cola bottler *takes care of it all.*

If your club's facilities don't offer Pepsi-Cola now, why not find out what *real* profit is. Write to Roger C. Bulkley, National Sales Dept., Pepsi-Cola Company, 500 Park Avenue, New York, N.Y. 10022.

taste that beats the others cold!

Turfgrass research review

By Dr. James B. Beard

The role of guttation fluid in fungal disease development.
R. M. Endo. *California Turfgrass Culture*. 17(2):12-13. 1967. (from the Department of Plant Pathology, University of California at Riverside, Riverside, Calif. 92502).

The objective of this study was to ascertain the relationship of guttation to the spread of turfgrass diseases by (a) fungal thread and (b) spores. Guttation fluid was collected in early morning. Drops of guttation fluid and water were placed on seaside bentgrass leaves and fungal threads of dollar spot and brown patch were added to the droplets. Actual infection occurred only with the droplets containing the guttation fluid.

In a related study, guttation of moistened four-inch plugs of turf was induced by placing the plug in a closed plastic bag. Fungal threads of brown patch were placed on a single leaf. In this situation, the fungal threads were observed to bridge from one guttation droplet to another with mycelial growth being stimulated from each droplet.

Studies were also conducted with leafspot which spreads by spores. Spores suspended in guttation fluid and water were sprayed on bentgrass seedlings. All plants sprayed with the spore-guttation fluid were dead after six days. All plants sprayed with the spore-water suspension survived even after 14 days. The guttation fluid induced acceleration and increase in spore germination, percentage of infections and the subsequent development and spread of the fungus in the infected tissues.

Comments—Droplets of water occur at the leaf tips of turfgrasses during the night and early morning hours. These droplets are produced by guttation or may be the result of direct wound exudation from the freshly cut leaf. Leaf exudations should not be confused with dew, which is more likely to be distributed over the leaf rather than at the tip. Rapid water absorption by roots, restricted transpiration, frequent irrigation, close-frequent mowing and heavy nitrogen fertilization will stimulate leaf exudation. Exudation fluids enhance turfgrass disease spread and infection because of the mineral salts, sugars, amino acids, amides and other organic acids contained in the exudate.

Since leaf exudates enhance disease activity, it is a desirable practice to break up or remove these droplets. The preferred method of exudate removal is by syringing, since the water washes the disease-favoring organic material from the leaf surface. Dragging, brushing or poling are also effective in disrupting the droplets and increasing evaporation. However, the latter methods may also tend to distribute the fungal threads over the entire leaf surface. Leaf exudation can be minimized by effective air movement and avoiding excessive nitrogen fertilization or watering.

Recent advances in controlling winter injury of turfgrasses.
J. P. Lebeau. Proceedings of the 21st Annual Northwest Turfgrass Conference. pp. 14-21. 1967. (from the Canada Department of Agriculture, Lethbridge, Alberta, Canada).

Turf heating with electrical cables has ensured the winter survival of non-hardy turfgrasses on greens at Lethbridge, Alberta, Canada. Turfs maintained at minimum temperature of 38 to 42° F. showed injury and had an uneconomical power requirement. On the other hand, turfs held at a mimimum temperature of 26 to 32° F. survived the winters in good condition and had an economical power consumption. The results indicate that the power requirement to bring non-hardy turfs through the winter uninjured was in the economical range.

Polyethylene covers are also being evaluated for use in winterkill prevention caused by desiccation and low temperature. Studies in southern Alberta indicate that polyethylene covers increase the effectiveness of inorganic mercurial fungicides used in the control of snow mold. One half the recommended rate for mercurial fungicides was effective in the control of snow mold when the turf was covered immediately after application of the fungicide. Problems were encountered in securing the cover to the ground. In addition, the covers had to be removed at intervals during the spring in order to mow the excessive leaf growth.

Tests at Edmonton and Lethbridge showed most creeping bentgrasses to be more winter hardy than colonial bentgrass and annual bluegrass. Northland creeping bentgrass has exhibited superior winter hardiness to low temperature and snow mold.

Comments—Electrical heating of golf greens and tees is still in the experimental stage of development in North America. Soil warming shows promise for future use on courses having medium high to high budgets. This technique may offer

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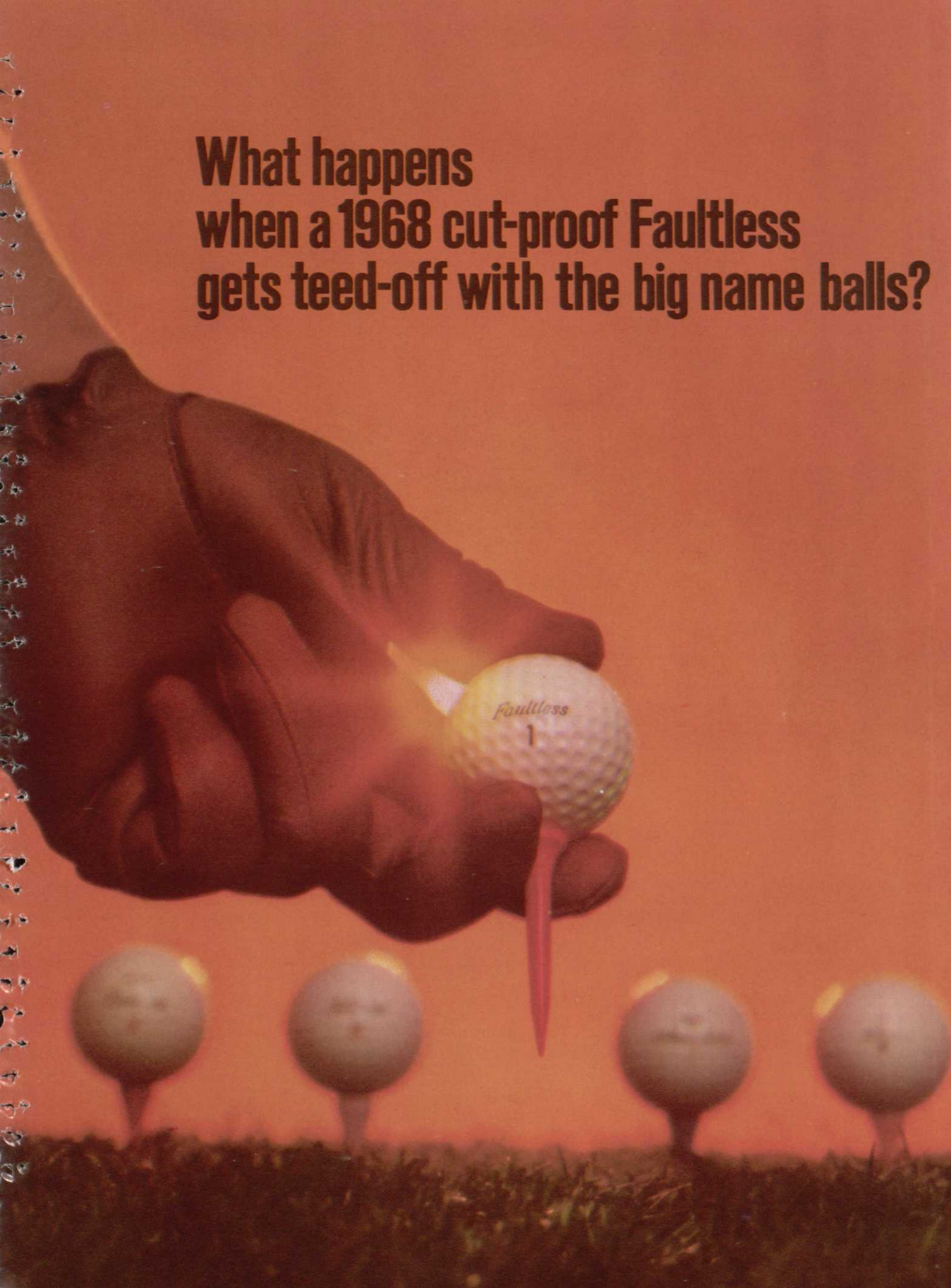
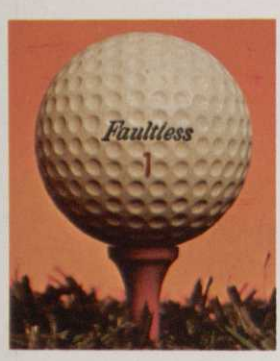
What happens when a 1968 cut-proof Faultless gets teed-off with the big name balls?



Faultless gives you the best performance



The Faultless comes closer to the pin.

And that's the name of the game. In one of a continuing series of carefully controlled tests, we proved out the overall performance of the new 1968 Faultless with our secret weapon.

The Faultless hitting machine. There's no chance for human error, because our machine hits every ball the same. Perfectly.

Result? Look at the diagram: Faultless comes closer to the pin.

Faultless construction.

Faultless golf balls are made the way most balls will be made in the future—in one solid sphere. Our '68 version has a new satisfying feel that really clicks for distance.

And it flies like it's got eyes. Faultless Golf Balls shoot and putt true because they don't have it in them to do anything else. No core. No rubber bands. Nothing inside to get out of round or balance.

And no cover to smile up at you after you clobber one like a duffer.

It's like hitting a new ball every time you swing.

The perils of Faultless.

You can even guillotine a Faultless with a knife-sharp blade that chops into conventional balls, and—Vive la Faultless! No cut.

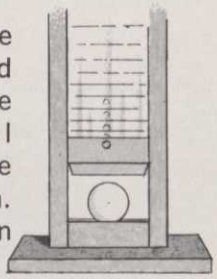
Here's another test big-name balls can't survive. Put a '68 Faultless in a punch press for 10 or 15 minutes hitting at 240 impacts per minute. (Other balls become unplayable after a couple of minutes.)

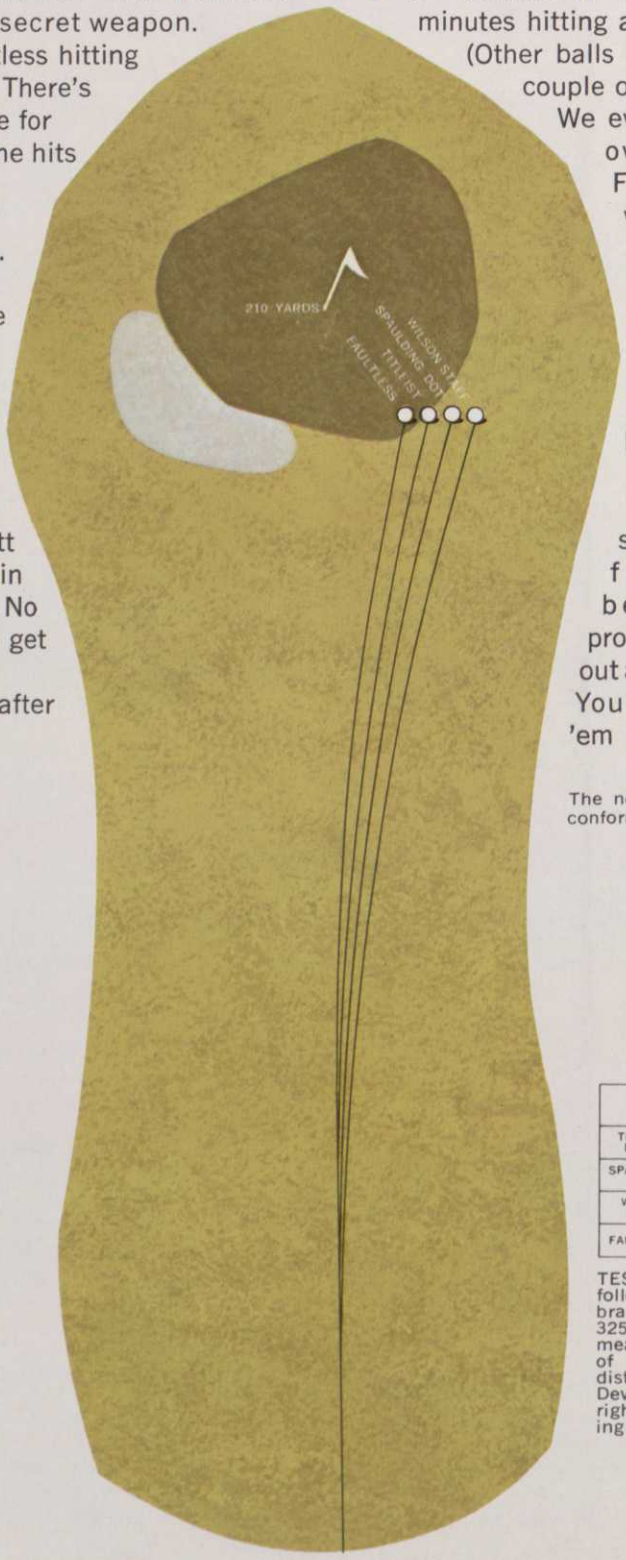
We even left a test machine on overnight. Next morning, a Faultless had taken 140,000 wallops—and was still ready for more.

The honest ball.

Last but not least, the easiest test of them all—the click and feel test. Just tee-off on a '68 Faultless. Then hit any big-name ball.

Which one sounds and feels the best? It'll probably come out about even. You can't win 'em all.





The new Faultless *Professional* and *Futura* conform with all U.S.G.A. rules

	SHORTEST HIT	LONGEST HIT	EXTREME LEFT AND RIGHT DEVIATION TOTAL
TITLEIST DT 100	194 yds.	208 yds.	40 ft.
SPAULDING DOT	196 yds.	209 yds.	41 ft.
WILSON STAFF	196 yds.	208 yds.	54 ft.
FAULTLESS	199 yds.	208 yds.	28 ft.

TEST CONDITIONS: Variable 16-19 mph following wind. 12 new balls hit of each brand. Each ball hit exactly the same: 325 rpm's on hitting machine. Flights measured from hitting machine to point of first touchdown. Distance = average distance of 12 balls hit of each brand. Deviation = maximum variance, left and right, shown on diagram in relative ranking closest to pin.