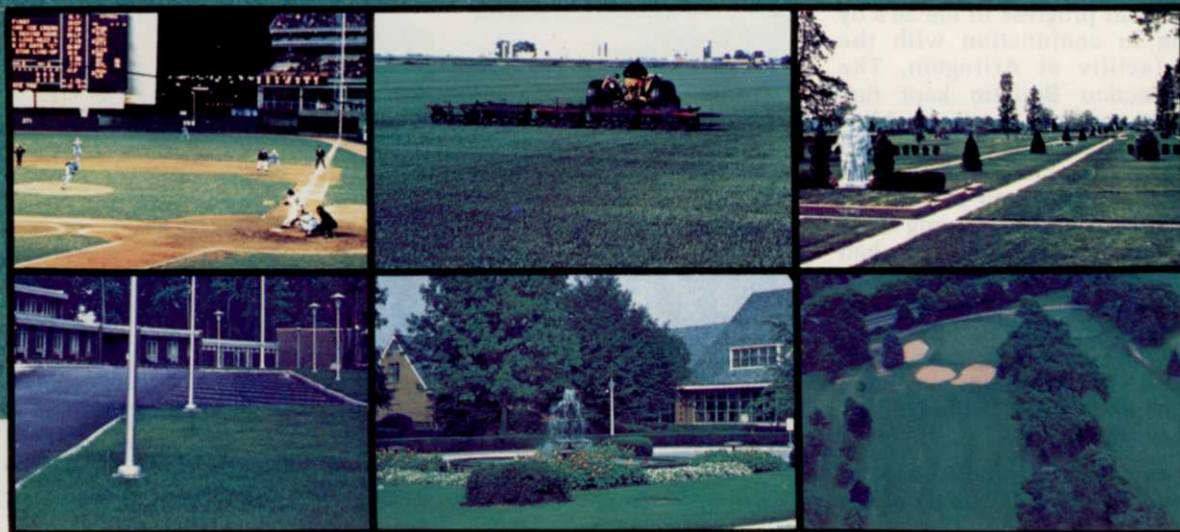


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The GREENER Kentucky Bluegrass

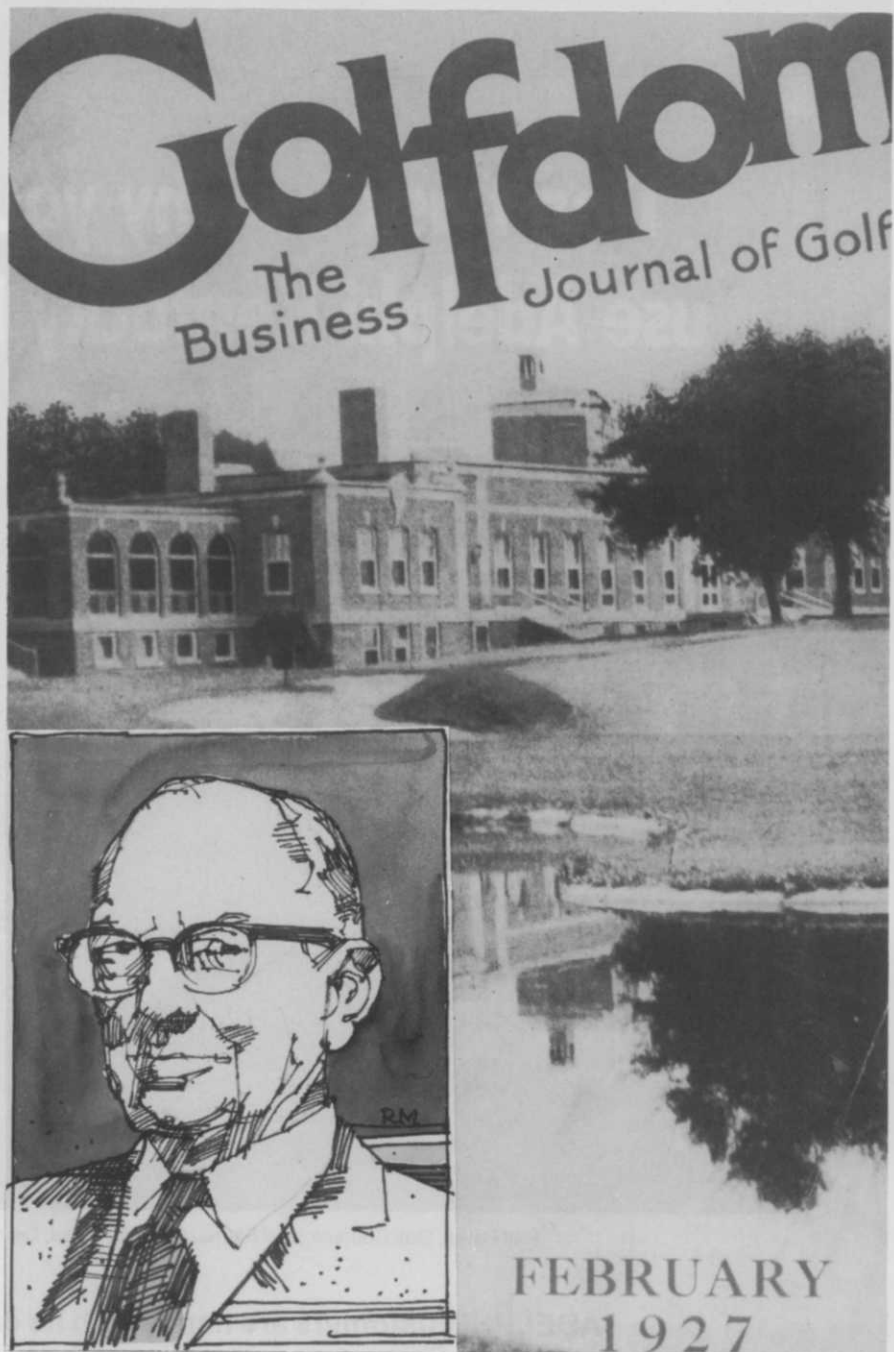
deaux mixture for disease control. Mallinckrodt developed Calo-Clor and Calogreen, mercuric chloride compounds. Bayer produced Uspulum Nu-Green and Du Pont offered Semesan, a chlorophenyl mercury compound. These fungicides were used for many years.

By the late 20's the golf industry was very healthy. Other sports were gaining strength on a college and professional level. The concept of a well-groomed memorial park instead of standard cemetery originated in the 20's. Scotts' publication *Lawn Care* was launched and created more residential interest in turf. Turf was booming. It was another 30 years before turf regained its momentum after the Depression and two wars. During that period, however, progress continued.

John Monteith, director of the Green Section, spearheaded much of the technical progress in the 20's by working in conjunction with the USDA facility at Arlington. The *Green Section Bulletin* kept turf managers current. It was a blow when USGA was forced to lay off everyone in the Green Section except Monteith and stop publication of the *Bulletin* in 1933. Among those let go were Arnold Dahl, who had coauthored *Turf Diseases and Their Control* with Monteith in 1932 and Fred Grau, a graduate of the University of Nebraska turf program. Dahl became a turf consultant and Grau began his Ph.D. work at the University of Maryland.

Progress did not come to a complete halt in the 30's. Du Pont introduced the fungicide, Thiram, in 1931. Research continued on weed control and turfgrass selection at universities. Combinations of fertilizer and lead arsenate were proving effective. Merion Golf Club superintendent Joe Valentine selected the first quantities of Merion Kentucky bluegrass in 1936, the same year Grau joined up with Burt Musser at Penn State after completing his Ph.D. O.J. Noer, a progressive businessman with the Milwaukee Sewerage Commission travelled the U.S. touting Milorganite and Milar-sentie for turf.

The preservation of the science can be attributed to regional personalities, whether they were golf course superintendents, suppliers, university specialists, or association leaders. Without them, the turf market would have lost ground. The hard times may have unified turf



Turf and golf growth in the 1920's was recorded by a number of new publications including *Goldom*, founded by Herb Graffis (inset) and his brother Joe in 1927.

managers, especially golf course superintendents, and caused continued progress through discussion of mutual concerns. This unity kept healthy manufacturers interested in the market and encouraged inventiveness in those that had mechanical talent.

In 1936, Tom Mascaro launched a topdressing supply business in West Point, Pennsylvania. He quickly made acquaintance with superintendents and turf specialists, such as Monteith, Dickinson, Musser,

DeFrance at Rhode Island, and Sprague at Rutgers. It was already understood that some type of cultivation prior to topdressing was beneficial. Removal of thatch by hand raking was also practiced. Ten years after it began, West Point Products, with the technical assistance of Grau, developed the first commercially produced aerifier and verticutter. The first aerifier was tractor drawn and used a series of spoon-shaped rods to pierce the soil surface. His technology was purchased

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in 1969 by Hahn Inc. of Evansville, Indiana. Turf technology regained momentum in the late 40's and has yet to stumble like it did in the 30's.

After World War II there was a flurry of activity in the turf market. Fanny Fern Davis, Green Section director during the war, supported the use of a new herbicide, developed in 1941 to be a fungicide or insecticide. It was a substance that selectively affected the growth of plants, specifically broadleaved plants, without harming grasses. 2,4-D was the start of a chemical revolution in weed control. It was the basis for the new commercial applicator market, treating roadsides, drainage ditches, rights-of-way, and lawns.

The 40's was also the first identification of turf as a special committee in the American Society of Agronomy. This was an important event since now turf related research would be reported in the *Agronomy Journal*. The creation of the committee was pushed by then director of the Green Section, Fred Grau, who returned to USGA for eight more years of service.

Progress was also made with fertilizers. It was discovered in the early 20's that combining the hydrogen in natural gas with nitrogen produced ammonia. By reacting ammonia with carbon dioxide gas, a more stable source of nitrogen was created, urea. But urea was volatile and did not persist in the soil as a source of nitrogen for plants for very long. It was discovered that by chemically reacting formaldehyde with the urea a longer lasting product was obtained, ureaformaldehyde. Both Du Pont and Nitroform Agricultural Products introduced UF products in the 40's, Uramite and Nitroform.

This chemical revolution extended to growth retardants. Giberellic acid was the first to receive attention for turf use in the late 40's. Growth retardants required very precise use and exhibited side effects which were unacceptable to major turf markets.

The chemical that really started the revolution was the insecticide DDT. Commercial production of this chemical began during the War and continued until environmentalists, spurred on by Rachael Carson's *Silent Spring*, stopped its production and sale in certain countries. DDT was the first major breakthrough with insecticides since the discovery of the arsenicals, nicotine, and pyrethrum decades before.

Subsurface irrigation began to gain acceptance in the 40's. California companies set equipment standards which spread rapidly to the Southeast and slowly northward. Quick coupling systems of the 40's were installed with galvanized metal, copper, or asbestos pipe. Automatic controls (electromechanical) were introduced in the late 50's. In the 40's and 50's regional agricultural irrigation suppliers were a major factor in turf, such as Skinner and Thompson. Toro purchased the California company Moist-O-Matic in

1958 and provided a national source for turf irrigation equipment in addition to Buckner and Rain Bird.

Permanent irrigation heads slowly gained share of market with quick couplers, especially in arid/semi-arid regions where daily irrigation was necessary. Spray, impact and eventually gear-driven heads were developed. Plastic began overtaking metal and asbestos in the 60's for pipe and heads. Installation was simplified by the use of flexible plastic pipe. Computer technology has added flexibility to the controller in the past decade.

While the chemists worked on new fungicides, herbicides, and insecticides in the 50's, a second generation of turf specialists were studying under the first. These new investigators tested the new chemicals as part of their research work. The result was a very productive 60's. Butler, Burton, Daniel, Duich, Engel, Indyk, Kozelnicky, Kneebone, Miller, Murray, Reike, Shoulders, Skogley, Watson, and Youngner improved the market's data base. At the same time they coordinated regional turf field days and conferences further strengthening the turf industry.

They reported on new preemergence herbicides such as DCPA, DMPA, bensulide, siduron, trifluralin, and terbutol. They tested the postemergence herbicides mecoprop, dicamba, dalapon, simazine, and the methanearsenates. They pinpointed the role of nematodes in turf disease and studied the new contact and systemic fungicides. IBDU was evaluated as the second major slow-release fertilizer. They helped turf managers understand the new chlorinated hydrocarbons, organophosphates, and carbamate insecticides.

The 50's and 60's were the introductory years of many improved turfgrasses selected and produced by seed. The first fulltime turfgrass breeding position of Dr. Reed Funk at Rutgers was experiencing great success with new possible grasses.

During this time, the Green Section narrowed its scope of service and established regional technical areas each staffed with an agronomists. Al Radko took the reins from Fred Grau in 1953. At Beltsville, Felix Juska headed turf research until Jack Murray stepped in. Professional golf reached new levels of spectatorship with the skills of



Eb Steiniger

Superintendent of Pine Valley Golf Club in Clementon, New Jersey, since the 30's.

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Early gasoline-powered single reel mower. Circa 1920. Courtesy Toro Co.

Hogan, Sneed and Palmer.

Events receiving little attention but important nonetheless were the development of wetting agents for turf, additives for better spray coverage and adherence, colorants, and high impact plastics and fiberglass.

By the end of the 50's, it was clear turf was back on its feet and ready to grow rapidly. To serve the turf manager in areas other than golf, *Weeds Trees & Turf* was launched in 1962. Four years later, *Grounds Maintenance* was started. These publications published news and interpretive articles on the mass of technical data being produced. The market was gaining in professional stature and drew the attention of potential suppliers. Commercial publications assisted these suppliers in reaching the new market.

The graduate students of the 60's are now attaining professor status. It has become their challenge to put all the progress into a digestible and logical form. Stiffer environmental



Jim Watson

Studied under Musser at Penn State and went from there to Texas A & M and Toro to solve irrigation turf irrigation needs.

regulations make their tests more intense and involved. Among this group are Beard, Dunn, Gibeault, Hall, Larsen, Shearman, Smiley, Turgeon and Turner.

The commercial sector began to provide attractive employment for some of these new graduates. It began to pick up some of the research load previously left to the university. Examples are ChemLawn's Miller, Joyner, Martin and Wilkinson; Davey's Funk; Turf Seed's Meyer; International Seed's Pepin; and Loft's Hurley.

The 70's was a decade of questioning existing turf practices. Loss of certain chemicals, resistance to others, and rising costs of water and petrochemicals forced a reevaluation of turf maintenance. Integrated management and lower maintenance levels are being studied for practicality. Better attention to basics like rootzone construction, pH, and drainage may lower dependence on corrective measures.

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MAINTENANCE PRACTICES TODAY

The pioneering days of turf management are for the most part over. Efforts are now directed on improvement of existing equipment and new uses for existing chemicals. The primary goals of engineers and chemists now are saving labor and fuel. Even water is becoming a critical limiting factor in turf maintenance in some areas.

Safety and environmental regulations for chemicals and equipment have increased cost without increasing productivity or efficiency. At the same time, they have greatly discouraged new suppliers from entering the market. Ingenuity is too often suppressed by the liability of manufacturing today.

After ten years of trying to meet unclear and constantly changing demands by the Environmental Protection Agency, chemical manufac-

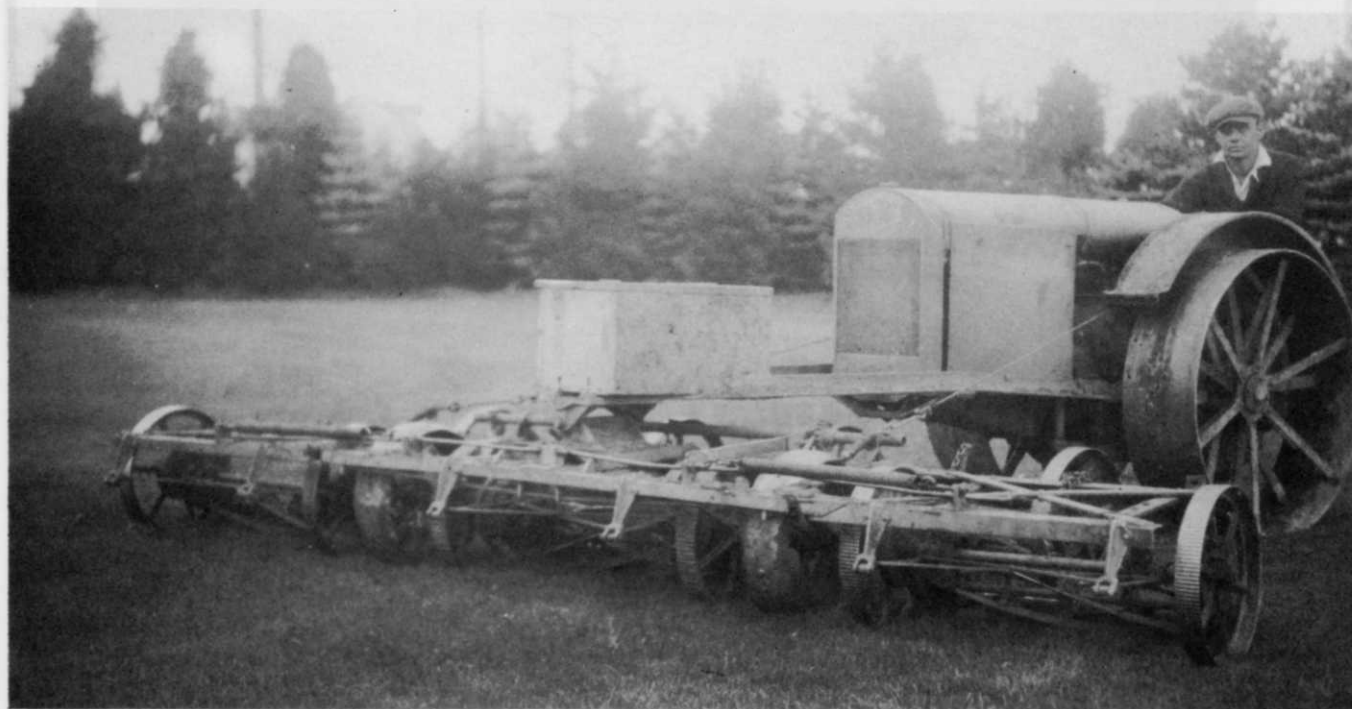
turers have at least a few precedents to go by in chemical registration. As a result, more uses for existing products are becoming available. However, some of the chemical workhorses of turf management are floundering in EPA's Rebuttable Presumption Against Registration Process (RPAR). In this evaluation, products with suspected dangerous side effects are prosecuted under the full weight of environmental groups. This process forces the manufacturer to reevaluate the profitability of keeping older chemicals on the market when expensive testing is mandated. If the chemical is placed in a restricted category and the market for the product is reduced considerably, the manufacturer will be forced to raise prices to cover the cost of manufacturing smaller quantities.

The equipment manufacturer will soon face new safety regulations. Mower manufacturers are being required to add a blade brake which will supposedly prevent injury to feet and hands when the mower is not in motion. This precaution will add more than \$30 to the cost of a trim mower. It is likely that similar safeguards will spread to machinery such as power trimmers, vacuums, and snow blowers.

Despite this burden of protecting the buyer against himself, manufacturers are making progress. Products are evolving which do cut labor time, gasoline consumption, and down time. Much of the savings however is lost in the price of the product.

The key to turf management efficiency is combining all known money saving measures into one in-

Continues on page 45



Thoughtful superintendent at Merion Cricket Club in Haverford, Pennsylvania, in the 20's rigged reel gangs in front of Toro tractor so that grass would be cut before heavy tractor wheels compressed it.

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Dave Portz
Grounds Superintendent
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EQUIPMENT

Jacobsen Division of Textron Inc.

A couple brothers, Knud and Oscar Jacobsen, and AJ Dremel founded the Jacobsen Co. in 1921 with the development of the "Four Acre," a lawn mower which could cut four acres in one day. This machine weighed 275 pounds and sold for \$275. The following year, the founders took back all 75 pieces that were sold and checked and reconditioned them to make sure they were working smoothly.

The Four Acre was the first mower with an engine designed for parks, cemeteries, and other heavy-duty operations. The second Jacobsen model arrived in 1923, called the "Estate." The next year the company introduced the first cast aluminum, power engine greens mower. Golf course superintendents hesitated to use the greens mower but soon realized it was ideal for cutting bentgrass.

The industry's first automatic recoil starter came out of the Jacobsen workshop in 1928, the same year the company unveiled its own fairway gang mower. That year Einar Jacobsen, Knud's son, joined the company and later became president.

In the years following, the company introduced many firsts to aid those involved in turfgrass maintenance: the first polyethylene grass catcher; the first mower with four reversible, replaceable, retractable blades from rotaries; the first with pneumatic tire equipment; the first mower with hydraulic tri-plex screens; and the first out-front hydraulic fairway mower.

Before 1929, someone cutting turf of any expanse had to walk behind the mower. Thus Jacobsen saw the need for and invented the sulky, an interchangeable riding attachment for power mowers.

In the spring of 1939, the company introduced the Lawn Queen for \$87.50. It was the first homeowner-type power mower for lawns and cut an 18 or 21-inch swath.

Jacobsen bought the Johnston Lawnmower Co. in Otumwa, IA, which built all-steel hand mowers. World War II halted lawn mower manufacturing for all but a few companies and Jacobsen built generators and other defense equipment for the Army.

The company continued to develop more products for golf courses and homeowners and in 1953 introduced power snow removal equipment to its line of other products. Jacobsen merged with the Allegheny Ludlum Co. in 1969 and two years ago Textron Inc. bought Jacobsen from Allegheny Ludlum.