

Survey Confirms Green Industry Expo Success

Results from an independently tabulated survey verify claims that the national Green Industry Expo (GIE) is the "Home of the Professional."

GIE is sponsored by the Professional Lawn Care Association of America, the Professional Grounds Management Society and the Associated Landscape Contractors of America, in conjunction with educational conferences. "The positive responses confirm that the show's position in the marketplace continues to gain strength and momentum," said GIE President George Gaumer.

More than 1,500 attendees at GIE 1993 were surveyed to determine their role in business, their purchasing authority, and the services performed by their companies.

The survey found that 67 percent of the attendees were upper management, while 45 percent were owners or presidents. Nearly all—92 percent—play a major role in the decision-making process for purchasing new equipment and services.

GIE 1994 is scheduled for November 14-17 in St. Louis. For more information, call (404) 973-2019 or FAX (404) 578-6071.

STMA 1995 Speakers Announced

American League Senior Umpire Larry Barnett, sports turf expert Dr. James Beard and noted stress-management guru Tom Jadin are among the top speakers to take part in the STMA Sixth Annual National Conference and Exhibition. The event is slated for February 4-8 at Pirate City in Bradenton, FL.

A variety of educational sessions, facility tours, hands-on product demonstrations and the national awards reception and banquet are on the schedule for the five-day event.

For more information about the STMA 1995 National Conference and Exhibition, call Carey Haines at (312) 644-6610.

Erosion Control Courses Offered

Two one-day professional development courses offered by the International Erosion Control Association (IECA) will provide useful, fundamental training

for those interested in improving their erosion- and sediment-control skills. The classes are preparatory courses for persons seeking the Certified Professional Erosion and Sediment Control (CPESC) specialist designation.

"Practical Approaches for Effective Erosion and Sediment Control" will focus on solutions for urban and construction-related erosion problems. This class is scheduled for November 29 in Orlando, FL.

"Design Methods for Channel Protection and Streambank Stabilization" will provide a basic understanding of stream and channel instability processes and what design methods can be used for protection and stabilization purposes. This class is offered on November 30 in Orlando, FL.

For information and registration, contact the IECA at (303) 879-3010, or by fax at (303) 879-8563.

YOU COULD BE HONORED BY THE PROS!

Why not enter your baseball field in the **Beam Clay® Baseball Diamond of the Year Awards** contest? You need not be a customer, member, or subscriber; and there is no entry fee. You could be featured in **sportsTURF magazine** and receive an official awards plaque.

The Awards are sponsored by **Beam Clay®, sportsTURF magazine, and the Sports Turf Managers Assoc.**, in recognition of excellence and professionalism in maintaining outstanding, safe, professional quality baseball diamonds. Entries will be judged in three categories: professional diamonds; college diamonds; and school, municipal or park diamonds.

Send the information below to enter:

1. Age of baseball diamond (year of installation).
2. Geographic location (city and state).
3. Description of maintenance program.
4. Operating budget for baseball diamond.
5. Irrigation: None _____ Manual _____ Automatic _____
6. Total number of maintenance staff for field.
7. Does baseball field have lighting for night games?
8. Number of events on baseball diamond per year.
9. Types and number of events on diamond other than baseball?
10. How many months during the year is the field used?
11. Why you think this field is one of the best?
12. **IMPORTANT:** Send two sets of color slides or prints.

Deadline for entries: Entries must be postmarked no later than November 30. Selection of winners will be made by the Awards Committee of Four Major League Head Groundskeepers.

Mail entries to:
Beam Clay Awards
Kelsey Park
Great Meadows, NJ
07838

Sports
Turf Managers Association



sportsTURF
magazine



A Tale of Two Sports Complexes



Wayne Klosterman (right). Prefabricated drain tubing was connected to eight-inch collector lines on the side of the University of Dubuque football field. Bluegrass sod on a peat base was installed in late June.

By Bob Tracinski

There are points in many sports field construction or renovation projects when it seems appropriate to borrow a phrase from Charles Dickens, "It was the best of times, it was the worst of times." Sometimes everything runs smoothly, but glitches can and do occur. Thorough initial planning — and the perseverance to stick with the plan rather than cut corners — greatly affect the final quality of the field.

Consider Wayne Klostermann's tale of two projects in the city of Dubuque, IA.

In early 1993, Klostermann established Klostermann & Associates, offering services as sports complex consultants, designers and construction managers. He works closely with another Dubuque firm, Buesing & Associates, which specializes in construction engineering and land surveying. Owner Ken Buesing says sports field work has been part of their emphasis since the business was established in 1985. "Wayne's knowledge of the specialized needs of athletic field design and maintenance has brought a new dimension to our sports field projects," says Buesing.



The Dubuque Soccer Complex

In 1984, the Dubuque region of the American Youth Soccer Organization (AYSO) organized with 300 pre-kindergarten through high-school-age participants. By 1993, over 2,300 young people (about 23 percent of the youth in the city) were part of AYSO and playing competitive soccer in the AYSO club program throughout the Midwest. Also starting in 1984, all three city high schools added soccer as a varsity sport for both boys and girls. The Dubuque Steamers Soccer Club provides competitive opportunities for adult players.

With all this soccer activity, the demands for practice and game

field access overwhelmed available space. Existing fields deteriorated as heavy use for practices and games took its toll.

In 1992, AYSO, the Steamers, the Dubuque Soccer Club, the Dubuque Community School District, the Leisure Services Department of the City of Dubuque and the Dubuque Area Labor-Management Council formed the Dubuque Soccer Alliance to develop a complex of game-quality soccer fields in the community.

In the spring of 1993, the Alliance leased approximately 55 acres from the Dubuque Community School District with the agreement that development and maintenance of the complex would be the

responsibility of the Alliance. The Alliance's fund-raising arm reached out to private organizations, foundations and individual donors.

Once design work for the site began, it became apparent that the Alliance had great enthusiasm, but little knowledge of field construction. At this point, Klostermann, a board member of AYSO, was asked to assist with the project. He opted to donate his services as his contribution to the complex. He met with the Alliance board and provided them with an overview of the requirements for the complex. He then developed detailed plans for proper drainage and the irrigation system, offering several options at various price levels for each. He advised the Alliance on the type of turf needed. He developed a maintenance program and needs list for long-term field care.

The community enthusiastically adopted the project. I.I.W., a local engineering firm, drew up the plan. Buesing & Associates surveyed some of the fields. John Deere and the Navy Seabees both donated the use of equipment and some equipment-operator time. Retired local equipment operators donated their time. Local diesel fuel jobbers donated 2,500 gallons of fuel. All labor was volunteered.

Though wet weather made it tough, soil moving began in the summer of 1993 and continued until the deep freeze of December. One field had been brought to grade; a second field to subgrade. Work resumed in the spring of 1994. The first field was seeded. The Alliance plans to have six more fields completed by the end of 1994.

During this period, the soccer project experienced multiple "changes of plans." No irrigation was installed; lesser turf seed was used; corners have been cut. The dream remains strong, but the path is still rocky.

Klostermann says, "It's important for sports turf managers to give something back to the community, but when consulting on a volunteer basis, you lose some of the 'clout' you have as a paid adviser. There will be times when your recommendations will be 'adjusted' to channel funding to other, more immediately visible, areas of the project.

"Don't take it personally. Don't get discouraged. Keep the doors open. Continue to provide advice when they ask for it. You want to do all you can to help achieve a positive outcome for the

project. You just have to realize you probably won't have much control over final decisions, but your input can make a difference."

The University of Dubuque Football Field

In late March of 1994, the University of Dubuque awarded the design contract for its football field renovation to Buesing & Associates who then subcontracted a portion of the work to Klostermann & Associates. Klostermann

and Buesing met with Athletic Director Connie Hodge; Vice President of Finance Tracy Wagner; Football Coach Jim Collins and Track Coach Don Caves to develop a "dream list" for the field. School alumnus, Joe Chlapaty, now President of ADS, Columbus, OH provided \$1.5 million for the project. The design team of Terry Koelker, John Hermesen, John White, Ken Buesing and Wayne Klostermann worked with the dream list to "turn it into reality."

continued on page 24

GREENS QUALITY SOD

Maintained in a "putting green" state at our farm, West Coast Turf's greens quality sod comes to you fresh, meticulously manicured, and essentially ready for play. Whether you choose bentgrass or Tifdwarf hybrid bermuda, you'll discover a sod that reflects our high standards of quality. And one that exceeds your expectations.

BENTGRASS SOD

- Penncross, SR 1020, Crenshaw
- Other varieties grown on request
- Available year-round
- Washed or with sand
- 3/16" height of cut
- Shipped anywhere in the U.S. and Mexico via refrigerated trucks
- Installation available

TIFDWARF

- True "oldline" Tifdwarf (Tifgreen and P.D. 102 on request)
- Available overseeded for winter color
- Washed or with sand
- 3/16" height of cut
- Shipped anywhere in the U.S. and Mexico via refrigerated trucks
- Installation available



GROWERS AND INSTALLERS OF
PREMIUM QUALITY SOD AND STOLONS

P.O. Box 4563, Palm Desert, CA 92261 619/360-5464 800/447-1840 FAX: 619/360-5616

Two Sports Complexes

continued from page 23

The project was put out for bid on May 5. It was awarded on May 15 with an immediate start date.

Klostermann describes the progress of the project, "Existing vegetation was treated with Glyphosate. Ten days later, this material was stripped from the field and excavation began.

The original native soil, consisting of 62 percent silt, 20 percent clay and 18 percent sand, would be replaced with sand. 1,500 cubic yards of soil were removed with a sidewinder and stockpiled at the outfield area of the University's future baseball field renovation.

"The clay base was rolled to develop a hardpan with a 1/2-percent slope, to channel water in both directions toward the drainage lines. To accommodate the ADS-AdvanEdge drainage system, trenches were formed in the hardpan layer in a herringbone pattern on 20-foot centers. A central line runs through the length of the field exiting between each goal post. The ADS material is covered with a Typar sleeve. This is imbedded in the trenches and surrounded by 3/4-inch washed river gravel. The ADS network drains into 8-inch tile collector lines along side of the track surrounding the field. The stadium drainage system is split at the 50-yard line. The north side drains into the north storm sewer system. The south side into the south storm sewer system. A layer of Typar covers the gravel-filled trenches.

"The sand selected was graduated at 90 to 95 percent in the medium range; less than 2 percent in the coarse range. Specifications called for none in the 2 mm to 1 mm range; 50 to 70 percent in the 1 to 0.5 mm range; 20 to 40 percent in the .50 to .25 mm range; less than 4 percent in the .25 to .10 mm range; and none in the .10 to .002 mm range.

"A nine-inch layer of sand was placed over the clay hardpan. A one-inch layer of the vegetative material that had previously been removed was spread over the sand and incorporated with the sidewinder throughout the entire nine inches. Following this, an additional two-inch layer of sand was spread on the field and graded at 0 percent slope.

"On June 12 and 13, a Toro irrigation system was installed using 2001 series heads on swing joints, 250 #22606 valves and a 162603 controller.

"The sod, a combination of bluegrass cultivars on a peat-base, was supplied by Long Island Sod Farms of Marshall, WI. Sod was laid on the last day of June and the first day of July, not exactly ideal timing for the Iowa area. Scotts 16-25-12 Poly S fertilizer was surface-applied at the rate of one pound of nitrogen (N) per 1,000 square feet. The irrigation system was set to apply water for 15 minutes per zone each day for the first week; every other day for the second week.

"A second application of 16-25-12 at the same rate was made 45 days after the first application. A 6-28-16 formula fertilizer is now being applied every two weeks at the rate of one pound of N per 1,000 square feet. The field is irrigated on an as-needed basis.

"The sod was rooted to 1.5 inches by the end of the first week; to 8.5 inches by September 1. The field is mowed in a five-yard pattern with a reel mower to a height of 2 inches.

"The Dubuque Spartans football team played its first home game on Saturday, September 10. The Friday night pentameter reading was 11.5. The field was watered lightly late Friday night. The pre-game pentameter reading was 11.5. Saturday's temperature shot up to over 90° with a strong wind. The post-game pentameter reading was 10.5. The field was irrigated again following the game, rolled on Sunday with a 105 pound roller and mowed on Monday. It looked great.

"With the exception of Friday afternoon non-contact drills and the daily practice of the field-goal kicker, the field will be reserved for games. Prior to the season opener, two goal-line-to-goal-line scrimmages were held to let the players get the 'feel' of the field.

"The every-two-week fertilization schedule will continue until the frost layer stops turf-nutrient uptake. Late season soil testing will determine the formula and rate of the final fertilization of the year.

"If overseeding is necessary, they will use pre-germinated Manhattan II perennial ryegrass. Topdressing will be with straight sand of the same specifications as the field base.

"The field is located on top of a hill in a windswept, open area. Although that breeze felt great during the opening game, we anticipate it will whip snow in

and trap it within the fences, so they will make a preventive application to discourage snow mold. The projected spring program includes overseeding between the hash marks with a combination of primed bluegrass and pre-germinated perennial ryegrass."

Klostermann was retained as a consultant by the University to establish the initial maintenance calendar, the next season's maintenance calendar and to train the newly hired sports turf manager. "Because of John Rotz's background as an athlete, he understands the importance of quality turf".

Klostermann was initially drawn to plant care while working part-time for a landscape firm during his high school days. After graduating from Kirkwood Community College, Cedar Rapids, IA, with an associate degree in horticulture, he held a variety of industry-related positions. In 1990, he settled in at Loras College, Dubuque, IA, as a campus horticulturist. It was there that he "got serious" about sports turf, as the challenge of keeping athletic fields in top condition "hooked" him.

"I started expanding my turf knowledge, reading everything I could find on sports turf maintenance, field construction, grass varieties — anything at all that might affect field conditions.

"I was continually checking out other athletic fields and talking to other sports turf managers. Through this contact, I found out about the Iowa Sports Turf Managers Association and the National STMA. Membership in both these organizations gives me even more sources of information.

Klostermann gained the "incentive" to establish his own company with a little help from the budget crunch at Loras that forced the elimination of several positions in early 1993. "It's a fact of life in today's downsizing trend that sports turf managers must plan ahead for themselves as well as their fields. That means staying active in your community and in the overall sports turf industry. The more you know, the more you can grow." □

Editor's Note: Bob Tracinski is the manager of public relations for the John Deere Company in Raleigh, NC, and public relations chair for the Sports Turf Managers Association.

National Turf Course Offered in Several States

Ten states have recognized the joint University of Georgia and Professional Lawn Care Association of America turf certification program as meeting the requirements for pesticide recertification credits.

Florida, New Jersey, Pennsylvania, Delaware, Wyoming, Nebraska, Maine, Rhode Island, West Virginia and Georgia now grant varying degrees of pesticide recertification credits with successful completion of the course. Six more states—Colorado, North Carolina, Connecticut, South Dakota, Oregon and Indiana—are reviewing the course for recertification credits.

The "Principles of Turfgrass Management," introduced in 1993, is a home-study correspondence course that covers mowing, irrigation, pesticides, customer relations and more for all regions of the U.S.

For more information, call the University of Georgia at (706) 542-1756. PLCAA members can call (800) 458-3466 for information on enrollment discounts.

Electronic Weather Station Installed

Thanks to contributions by individuals, suppliers and golf clubs, a \$7,000 electronic weather station was recently installed at the Georgia Turfgrass Foundation Trust's research green.

The weather station is part of a statewide automated environmental monitoring network developed by University of Georgia assistant professor Gerrit Hoogenboom Ph.D., with the objective of collecting reliable weather variables for agriculture, environmental research and related applications. The station will measure air temperature, relative humidity, rainfall, solar radiation, wind speed and direction, and soil temperature at several intervals. A microprocessor stores the readings and downloads the data each day via modem to a central processing station in Griffin.

For more information, or to make a donation, contact Douglas Moody, executive director at (404) 975-4123.

Shemin Opens New Atlanta Office

Shemin Nurseries Inc. recently opened its second office in the Atlanta, GA area. The company also recently opened a new facility in Gainesville, VA to serve the northern Virginia area and also plans to open two facilities in the Charlotte, NC area within the next 12 months.

Shemin Nurseries Inc. is a wholesale distributor of landscaping supplies and irrigation products with 11 distribution centers located in Georgia, Maryland, Pennsylvania, New Jersey, Connecticut, Massachusetts, Michigan, Illinois and Virginia. Executive offices are located in Ridgefield, CT.

Shemin Nurseries also recently announced an agreement with Scotts Professional Products to participate in the sale and distribution of Scotts' fertilizers, herbicides, insecticides and grass seed products. Scotts is headquartered in Marysville, OH.

Geiger Purchases Entire Hormodin Inventory

Merck AgVet announces that it has sold its entire remaining inventory of Hormodin Rooting Compound to E. C. Geiger Inc. of Harleysville, PA.

According to Michael Ames, director of crop protection products for Merck, AgVet chose not to renew and support re-registration of Hormodin when requested by the EPA. Instead, the company voluntarily canceled the registration as a result of the high cost of the studies required under the 1988 EPA call-in.

However, the EPA allows for a timely liquidation of remaining inventory through normal distribution channels. It is estimated that as much as a two-year supply of Hormodin remains, and is in stock at locations in Pennsylvania and California. Merck and Geiger will maintain and support all state registrations for as long as necessary to liquidate the entire inventory of Hormodin.

Official Peat

Dakota Peat was recently named the official organic material of the Stadium Managers Association as part of an exclusive contract for the company to supply the SMA members.

The agreement was initiated because Dakota Peat has the one of the longest running track records in the turf industry. Applications are used in new construction rootzone mixes, topdressings and landscaping.

Clean Water Act Amendment

Saying that recycled water will play an integral role in meeting the state's future water needs, the Association of California Water Agencies (ACWA) voted recently to support amendments to the nation's Clean Water Act that would emphasize the importance of reclaimed water in arid or semi-arid regions.

The amendments would make it federal policy to promote the beneficial use of reclaimed water and recognize the unique ecosystems created by reclaimed water discharges. The language would also direct states to consider the use and value of reclaimed water discharges when setting standards for ephemeral or intermittent water bodies in arid or semi-arid states.

According to the ACWA Executive Director Stephan Hall, the language is needed to ensure that reclaimed water can be used to its full potential in California and other states with growing populations and limited water supplies.

"Given the fact that reclaimed water is expected to supply at least 800,000 acre-feet each year by 2020, federal law needs to reflect the importance of that resource," Hall said. "The Clean Water Act should be amended to include a policy statement supporting use of reclaimed water and recognizing the unique nature of individual reclamation projects.

Without such a provision, incomplete or inappropriate science could serve as the basis of standards and lead to costly regulations that do little to protect public health. An example, Hall said, is the EPA's proposed standard for radon in drinking water, which would cost California \$3.7 billion and yet result in no appreciable public health benefit.

Valley Crest Awarded Olympic Contract

The Metropolitan Atlanta Olympic Games Authority approved a \$14.9 million contract awarded by the Atlanta Committee for the Olympic Games to Valley Crest Landscaping and Urban Construction Company for total construction of the equestrian venue for the 1996 Olympics. Valley Crest also performed most of the landscape-related services in Los Angeles for the 1984 games.

Chemigation Systems



If you are looking for an injection pump that keeps working year after year, then you're looking for an **Inject-O-Meter**.

Pumps utilized in:

- Agriculture
- Landscaping
- Industrial
- Turf Athletic Fields

Complete product lines from chemigation systems to single injection units.

Capacities of .09 to 326 GPH, various models.

Make us your first call.

Inject-O-Meter Mfg. Co., Inc.

820 Thornton Street
Clovis, New Mexico 88101
1(800) 545-4440

Circle 110 on Postage Free Card

Turf Grids



Tough Stuff for Sports Turf

The TurfGrid system is patented, simple, logical and long overdue. It combines specially designed synthetic fibers into the natural grass field and increases the shear strength of the playing surface by 100%. This means sure footing and safety with less divots and injuries...just what good teams expect from their playing surface. From football to baseball, to soccer, to polo, to golf, TurfGrids can replace or upgrade any surface.

Natural and Fiber Reinforced Sport and Recreational Surfaces

Stabilizer

4832 E. Indian School Rd., Phoenix AZ 85018 • USA
(602) 952-8009 • Fax: (602) 852-0718
1 (800) 336-2468

Circle 111 on Postage Free Card

Turfgrass Seed Coating



CelPril's Nutri-Kote™ is the grounds care professional's best friend. Nutri-Kote stimulates growth and fights disease in newly seeded turfgrass. Nutri-Kote supplies vital nutrients to young seedlings during the critical early growth stage, providing a feeding as soon as young plants come to life. Nutri-Kote improves stand establishment by promoting more vigorous, healthier, thicker plants. Available with Apron® for Pythium control. Newly seeded greens can be played in as little as 3 weeks. Ask your turfgrass seed supplier for Nutri-Koted seed. **Ask for:**

CelPril

251 Oak Street • Manteca, CA 95337
(209) 823-1738 • (209) 823-8855 fax

Circle 112 on Postage Free Card

Infield Maintenance Machine



The Diamond Demon is the machine that will turn your difficult baseball/softball infields into level, smooth playing areas in short order. The Diamond Demon comes in four- and six-foot widths. All production models come with a tow package as standard equipment (not shown). Hundreds of satisfied users worldwide!

See us at Booth #319

Diamond Demon

4115 Southernaire, St. Louis, MO 63125
(314) 487-1753

Circle 113 on Postage Free Card

New! Speed Wrenches



Stamos Tool has introduced a new full line of cast aluminum speed wrenches designed to fit all nub-style PVC fittings and most adapters. These wrenches outperform chain, strap and pipe wrenches by far and are designed to fit different sizes of coupling caps, bodies, unions, female and male adapters. Only minimal ground clearance is required and they work on all manufacturers fittings. Many of our customers have been extremely satisfied with the STAMOS PVC NUB WRENCH. Here are some of their comments: "Performed admirably, exceeded my expectations by

far." John Gallagher, Orange, CT; "Best irrigation tool improvement and innovation developed in quite some time." Jim Hengel, NY. For further information call our toll-free number.

Distributors are welcome.

Stamos Tool Inc.

P.O. Box 4548, Boise, ID 83711-4548
(800) 554-1074

Circle 114 on Postage Free Card

Athletic Field Maintainer™ (AFM)



LINER • GROOMER • SPRAYER

The Machine that handles all of your AFM needs

• **Versatile – 4 Machines in one.**

• **Safer Infields** – Groom and condition infields with water in one operation.

• **Superior Line Painter** – Straighter lines with front mid-mounted liner box; agitation and large 30-gallon and 50-gallon tanks.

• **Superior Maneuverability and Ease of Handling** – compact tractor with hydrostatic drive and 8-hp Kohler engine (9-hp Honda optional).

"Specialists in Athletic Field Maintenance Equipment"

Kromer Co.

2365 Commerce Blvd., Mound, MN 55365-1425
(800) 373-0337 • Fax (612) 472-5991

Circle 115 on Postage Free Card

Marking Machine



The Jaydee Model 5000 is a fully featured, self-propelled, professional line marking machine. The engine powers a piston pump, providing mechanical agitation, and powers both rear wheels - it tracks a straight line under its own power. The constant 2-mph speed results in uniform line width & brightness as well as predictable marking material consumption.

Jaydee Equipment Company

202 East Joliet Highway, Box 278, New
Lenox, IL 60451-0278. (815) 485-6146

Circle 116 on Postage Free Card

Deep Drill Aeration



U.S. Pat. No. 4,476,938

**FILL AERATOR HOLES COMPLETELY,
THE FIRST TIME**

- 0-8 inches deep using 24 Carbide Tip Bits – Spaced 7.5 centers.
- 1 inch Drill Size.
- 2500 to 3000 sq. ft. hour.
- Hoppers will hold total of 1.87 sq. yd. per fill.
- Medium – Dry Sand – Isolite – Profile, etc.

Floyd McKay Aerofier Co.

P.O. Box 191 • Dunn, NC 28335
(910) 892-7806 • (910) 892-4443 fax

Circle 117 on Postage Free Card

EXPLORING EQUIPMENT:

Installing Pipe and Wire Without a Trench

By Daniel Ingham, Equipment Editor

Trenchless technology has come a long way. It used to be that only utility companies and large construction contractors could afford the technology and personnel necessary for successful underground boring. Today, boring machines can be found at rental stores and in municipal equipment inventories. A growing number of landscape contractors are adding them to their tool collection.

One reason for the increase in boring over trenching is that it reduces the disruption of carefully constructed surfaces like athletic fields and pavement. It's also more desirable in retrofitting situations because there is less danger of cutting through unidentified pipes or underground cables.

Today, the tools available for underground boring range from small units powered by an electric drill, to directional units that not only can bore under things, but around them as well. Sports turf managers need a basic understanding of borers and how they work.

Non-Directional Borers

Boring units fall into two main categories: non-directional and directional. Non-directional borers are the least expensive of the two and the most commonly used for smaller, uncomplicated tasks. These also fall into two categories, mechanical and pneumatic. Mechanical units are basically a metal rod with a drilling bit. A motor rotates the rod like a drill and additional sections of rod can be added as digging proceeds. Pneumatic borers are powered by compressed air and operate just like a torpedo-shaped jackhammer, traveling under the ground, trailing its air-hoses behind.

Both require excavation of both an entrance and exit hole. Because they cannot be steered, they will continue at whatever angle they enter the ground. Therefore, if you are going to bore under a driveway or sidewalk, the drill or pneumatic piercing tool must enter the ground horizontally.

When all you need is to go from point A to point B and there are no buried

Non-directional borer (below) works well for short bores with access on both ends. Directional units (right) can steer around obstacles.



obstacles, non-directional (non-steerable) units will serve most of your needs.

Non-directional units are also best suited to shorter bores. If, for some reason, the drill or piercing tool is deflected or veers off course, you will not be able to correct it and a new bore will have to be attempted. The longer the bore, the greater the chance of this happening. If a drill pipe or pneumatic piercing tool disconnects below ground, it will be more difficult to locate and retrieve.

For short bores one of the easiest and least expensive devices to use would be something like Borit's hydro-mechanical earth auger. The power source is a standard 1/2-inch drive electric drill and the drill pipe is standard 3/4 or 1/2-inch water pipe. An attachment allows water from a standard garden hose to spray out through the drill head to facilitate boring.

"Once the entrance and exit holes are dug," says Jim Hill, president of Borit, "you can drill about one foot a minute. If it hits a rock that is not too large, the water will wet the soil around it, and by working the bit it can be jiggled out of the way."



Since multi-use equipment increases productivity and cost return, a good choice may be the L-2 by Line-Ward Corporation. The L-2 is a walk-behind vibratory plow designed for laying cable or irrigation pipe. Its maneuverable in close quarters and its size allows it to get through narrow gates and it has a boring attachment.

According to Robert Ward of Line-Ward, "The L-2 is the only unit we make. All attachments, including the boring attachment, go on and off in seconds without the use of tools." An entrance and exit trench still need to be dug when using the L-2's boring unit, the unit itself remains at ground level. A guidance tool is used to make sure that the drill enters at correct angle.

For longer, larger diameter bores, pneumatic piercing tools could be the way to go. One of the advantages of the pneumatic tool is that as it travels through the soil, it compacts the soil around the bore-hole which keeps it from collapsing during the bore or during pipe installation. They're efficient and can move fairly easily through compacted soils. Rocks, tree roots and other obstacles, however, can deflect a pneumatic boring unit into an undesired direction.

Because of the possibility of a pneumatic tool deflecting and perhaps getting "lost," many have stayed away from them.

For years manufacturers have tried to manufacture a locating beacon that can be installed in the piercing head and survive more than a few hours of normal