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in 1970. The results showed that heating does stabilise clay soils against compaction. If an appropriate situation arises, heating could be tried on a golf course.

Lab Test Results

A clay loam soil, characterised by medium plasticity, low permeability and medium aggregate stability, was used in our studies. After being heated, soil samples were put into test cylinders, wetted overnight, drained to field capacity and compacted by dropping a 3-pound hammer from a 1-foot height 15 times.

The permeability of the compacted soil samples was then measured. The compaction and permeability apparatus is shown in Figure 1. This is the procedure recommended by the United States Golf Association for evaluation of soil mixtures.*

The results in Table I show that the heated soil had a good permeability after compaction. The untreated soil was impermeable after compaction. With this indication that heat could stabilise soils against compaction, we designed a field experiment to test heating.

Field Results

Plots were laid out on a clay loam soil near Montreal to compare heating with lime and hydrated lime as stabilising treatments. The lime was mixed into the surface soil at 8 and 40 pounds per 100 square feet. The top 2-inch layer of soil was heated with the special apparatus shown in Figure II. Nails $2\frac{1}{2}$ inches long were welded at 1-inch spacing on a $\frac{1}{4}$ -inch-thick steel plate, 2 feet by 2 feet. The plate was set onto the soil with the nails penetrating the soil to transfer the heat provided by gas burners. Soil temperature was measured with a thermocouple at a 2-inch depth. Temperatures of 400 to 500 degrees F were attained after three to four hours of heating.

The soil plots were compacted after a rain, with a heavy roller. Infiltration was then measured with an infiltrometer. After a series of infiltration measurements during two weeks, the soil was then compacted and more infiltration measurements were made.

Heated soil was consistently more permeable than untreated soil or soil to which lime had been added (Table II). Also the bulk density of the compacted, heated soil was lower than lime-treated soil, indicating greater resistance to compaction. The rate of water infiltration decreased with the second compaction, indicating that the effect of heating does not last long.

Various grass seeds were sown in samples of heated soil. Germination and growth were as good in heated soil as in the untreated soil. Therefore, heat treatment can be safely used for soils on which seed is to be sown.

Evaluation of Experiments

These experiments indicate that heating is a potentially useful method for stabilising surface soils, but the results must be considered only preliminary. Heating will be useful only for certain clay soils where swelling on wetting leads to decreased stability. These swelling clay soils can be recognised from their high plasticity. Each problem of fairway compaction has to be studied to determine the best and most economical solution. This usually requires investigation and evaluation by a trained soils man. Heating is most economically done when the soil is dry; otherwise a large amount of heat is used in dissipation of water.

A method would have to be worked out to heat soil with a moving heat source. Machines used for soil engineering projects may possibly be adapted for use on fairways. Heat could be applied to the soil in place, or a 2-inch layer of soil could be lifted, heated

*Ferguson, M. H., H. L. Howard and M. E. Bloodworth. 1960. Laboratory methods for evaluation of putting green soil mixtures. USGA Journ. 13(5): 5-8.

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and returned in a continuous operation. The fact that heating is used for stabilising road bases indicates that it is economically feasible.

TABLE I
Laboratory evaluation of permeability of heat-treated soil samples

<i>Heat Treatment Temperature</i>	<i>Time Heated</i>	<i>Permeability of Compacted Samples</i>
not heated	—	0 in/hr.
400 degrees F	½ hr.	0.1 in/hr.
400 degrees F	2 hrs.	2.8 in/hr.
400 degrees F	12 hrs.	1.1 in/hr.

TABLE II
Infiltration of water into soil plots

<i>Treatment</i>	<i>Inches of Water Infiltrated in 15 minutes</i>	
	<i>After 1st Compaction</i>	<i>After 2nd Compaction</i>
No treatment	1.25	0.50
Heated	5.00	1.50
Lime	2.00	1.50
Hydrated Lime	1.50	0.75

With grateful acknowledgements to "Golf Superintendent".

Notice of Meeting

NOTICE is hereby given that an EXTRAORDINARY GENERAL MEETING will be held at:

The English Speaking Union,
37 Charles Street
Berkeley Square
London W1

on Saturday 19th May 1973 at 12 noon

BUSINESS – To consider and vote on a proposition of the Executive Committee that Membership Subscriptions should be increased as from 1st May 1973 to:

Class A Membership	£4.00
Class B Membership	£3.00
Class C Membership	£2.00
Class D Membership	£4.00
Class E Membership	£5.00

Entrance Fee – 50% of Subscription

All additional income to be allocated to Head Office Funds.

That all New Members should pay full subscription whatever time of year they join. This would mean deleting second part of Section B, Rule 7.

As it is often two or three months before they receive their first Journal, subscriptions of New Members joining in last quarter of year to count for following year. This should be left to the discretion of Section Secretaries.

Wage Scale Recommendation

At the Executive Meeting held on the 17th March, 1973, the Committee recommended an increase on their 1972 figures, and suggest they should now read:

Head Greenkeeper	£2000 per annum (plus accommodation) (4 weeks holiday)
First Assistant	£1500 per annum (plus 3 weeks holiday)
Assistants	£1300 per annum (plus 3 weeks holiday)
40 hour Week	
Plus statutory holidays	

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Two Vertirake Models for thatch
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Works, Stanmore, Middx. 01-954 4171

U.K. DEBUT FOR NEW TORO TROJAN Mk 3

INTERNATIONAL attention is focussed on the latest triple-rotary riding machine for continuous heavy duty grasscutting at the Institute of Park and Recreation Administration exhibition. Known as the Toro Mk 3, it has been introduced by The Institutional Division of Flymo Limited and will make its exhibition debut at Victoria Park, Hackney on 24th/25th May.

The Trojan Mk 3 has a 60 in. cut and replaces the Trojan 50 in. Mk 2 model which has established a favourable reputation with local authorities and other large institutional users since it was introduced to the U.K. in 1970. The Trojans are particularly useful in situations with rugged grasscutting requirements.

The new model incorporates a number of additional advantages with three, 21 in. heat-treated rotary blades providing a 60 in. cut under the heavy duty 10 gauge steel cutter housing. With a more powerful, 14 hp Kohler engine, the Mk 3 has a capacity of 15 acres per day at 3.5 mph compared with 12 acres for the 50 in. version. Four-speed gear transmission is from .6 mph to 5.2 mph. Recoil start is standard.

A detachable sully provides compact storage as well as enabling pedestrian operation of the machine in restricted or difficult areas, if required.

The Toro Trojan Mk 3 will cost £948.

Other equipment on the Flymo stand at the I.P.R.A. exhibition will be diesel and petrol-engined Parkmasters for cutting up to 60 acres a day; the Toro Super Professional ride-on gang mower with capacity of up to 46 acres per day for the 11 ft. version; five and seven-blade Spartan gang units, and the versatile Toro 70in. Professional for large, formal areas. The 28 in. Roughmaster, from Morrison in New Zealand, will also be seen for the first time in a new, distinctive red livery.

FLYMO INTRODUCE POWER RAKE HIRE SCHEME

PROBLEMS ASSOCIATED with the accumulation of thatch – cut roots, stems and grass clippings which have not been decomposed – have been overcome with the introduction of a scheme for hire of a power rake.

The rake, known as the Andi-Scari Power Rake and marketed exclusively in the U.K. by the Consumer Division of Flymo Limited, Watford, removes thatch and allows the growth of fine new lawn grasses by preventing the breeding of insects and fungus in the thatch which destroy existing grass.

Depth of penetration can be varied to suit prevailing conditions by simple adjustment on the front wheel assembly. The unit is compact and can be easily lifted into the boot of the average saloon car for transportation.

The hire scheme is limited initially to the southern part of England. Daily rate of hire is between £3.00 and £4.50 and the rake will be available through Flymo Authorised Distributors and Dealers.

The rake, manufactured by Andrews of Hindhead (Developments) Limited, Surrey, has a width of 14 in., a rotor of 17 spring-tensioned swinging steel blades and is powered by an Aspera four-stroke petrol engine with pull-up recoil starter.

* * *

Flymo have produced an excellent booklet on the place of the man and machine in modern golf course management. It is very well illustrated and will interest casual readers as well as the expert. Copies can be obtained free of charge from Flymo Ltd., Watford, Herts.

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SITUATIONS VACANT

Worsley **Urban District Council** **Parks Department**

Appointment of Head Greenkeeper

Miscellaneous Grade 6-7
(£1428-£1677)

Applications are invited from qualified Greenkeepers for the above post. Candidates must have received a sound training in the maintenance of a golf course and preference will be given to persons working in a similar capacity at the present time.

The Council is constructing a 63 acre 9 hole course at Worsley which is due for completion by Autumn 1973.

The successful applicant will control a groundstaff of 2/3 men and will be responsible directly to the Parks Superintendent.

Housing accommodation will be available.

The appointment will be from the 1st August 1973.

Forms of application may be obtained from the undersigned to whom they should be returned by not later than Monday, 28th May 1973.

ROBERT E. HUBAND
Clerk of the Council

Town Hall, Worsley,
Manchester, M28 4GD

REDDITCH URBAN DISTRICT **COUNCIL**

Parks and Recreation Department

Applications are invited for the position of Head Greenkeeper at the Pitcheroak Municipal Golf Course, Plymouth Road, Redditch

The appointment is subject to the N.J.C. terms and conditions of service. Average weekly wage including overtime and bonus - £29.

Housing accommodation will be considered in appropriate cases.

Applications to:

W. R. Pilcher, Parks and Recreation Superintendent, P.O. Box 15, Council House, Redditch, Worcs.

THETFORD GOLF CLUB require a First Assistant Greenkeeper with view to taking charge. Must be fully conversant with Course Maintenance.

Preferably from London area.

Interview expenses paid.

Apply in writing to:

**The Secretary,
Thetford Golf Club,
Brandon Road, Thetford IP24 3ND**

SCRAPTOFT GOLF CLUB **LEICESTERSHIRE**

Head Greenkeeper *required*

Good Salary

Accommodation a possibility

Reply to the Secretary

HEAD GREENKEEPER

required for NEW GOLF COURSE in RENFREWSHIRE

The Head Greenkeeper would be appointed well in advance of the opening and will be responsible for taking over the maintenance of each part of the Golf Course as it is completed.

Salary and accommodation by negotiation.

Apply in writing giving details of qualifications and experience to: **The General Manager, Gleddoch House, Langbank, Renfrewshire**

Classified Adverts — *continued page 24.*

News



from the Sections

Special occasions

- April 18 Welsh Section Spring Tournament
- May 8 Midland Section Spring Tournament
9 East Midland Spring Tournament
9 Southern Section Spring Tournament
- June 6 Southern Section A.G.M.
12 Sheffield Section Outing
13 East Midland Section President's Match
14 Midland Section President's Match
- July 18 Sheffield Section Annual Tournament
- Sept. 5 Southern Section Autumn Tournament
30 Southern Section Trip to Bingley
- Oct. 3 East Midland Section Autumn Tournament
10 Southern Section Secretary's Match

SHEFFIELD SECTION

Chairman:
G. HERRINGTON
(Lindrick)

By H. Gillespie
Hon. Secretary/Treasurer:
63 Langsett Avenue,
Sheffield S6 4AA

Lecture

Without doubt the best attendance we have had for a very long time turned out to welcome

May 1973

Mr. F. W. Hawtree to Abbeydale Golf Club on 1st March.

Mr. Hawtree took for his subject, 'Golf Course Architecture' and some very interesting points were put forward and the question time raised the usual well thought-out problems and Mr. Hawtree dealt with these in his stride.

We were also pleased to see Mr. Dix, who had accompanied Mr. Hawtree, and hope he enjoyed his visit to Sheffield.

Outing

The outing to Cannock Fertilisers Ltd. is on Tuesday 12th June 1973, the coach will leave Harmer Lane (Pond Street Bus Station) at 9.30 am arriving at Cannock at approx. 11.45 am. Following lunch, the party will be split into small groups and tour the works; after light refreshment the coach will leave for the return journey to arrive in Sheffield at approx. 6.00 pm.

New Member

We welcome to the section H. Smith of APCM Bradwell and hope his association will be a happy one.

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All controls are accessible from the operating position behind the machine and a self-release control lever is fitted for maximum safety. Depth adjustment up to 4 ins. is quick and simple without tools. There is a separate control for disengagement of the drive to the tines and quick transfer to the transport position without tools. Standard SISIS Auto-Turfman tines can be fitted giving the choice of slit tining, solid tining or hollow coring.

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