



APRIL	16th	Welsh Section Spring Meeting—Glamorganshire Golf Club.
	24th	Sheffield Section A.G.M.—Brunswick Hotel.
	24th	North-East Section Spring Tournament.
MAY	7th	Southern Section Spring Tournament—Beaconsfield Golf Club.
	7th	Midland Section Spring Tournament—Coventry Golf Club.
	13th	North-West Section Spring Tournament—Southport and Ainsdale Golf Club.
	14th	East Midland Spring Tournament—Kettering Golf Club.
JUNE	14th	Northern Section Spring Tournament—Harrogate Golf Club.
	24th	Welsh Section A.G.M.—Royal Porthcawl Golf Club.
JUNE	26th	Midland Section Annual Match v. President's team.
	AUGUST	11th
13th		
12th		
SEPT.	16th	N.A.G. Exhibition—Motspur Park.
	17th	
	18th	
	24th	
SEPT.	24th	Welsh Section Autumn Meeting—Carmarthenshire Golf Club.
	25th	Southern Section visit to ATCO.
OCTOBER	15th	Southern Section Greenkeepers v. Secretaries.

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(contd. from p. 5)

design of land drainage schemes; this is basically the lack of comprehensive investigations into design of schemes, their relation to results, and the degree of control of water obtained. There is a dire need for some standard pattern based upon statistical results."

I can see some light being shed on this subject in the not too distant future. Many soil researchers have been looking critically at what is called "the permeability" of the soil—using the term qualitatively "to represent the quality or state of a porous medium related to the readiness with which it conducts or transmits fluids". This can be measured by what is called "hydraulic conductivity" which is usually stated in cm./sec., in./hr. or ft./24hr. and which is abbreviated to "k" in much the same way as acidity or alkalinity can be indicated by "pH".

My studies of the literature of this has led me to the tentative conclusion that there is some hope in this direction. In 1954 Visser in the Netherlands proposed mathematical solutions for homogeneous soils using "hydraulic conductivity" as the basic measurement, and he produced some formulae for it. Others, notably O'Neal, Smith and Browning,<sup>10</sup> have produced tables. And Luthin<sup>11</sup> in the latest American textbook 1965, *Drainage Engineering*, says "It is now possible to design drainage systems based upon measurable soil properties".

### Mains and Outlets

It will not be necessary to spend so much time on the references to the design of mains and outfalls because the practices are well documented and mathematical solutions are well tried. CP 301 and 303<sup>12</sup> give formulae for rainfall and run-off and guides as to the factors to be taken into account in "areas of buildings, roads, paths and parks, gardens, lawns and wooded areas". Refinements can be found in Road Research Technical Paper No. 55<sup>13</sup> which also lists many references.

For areas entirely soft landscape a good guide to sizes of outfalls and mains can be obtained from the table in "Land Drainage Notes No. 3"<sup>14</sup> of the Ministry of Agriculture. Although here you will have to make decision as to the selection of the "Coefficient" or the amount of

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water to be removed in 24 hours. In doubtful cases in Kent we use 1 in. in 24/hr., but  $\frac{1}{2}$  in. for low rainfall areas of North Kent is probably adequate bearing in mind the large graduation in sizes of standard pipes from 3 in. to 60 in. in steps of 3 in.; usually it is easy enough to allow for safety margins in areas which include hardened urban development or where flooding cannot be tolerated.

For some information as to the design of soakaways and boreholes there are some notes in "An outline of Field Drainage with special reference to the Drainage of Sports Fields",<sup>19</sup> which I wrote for the N.A.G. in 1960.

### Some Notes on Soil Types

I have mentioned above some of the pitfalls in designing inherent in the crude classifications of soils—which it would be well for landscape designers to be aware of. No study of this aspect would be complete without some reference to the sources of information on soil physical features. One of the simplest and in my opinion best books is *Good Soil* by

(contd. on p. 18)

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## THOSE WHO SERVE

*Number two in the series of Profiles by Brigadier C. W. Morton, M.C.*



**FRANCIS GORDON SMITH**  
late of the S.T.R.I., Bingley

Frank Smith first became a greenkeeper in 1913 at Cruden Bay Golf Club. But the First World War broke out in 1914, and Mr Smith joined the Hawke Battalion of the 63rd Royal Naval Division, serving on both the Western and the Eastern Fronts. In 1919, he returned to Cruden Bay Golf Club as their head greenkeeper where he remained for 14 years. He later went to the Wilmslow Golf Club, Cheshire, for five years as head greenkeeper. Finally, he spent 26 years at the Sports Turf Research Institute, Bingley, as a ground superintendent until he retired in 1964, after completing 46 years' total service in greenkeeping. During his service, he attended a course of instruction after the First World War, at Walton Heath—that lasted three months. He is now aged 74 and if it had not been for his war service, he would have probably completed 51 years greenkeeping service. A fine record of service. Our greenkeepers not only live to a ripe old age but also work to a ripe old age. It must be the

open air life. Whatever it is, congratulations Mr Smith.

**THOMAS ARTHUR HULLAH**  
late of Leeds Golf Club

Thomas first became a greenkeeper in 1921 at the Leeds Golf Club, where he has been up to the date of his retirement in 1966—a total of 46 years' service, all at one club. He became a head greenkeeper in 1955. He attended a Greenkeeping Course of Instruction at the Sports Turf Research Institute, Bingley, in 1957. He was a member of the Northern Section of the British Golf Greenkeepers' Association. Later he served on the section's committee for a number of years, became vice-chairman for three years, and finally chairman for a further four years. On his



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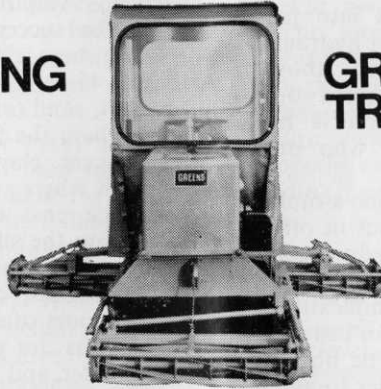
retirement, after completing his 46 years' service at the Leeds Golf Club, the club committee organised a special Open Competition for his benefit one Sunday. There was a record entry. On its conclusion, the president of the club presented him with a cheque (he does not tell us how much) and the club vice-president presented him with a clock and watch. The above photograph shows the presentation and his proud wife. Altogether a fine record of steady, loyal service to one golf club throughout his lifetime career of greenkeeping. Congratulations, Mr Hullah. We hope you are enjoying a well-earned retirement. Still young at 68!

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(contd. from p. 12)

Brade-Birks. He reminds us that classification can be made in soil series (general) soil types (species) and soil phases (varieties) and also that for the general purpose of recognition of texture he lists 18 classes. We need now a further classification of these phases into permeability classes with figures for hydraulic conductivity. As I mentioned above, engineers have already attempted this, but their general classification is not altogether helpful for those who deal with soil as a living material.

"It may be objected that such a multiplicity would be confusing, but in other sciences no one attempts to reduce complexity by calling two substances by the same name to reduce the complexity of the diversity. In entomology, for instance, there are 3,000 species of beetle but not one would suggest that in order to avoid confusion in speaking of them, three or four species should be combined and called by the same name."<sup>15</sup>

### Proper Description

One of the most important hurdles yet to be overcome in the sphere of field drainage design is the inability of those who talk about their soil, to properly describe it so that accurate comparisons can be made of the effects of various techniques. There is, for example, a general impression that permeability progresses from good to bad as one goes from coarse sand, to fine sand, to very fine sand, to loamy sandy loam, sandy loam, loam, to silty loam, silt loam, silty clay loam, clay loam, clay; this is just not so and I showed above how engineers have shown that the characteristic known as "practically impervious" relates sometimes to "well-graded sand with small clay content", "sands with excess of fines", "clayey silts", "organic clays", etc. In my experience the worst soils in Kent to drain for sportsground purposes are not the clays at all, but the silts. Indeed one of the most intractable of all is miscalled by the geologists "Tunbridge Wells Sand" (part of the Divisions of the Hastings Beds), in which the silt fraction is of the order of 65 per cent., and clay 20 per cent.—it is by Brade-Birks' scale a silty clay loam, with a permeability of 10<sup>-7</sup> cm./sec., which

borders on the "practically impervious" range.

A further factor also intervenes to confuse the issue in drainage design criteria for such a soil. It is well known that certain clays, which Nicholson<sup>4</sup> lists, some of the Boulder, London, Gault, Kimeridge, Ampthill, Oxford, Weald, etc., can be successfully mole drained especially where the textures lie in the regions of 45 per cent. clay and less than 20 per cent. sand (and even some success is likely where the fractions are between 35-45 per cent. clay and 20-45 per cent. sand). Now where such clays can be mole drained the cost of the operations is very low, but the silts cannot be so mole drained at all and the costs of tile draining them are highest of all because piped drains are most often essential and what is worse, silts are easily transported by running water and the life of the piped system is often short.

I am supported in my thesis here by a comment by E. Crompton of Kings College, Newcastle on Tyne. He says,<sup>17</sup> "In the matter of soil physical properties clays are not the most difficult. Soils with a high proportion of silt can be much worse; the small hard particles, often platy in character, can pack closely together leaving only very small spaces. A small amount of clay may be sufficient to bind the particles very tightly when dry and may effectively prevent aeration when wet. The most striking example of this problem can be seen in the Dombes region of France where a soil with almost 70 per cent. silt and only 13 per cent. clay appears to have defeated all attempts at orthodox management—it is cropped for a year or two and then flooded for use as a fish pond, after which another year or two of cropping is possible in the residues on the lake floor."

The point I am making I hope is that in the present state of our knowledge some silts cannot be successfully drained and we should not pretend to do so.

In this connection see pages 355-356 of Russel's *Soil Conditions and Plant Growth* for a description of silty soils which cannot be said to possess a "field capacity".

### Materials and Mechanisation

If we have sufficient time I will con-



clude my talk by a reference to the strides which have been taken in new material and machines recently. Here the developments are tangible. In the last five to seven years we have seen a number of new pipes made of p.v.c. plastics, pitch and bituminous fibre, and so on. Early hopes that these might drastically reduce prices of finished work have not been realised, but they have helped to stabilise. Prices for drainage work have not risen very much in recent years.

The new pipes have many advantages mainly on account of their light weight and ease of handling and laying; additionally they are useful in difficult ground conditions such as running sand and peat, because they are made in long lengths of between 20 ft. and 660 ft.; they are as little as 1/30th of the weight of clay tiles.

Some of these pipes are:

(i) 2 in. and 4 in. "Lamflex" of p.v.c.; 660 ft. of 2 in. weighs 84 lb., and can be laid by a modified mole plough and D7 tractor.

(ii) 2 in. "Carag" of polythene in 20 ft. lengths—less than 4 lb. weight per length; also in 3½ in. size. Can be laid like tile.

(iii) 2 in. "Landcoil" of polythene in 660 ft. lengths weighing 1½ cwt. per coil. Needs special machinery to lay it. Also available in 2¼ in. size.

In considering design of schemes with these pipes, reference should be made to the *Notes and Codes of Practice* issued by the Ministry of Agriculture Land Drainage Division,<sup>20</sup> which lists permissible lengths of laterals, methods of laying, materials for gravel envelopes and so on. In my opinion the days of the clay tile are numbered.

In the sphere of mechanisation the development of such new machines as the latest Allen heavy Drainer costing £6,000 reaching a speed of 40 ft./min. (half a mile an hour) with automatic placing and laying drains down to 54 in. Such machines are specialist contractors' tools, and when used with hopper feeding for gravel backfill and envelopes, new light pipes and trained men, costs will be kept level for some time to come.

In the lighter machines for small schemes and for maintenance such implements as the "Ditch Witch", "Trench Devil" and less exotic-named

Davis T66, cutting about 10 ft./min. are most economic. The great advantage of these machines is their ability to cut narrow trenches for the new narrower pipes and so show considerable savings on labour and more particularly when gravel backfill is used, trenches of 3 in. to 4 in. give substantial economies.

The introduction of the McConnell-Thornton-Garnett pipe feeding mole-plough may revolutionise under-drainage of new and established sports fields in the future, when the principles can be properly evaluated and ancillary gravel feeding equipment can be brought into use.

### Reference to Textbooks and Papers referred to in the Text:

*The second and concluding part of a talk given to the Architectural Association for Advanced Studies in Environment, May, 1968.*

<sup>10</sup> "Relation between Soil and Water," ed. T. J. Marshall, *Technical Communication No. 50*, Commonwealth Bureau of Soils.

<sup>11</sup> *Drainage Engineering*, ed. J. N. Luthin—American Society of Agronomy.

<sup>12</sup> *British Standard Codes of Practice Nos. 301 and 303.*

<sup>13</sup> "The Design of Urban Sewer Systems," Road Research Technical Paper No. 55, H.M.S.O.

<sup>14</sup> "Monograph of Discharge Curves for Drain Tile", Ministry of Agriculture, Fisheries and Food.

<sup>15</sup> *Principles of Underdrainage Design in the Belorussian SSR*, pub. American Natural Science Foundation.

<sup>16</sup> *Good Soil*, S. Graham Brade-Birks, Hodder & Stoughton.

<sup>17</sup> "Problems of Assessing Soil Structure", E. Crompton, Kings College, Newcastle on Tyne: paper read by British Grassland Society, Dec. 1960.

<sup>18</sup> "Recent Developments in the Techniques of Land Drainage", Paper by R. A. Walpole to 7th Askham Bryan Horticultural Technical Conference, E.F.P.P.

<sup>19</sup> *An Outline of Field Drainage with special reference to the Drainage of Sports Fields*, A. L. Turner, pub. by National Association of Grounds men, 1960.

<sup>20</sup> "Ministry of Agriculture—Technical Paper No. 209" and "Notes for the guidance of applicants for grants for Field Drainage," etc.

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# News



## from the Sections

### NORTH-EAST

By D. Earsman

*Chairman:*  
J. SIMPSON  
(Ponteland G.C.)

*Hon. Secretary:*  
1 Chesterhill,  
Cramlington,  
Northumberland.

#### Spring Tournament

OUR SPRING COMPETITION WILL BE held on Thursday, 24th April, at the Ravensworth Golf Club, with the kind permission of the captain and committee.

This will be an 18-hole Medal event, commencing at 12.30 p.m.

Here is a letter which I received from the wife of our old friend, Tom Auld, who was chairman of our section for many years. Tom does not get out much now and is unable to come to our meetings, but we never forget the work he has done for the section.

Dear Mr Earsman,

On behalf of Tom and myself, I would like to thank you and all the members of the North-East Section of the British Golf Greenkeepers Association for the kind gift which we received. Tom wishes to be remembered to all, and he asked me to convey his gratitude and best wishes.

Yours sincerely,

L. AULD.

#### New Member

We would like to welcome to this section Mr Henry Brown, Class A, of Newbiggin Golf Club.

## NORTHERN

By J. Parker

*Chairman:*  
A. ROBERTSHAW

*Hon. Secretary:*  
8 Goit Stock Terr., Harden,  
Bingley, Yorks.

#### February Lecture

THIS WAS HELD IN THE CLUBHOUSE of the Horsforth Golf Club on Wednesday, 26th February, when 35 members attended. The speaker was Mr D. J. Joss, of the Sports Turf Research Institute, who took for his subject "Construction Work" which was illustrated with slides. He went through the whole processes done to various areas in the making of a new course and the many snags that have to be overcome. Members found this most interesting and ably put over. Many questions were fired at the speaker who capably replied. A vote of thanks was proposed by our chairman, Mr G. Robertshaw, and heartily endorsed by members for a most interesting talk.

#### Mr G. Farmery

After 43 years' service on the staff of Bessacarr Golf Club, Doncaster, George Farmery recently retired. I am sure all members will join me in wishing him a long and happy retirement.

#### Handicaps

The following adjustments of handicaps have been made:—

E. Paley 14 to 12, A. Robertshaw 11 to 9, G. Bennison 11 to 9, M. Barrett 10 to 9, D. Spurden 16 to 14, W. Wilkinson 17 to 15, K. Young 16 to 14 and F. Cox 18 to 20.

#### New Members

We welcome to the section the following new members: B. Richardson, 42 Morrison Drive, Rossington, Doncaster (Bessacarr Golf Club); and J. Woodford, 118 Halifax Road, Odsal, Bradford (West Bowling Golf Club).

#### Mrs W. Paley

It is with deep regret that I inform members of the death of Mrs Walter Paley, wife of one of our oldest members. I have written to Walter expressing our condolences at his sad loss.

#### MISCELLANEOUS

PROFESSIONALS AND GREENKEEPERS having stocks of used golf balls contact Sparkbrook Golf Ball Co., 295 Highgate Road, Stoney Lane, Birmingham, with a view to filling export orders.