Report 229.

SOIL REFORT FOR THE SITE OF BILLINGOROUGH, LINCS BY H C M KEELEY

PROFILE I - DITCH SECTION



0 to 15 cms was very dark greyish brown (10YR3/2) medium sandy clay loam, friable and with medium weak granular structure. Pottery fragments were present, stones few (gravel to small) and roots absent.

15 to 27 cms was dark greyish brown (10YR4/2), otherwise similar to the layer above, but containing about 10% stones (gravel to small).

27 to 33 cms consisted of equal amounts of dark greyish brown (10YR4/2) and dark yellowish brown (10YR4/4) coarse sandy loam (the primary fill), which was moderately friable, structureless and contained 30% stones (gravel to small).

Below 33 cms was yellowish brown (10YR5/6) coarse calcareous sand, containing 45% stones (gravel to medium), structureless and moderately friable.

The section was freely drained and earthworm activity was noted throughout. Samples O to O were taken for pH determinations and results are as follows:-

	рн
1	7.4
2	7.9
3	8.1
4	8.0

PROFILE II - PIT WITH BURNT CLAY (F8)

0 to 10 cms was dark greyish brown medium sandy clay loam, friable and with weak medium granular structure. Stones were few (gravel to medium), roots few, fine, fibrous and this layer contained large lumps of burnt clay.

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10 to 32 cms was very dark greyish brown (10YR3/2) medium sandy clay loam similar (apart from colour) to the layer above. Stones were few (gravel to small), roots absent and a few fragments of charcoal and pottery were noted. 32 to 40 cms was dark greyish brown (10YR4/2) structureless coarse sandy clay loam, moderately friable and containing approximately 30% stones (gravel to small). Roots were absent.

Below 40 cms was yellowish brown (10YR5/6) structureless coarse calcareous sand, moderately friable and containing 45% stones (gravel).

The profile was freely drained. Earthworm activity was noted throughout. Samples () to (3) were taken for pH determinations, and results are as follows:-

	pH
0	8.2
Ô	8.2
3	8.3

PROFILE III - NATURAL SOIL AT EDGE OF SITE

The soils of this area have not yet been mapped and it was not possible to match the following profile with those described by Robson et al (1974) for the Woodhall Spa area.

Ap horizon	- 20 cm.	
	8 45 cm.	
Af and B	3) 48 cm.	
B/c		

0 to 45 cms was brown to dark brown (10YR4/3) medium sandy clay loam, friable and with moderate medium subangular blocky structure. Roots were abundant, fine, fibrous, mottles absent and stone content about 20% (gravel to medium angular flints). This layer was obviously disturbed, containing fragments of pottery, brick and charcoal. 45 to 48 cms was an Apand Bhorizon, ie material from the Ap horizon had been incorporated (probably by earthworm activity) into the underlying layer. The matrix was yellowish brown (10YR5/6) coarse sandy loam, moderately friable, structureless and containing about 35% stones (gravel).

Below 48 cms was similar to the material underlying the features (I and II) already described.

The profile was freely drained, slope 0°, vegetation cereals, and earthworms were present throughout the profile. Samples () to (3) were taken for pH determinations and results are as follows :-

	pH
1	8.3
2	8.0
3	8.2

Profiles I, II and III indicate the range of soils on the site, derived from calcareous sands and gravels, and it is hoped that the descriptions will be used as a basis for all future soil descriptions at Billingborough.

REFERENCE

Robson, J D. George, H and Heaven, F W (1974). Soil survey Record No. 22.

CALLIAINARY SUGGESTIONS FOR THE DESCRIPTION OF SITE SEDIMENTS

This I hope, is a basis from which we may form a comprehensive descriptive system; I have deliberately suggested a very simple format for I think initially we should avoid an overwhelming quanitity of terms or pedantic definitions. Ideally though we may end up using a system resembling that set out in the British Soil Survey Handbook [1973].

Suggested format for Context Card:

MATRIX	COLOUR
MATRIX	TEXTURE
MATRIX	CONSISTENCE
COARSE	COMPONENTS

The MATRIX is the fine earth fraction, that is material of sand grade or finer. COARSE COMPONENTS are of course gravels and stones - these may vary in their abundance.

MATRIX COLOUR

For a meaningful comparison to be made Munsell colours should be measured at a standardised moistness - I would recommend a wet reading but if the soil is found in its dry state a dry value can also be given.

MATRIX TEXTURE

The matrix texture refers to the relative proportions of sand silt and clay in the soil. It can be described by using the terms outlined in the 1973 Soil Survey Handbook but for simplicity I would suggest the following:

Sand: Mineral particles 0.06 mm - 2.00 mm in diamter. These particles are visible to the naked eye and feel gritty when rubbed between finger and thumb.

- Silt: Mineral particles 0.002 mm 0.06 mm in diameter. The particles cannot be detected with the naked eye but soils with a large proportion of silts have a scapy or silky feel and are only slightly sticky.
- Clay: Mineral matter less than 0.002 mm in diameter. Clay causes soils to cohere strongly and given it a sticky or plastic feel when wet.
- Loam: In agricultural terminology loam is a mixture of sand, silt, clay and which give an optimum tilth and fertility for cultivation. For soils descriptions however it is textural term referring to soils comprising all three texture grades - sand, silt and clay; this is best appreciated from the following diagram.



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Below are listed those terms used by the soil survey staff - some are subtle and require a considerable amount of experience to be diagonised with accuracy. We may however find that the 4 component system is too simple therefore I have underlined those terms which may be used to strengthen the system.

1.	Sand	7. Silty Clay
) (~4	Loamy Sand	8. Silty Clay Loam
3.	Sandy Loam	9. Silt Loam
lt.	Sandy Clay Loam	10. Sandy Silt Loam
5.	Sandy Clay	11. Clay Loam
6.	Clay	

MATRIX CONSISTENCE

This refers to the handling prosperties of the soil together with its properties of cohesion, adhesion, strength and cementation.

My suggested terms for consistence are:

loose	(Dry)	F	riable	(Moist)	
soft	(Dry)	F	ira	(Moist)	
nard	(Dry)	Very Firm		(Moist)	
		Cemented	(Wet;, Mo	ist or Dry)	
		Sticky	(Wet)		
		Plastic	(Wet)		

NB plasticity refers to the degree to which the soil can be rolled into "worms". Silty and sandy soils of course do not form "worms" when rolled between finger and thumb but most clays when wet roll out into long worms before breaking.

The terms in brackets refer to the moisture state of the soil.

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COARSE COMPONENTS:

The mineral particles greater than 2 mm dismeter [is stones].

The size of stones present should be described and if necessary the composition. The Soil Survey recommend the following categories:

Very small stones 2 - 6 mm Small stones 6 mm - 2 cm Medium stones 2 - 6 cm Large stones 6 - 20 cm Very large stones 20 - 60 cm Boulders greater than 60 cm

If for example chalk lumps predominate the chalk lumps can be substituted for stones.

DESCRIPTION

Here we should describe the gross characteristics of the beds:

- eg Dip of beds, orientation of stones, noticeable trends in grain size / eg medium chalk lumps decreasing to small in west /. Organic rich layers, lenses or inclusions if present. Note the nature of the organic remains eg fine root hairs, fibrous peat esc. The "packing" of the coarse components - some soils can be tightly packed with very few voids whereas others may have large voids, the latter are frequently described as "open work".
- The above can be supplemented by other pertinant observations: Presence of conspicously foreigh stones such as sell rounded flint pebbles in areas where these are rare. Also volcanic rocks or granits in areas of sedimentary rocks. Burn, flint, tile etc.

widdece of water logging.

Soils characterised by drab yellow, green, blue or olive colours. These occur when the soil remains saturated <u>/</u> therefore oxygen is excluded <u>/</u> for much of the year. Brighter colours may occur in patches where air enters the soil.

fron panning in spads and sandy loams these occur as layers cemented or A stained by iron.

Clay panning Thin clay sand deposited by soil waters within predominantly sandy soils.

Fanning frequently 'respects' the features and forms along the base or sides of the degression but at other times they can perversely cross 'Natural' and fill alike.

Disturbance of the strata by roots or ominal barrows - also the presence of only anomalies late or modern artifacts. $C_{ourSined}$, these can indicate that the strategraphy has been distrubed.

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