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SOIL SURVEY OF SHEEP BIOLOGY LABORATORY SITE PROSPECT HILL, N.S.W.

(Interim Report)

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INTRODUCTION

A soil survey has been carried out on the property at Prospect Hill, New South Wales recently acquired as the site for the new Sheep Biology Laboratory under the authority of the Division of Animal Health and Production, C.S.I.R.

The area surveyed consists of two adjoining blocks, viz.,

(1) A block of 99 acres comprising Portions 31, 32 and 33 (Parish of Prospect) with a frontage to the Great Western Highway.

(2) A block of 15 acres comprising part of Portion 27 (Parish of Prospect) with a frontage to Greystanes Road.

This report is intended only as a guide, to make intelligible the soil map which was drawn as a result of the soil survey. No analytical data is available as yet and it is intended to make a fuller report when this comes to hand.

TOPOGRAPHY AND GEOLOGY

Prospect Hill has been formed by the intrusion of an Essexite, with a chilled margin which is indistinguishable from abasalt in the hand specimen, into the Triassic Wianamatta Shale. The intrusion takes the form of a round-bottomed oval dish with a practically vertical abutment against the surrounding shale*. The hill itself forms a striking topographic feature rising sharply from the surrounding undulating country.

In the area surveyed only the chilled margin outcrops, in the south-west corner of the main block of 99 acres, the main part of the intrusion extending thence south and west. The country slopes steeply from this corner to the east and north. To the east the slopes become gradually gentler towards a small creek which flows south along the eastern boundary of the main block. To the north and north-east the slopes become gradually gentler towards an easterly flowing creek, becoming almost level on the south side of the creek. On the north side of this creek the country rises again into the typically undulating shale country. The small block consists of an even, gentle slope down towards the west to the northerly-flowing creek.

It is suspected that the whole area, apart from the chilled margin of the intrusion, is not Wianamatta shale but partly Hawkesbury sandstone. A boring at the top of the slope in the small block exposed a sandstone parent rock. Borings over the whole area were not deep enough to attempt to delineate boundaries between sandstone and shale.

THE SOILS

Ten soil types and two phases have been described and one profile sample of each type was taken. Two small atypical areas (Area "A" and Area "B") have been described but not sampled. The phases were not sampled, being of very limited extent. All these types and phases are described below :

	Horizon	Depth (ins.)	Description	Structure
Type 1	A_1	0 - 4	Dark brownish grey fine sandy clay loam with trace of gravel.	Slightly laminated
	A_2	4 - 8	Dark grey-brown fine sandy clay loam, slightly bleached with slight gravel and iron concretions.	
	B_1	8 - 16	Yellowish grey-brown with reddish brown mottle heavy clay, with slight gravel and trace iron concretions.	Blocky

*Reference to geology. Geology and Petrography of the Prospect Intrusion, H. Stanley Jones, M.A., B.Sc., FGS ; H.I. Jensen, D.Sc. ; T. Griffith Taylor, B.A., B.Sc. C.A. Sussmilch, FGS ; Procs. Roy. Soc. N.S.W. 1911, Vol. XLV, p. 445.

	Horizon	Depth (ins.)	Description	Structure
Type 1 (cont.)	B_1	16 - 30	Light grey with reddish brown and yellow-brown mottle, heavy clay, with slight gravel and trace iron concretions.	
		30 - 42"	Light grey with yellow-brown and reddish brown mottle decreasing heavy clay with slight coarse gravel.	
		42 - 69"	Light grey with yellow-brown mottle, heavy clay with light coarse gravel.	
		Continuing.		
Type 1A.	A_1	0 - 4	Brown to grey-brown sandy clay loam.	Slightly compacted
		4 - 9	Brown to grey-brown sandy clay loam to sandy clay.	Slightly compacted
	B_1	9 - 18	Brown to red-brown with slight yellowish grey mottle, heavy clay with trace ironstone gravel.	Blocky
		18 - 25	Brown to red-brown with light grey mottle heavy clay with trace of sand and gravel.	
		25 - 34	Grey-brown, light grey and brown reddish brown mottled heavy clay with trace of sand and gravel.	
		35 -	Very light grey and light grey with yellow-brown and red-brown mottle, light medium clay with trace of sand.	
		54 -	Trace iron concretions.	
		54 - 64	Light grey with red-brown mottle, heavy clay with trace red shale.	
		Continuing to 78" with red-brown mottle decreasing.		
Type 2		0 - 1½	Chocolate brown medium heavy clay.	Fine nutty
		1½ - 6	Slightly paler chocolate brown heavy clay.	Fine nutty
		6 - 11	Dark brownish grey heavy clay.	
		11 - 18	Dark grey-brown fine sandy light medium clay with decomposed mineral matter.	
		18 - 30	Grey-brown fine sandy clay loam with decomposed mineral matter.	Compacted
		30 - 48	Yellowish grey-brown loamy sand with decomposed mineral matter.	
		On decomposed basalt at 54" to 78" continuing.		
Type 2A		0 - 4	Chocolate brown dark brownish grey heavy clay.	Fine nutty
		4 - 8	Dark brownish grey heavy clay.	Fine nutty
		8 - 15	Dark yellowish brownish grey heavy clay.	Fine nutty
		15 - 24	Grey-brown with pockets of dark brownish grey heavy clay with slight reddish gravel.	Coarse nutty
		24 -	Light grey with reddish brown mottle, heavy clay with slight lime and trace of reddish gravel.	Blocky
		39 -	Lime out.	

	Horizon	Depth (ins.)	Description	Structure
Type 2A (cont.)		48 - 60	Light grey with reddish brown mottle, heavy clay with trace reddish gravel.	
		60 - 72	Yellowish grey-brown heavy clay with trace gravel.	
		Continuing.		
Type 3	A_1	0 - 3	Chocolate brown dark brownish grey silty clay.	Slightly laminated
	B_1	3 - 12	Dark brownish grey heavy clay with trace iron concretion. Cracks filled with black surface material.	Blocky
		12 - 25	Dark grey-brown heavy clay with trace of iron concretions. Cracks filled with black surface material.	
	B_2	25 - 33	Grey-brown heavy clay with trace lime and iron concretions.	
		33 - 51	Grey-brown heavy clay with slight lime and trace iron concretions.	
		51 - 72	Grey-brown heavy clay with slight iron concretions and trace lime.	
	C	72 - 81	Light grey with yellow-brown mottle, heavy clay with trace decomposed rock.	
Type 4	A_1	0 - 3	Dark brownish grey silty clay.	Nutty
		3 - 7	Dark brownish grey silty clay to light clay.	
	B_1	7 - 21	Very dark grey to black heavy clay with trace iron concretions.	Blocky
		21 - 34	Yellowish grey-brown heavy clay with trace iron concretions.	
	B_2	34 - 42	Yellowish grey and light grey mottled heavy clay with trace lime.	
		42 - 60	Yellowish grey-brown and light grey mottled heavy clay with slight lime.	
		60 - 84	Yellow-brown and light grey mottled heavy clay with slight to light lime.	
		Continuing.		
Type 5	A_1	0 - 2	Brownish grey fine sandy clay loam.	Slightly laminated
		2 - 6	Brownish grey silty clay.	
	B_1	6 - 15	Drab grey-brown heavy clay with trace iron concretions. Black surface material down cracks.	Blocky
		15 - 27	Yellowish grey-brown heavy clay with trace iron concretions. Black surface material down cracks.	
	B_2	27 - 45	Yellowish grey-brown heavy clay with trace iron concretions. Black surface material down cracks. Trace of lime.	
		45 - 63	Grey with slight brown to red-brown mottle, heavy clay with slight iron cemented pan.	
	C	63 - 78	Grey with grey-brown mottle, heavy clay with slight iron concretions.	
		Continuing.		

	Horizon	Depth (ins.)	Description	Structure
Type 6	A_1	0 - 4	Grey-brown fine sandy clay loam with slight gravel.	Slightly laminated
	A_2	4 - 8	Very light grey fine sandy clay loam.	
	B_1	8 - 22	Grey-brown to yellowish grey-brown heavy clay with trace gravel and iron concretions.	Blocky
		22 - 31	Yellow-brown heavy clay with trace gravel.	
		31 - 45	Yellow-brown heavy clay with trace gravel.	
		45 - 60	Grey-brown heavy clay with trace gravel.	
		Continuing.		

NOTE : Type 6 usually contains slight lime at 27" to 30", but is somewhat variable in this regard and in the depth of the A_1 horizon.

Type 8	0 - 4	Dark grey to dark brownish grey heavy clay.	Nutty
	4 - 12	Dark grey to dark brownish grey heavy clay with trace iron concretions.	Blocky to columnar
	12 - 24	Dark brownish grey with yellowish grey-brown mottle, heavy clay, with trace iron concretions.	
	24 - 33	Yellowish grey-brown heavy clay with trace iron concretions.	
	33 - 45	Yellowish grey heavy clay with slight to light rubble and trace iron concretions.	
	45 - 63	Grey with yellow-brown mottle, heavy clay with slight rubble and iron concretions.	
	63 - 78	Yellowish grey-brown heavy clay with trace rubble and iron concretions.	
	Continuing.		

Type 9	A_1	0 - 3	Dark brownish grey silty clay.	Nutty
	B_1	3 - 12	Dark brownish grey heavy clay.	Blocky
		12 - 24	Dark brownish grey heavy clay with trace iron concretions.	
		24 - 42	Dark brownish grey with yellowish brown mottle, heavy clay with trace iron concretions.	
		42 - 60	Grey with yellowish brown mottle, heavy clay with trace of iron concretions.	
		60 - 78	Grey with yellowish brown mottle, heavy clay with trace iron concretions and trace rubble.	
	Continuing.			

NOTE : Type 9 normally has approximately 6 inches of silty clay loam to silty clay as A_1 horizon but is variable in depth of surface, occurrence of lime and yellowness of subsoil.

Type 1 (Shallow Phase) Profile as for Type 1 except for A_1 horizon, consisting of about 4 inches of fine sandy clay loam instead of the normal 8 inches.

Type 3 (Deep Phase) Profile as for Type 3 except for A_1 horizon consisting of about 8 inches of fine sandy clay loam to fine sandy clay instead of the normal 3 inches.

	Horizon	Depth (ins.)	Description	Structure
Type 1B	A_1	0 - 8	Grey-brown sandy clay loam to sandy loam.	Slightly compacted
	A_2	8 - 12	Slightly bleached sandy loam.	
	B_1	12 - 24	Brown to red-brown heavy clay.	Blocky
		24 - 30	Paler medium clay with trace sand.	
		30 -	Yellowish reddish brown clayey sand.	
			Going lighter to 36" maximum continuing.	

Area "A" The soil comprising this area is substantially the same as Type 2 except that a definite A_1 horizon of 3 inches of silty clay has been developed.

Area "B" The soil comprising this area is atypical. Its profile is as follows :

0 - 4	Brownish grey fine sandy clay loam.	Slightly laminated
4 - 8	Very light brownish grey fine sandy clay loam.	
8 - 21	Brownish grey heavy clay with trace iron concretions.	Blocky
21 - 27	Grey-brown heavy clay with trace fine gravel.	
27 - 33	Grey-brown heavy clay with trace lime and rubble.	
33 - 39	Browner heavy clay with slight lime and rubble.	
39 - 48	With light lime.	
48 - 63	Grey and yellow-brown mottled heavy clay with slight to light lime and rubble.	
63 - 72	Grey increasing with depth and lime and rubble decreasing.	

THE SOIL MAP

The soil types and their phases described above have been mapped and the following is a brief description of their mode of occurrence.

Types 2 and 2A occur on the crest and steep slopes of the basalt hill in the south-west corner of the main block. Each covers a reasonable area and is of importance. Of the other soil types, Type 1 covers the largest area occupying almost one-third of the main block, with a further small area on the rise near the Great Western Highway and another on the rise near the Greystanes Road in the small block. Lower down the slopes in the main block occurs Type 3. Next in order of area covered is Type 6, which occurs similarly to Type 3; then Type 4 which appears to be an alluvial soil and occupies the flat adjoining the creek; then Type 9 occurring similarly to Types 3 and 6. Type 5 occurs as a small rise between two creek lines on the main block. Of minor importance are Type 1B occurring, as does Type 1A, on the upper slopes above Type 1; Type 3, deep phase, occurring lower on the slope than Type 3; Type 1, shallow phase, occurring as for Type 1; and Type 8 occurring as a small swampy area.

Area "A" is very similar to Type 2 and occurs in the same position. Area "B" is a small area close to the creek and is of very minor importance.

The outstanding soil association is that of a gradual transition down the slopes from Type 1A through Type 1 to Types 6 and 3. Types 2 and 2A occupy the higher parts of the main block and owe their features to the influence of the basaltic parent material. It should be emphasised that all the boundaries between soil types are gradual. The transition from one type to another is by no means sharp.

SOIL ANALYSIS

Samples have been taken for analysis of all types and phases. It is hoped also at a later date to do some mineralogical analyses to determine the part played by wash from the basaltic hill in the development, particularly of the surface soils, of types lower down the slopes.