Appendix 3 Details of deep borings

No. 1 Boring: Point of Ayre (See p. 289)

Details published by Prof. W. Boyd Dawkins in Trans. Manch. Geol. Soc., vol. xxii., p. 600, and by J. Todd in Yn Lioar Manninagh, vol. iii., p. 71.)

Formation	Engineer's record	Thickness	Depth
		Ft. in.	Ft. in.
[Raised Beach]	Shingle	23 0	
[Glacial]	Sand and shingle	70 0	
	Running sand	6 0	
	Clay	3 0	
	Sand and gravel	2 0	
	Clay	6 0	
	Hard sand	9 0	
	Clay	8 0	
	Hard sandy clay	20 0	
	Clay	3 0	
	Sand	4 0	
	Clay	4 0	
	Sand	8 0	
	Soft sandy clay	2 0	
	Hard brown clay	10 0	
	Gravel	2 0	
	Sandy boulder clay	4 0	
	Sand	3 0	
	Sand with stones	6 0	
	Hard sand	6 0	
	Silt	17 0	
	Sand	2 0	
	Hard sand	10 0	
	Sand	69 0	
	Gravel	1 0	298 0
[Triassic:Saliferous Marls]	Mottled brown and grey marl	54 0	
	Mottled brown and grey marl with gypsum	101 0	
	Light blue marlstone	3 2	
	Brown and blue marl	44 9	500 11
	Light blue marlstone with salt	11 0	
	Brown and grey marls with salt	19 9	
	Brown marl with veins of gypsum	1 6	
	Light blue marlstone	3 9	
	Brown marl with veins of gypsum	1 0	
	Brown marl and blue marlstone	26 11	
	Marl with salt	0 10	

	Blue marlstone	1 6	
	Brown marl	3 2	570 4
	Brown marl, with blue marlstone containing veins of gypsum and salt	45 1	615 5
	Brine run	2 6	
	Blue marlstone	8 1	
	Grey marlstone with marl	9 2	
	Salt	20 0	
	Mixed salt	0 8	
	Salt	3 4	
	Grey marlstone with salt	4 0	
	Salt	9 6	
	Brown marl	7.4	680 0
	1 Descriptions, throughout, in square brackets are not contained in the original records.		

No. 2 Boring: On the Ayre at Blue Point, opposite Ballawhane (See p. 282.)

[NX 39284 02429] (Details published by Prof. W. Boyd Dawkins in Trans. Manch. Geol. Soc., vol. xxii.2 p. 598, and vol. xxiii., p. 149; the subjoined account is from information supplied to the Survey by Messrs. Craine Bros.)

Formation	Engineer's record	Thickness	Depth
		Ft. in.	Ft. in.
[RaisedBeach]	Sand and shingle	16 0	
[Glacial]	Muddy sand	29 0	
	Sand containing small pieces of coal	41 0	
	Sand	20 0	
	Clay containing small pieces of coal	15 0	
	Silt	50 0	171 0
[Triassic: St. Bees Sandstone]	Red sandstone	11 6	
	Red sandstone with beds of marl	2 3	
	Red sandstone	20 0	
	Grey fakes [see footnote, p. 587]	0 8	
	Red sandstone with a grey band	14 6	
	Variegated do.	2 0	
	Red sandstone with grey bands	16 0	
	Red sandstone with beds of marl	1 9	
	Reddish brown marl	0 9	
	Reddish grey sandstone	1 2	
	Variegated sandstone	0 7	
	Red sandstone	11 9	

	Brown marl with bands of sandstone	3 3	
	Red sandstone striated with shale	6 9	
	Red sandstone with grey bands and shaly partings	62 9	
	Brown shale striated with red sandstone	4 6	
	Alternations of red sandstone with thin grey bands and shale	54 5	
	Reddish grey sandstone with tracesof coal in the bedding	1 0	
	Red and brown sandstone with thin grey bands and shale	110 11	
	Brown fakes [see footnote, p. 587]	30 0	
	Reddish grey sandstone	3 3	530 9
	Brown fakes	11 3	542 0
[Lower Marls]	Red sandy shale	24 0	
	Red sandy shale slightly speckled with coal	9 4	575 4
	[Fault]		
[Lower Carboniferous]	Brown fakey limestone resembling stone-marl	1 0	
	Light grey limestone tinged with yellow	7 2	
	Blue calcareous fakes	2 0	
	Reddish limestone	3 0	
	Purple sandstone striated with soft brown limestone	14 0	
	Dark purple sandy shale striated with soft brown limestone	10 6	
	Hard brown limestone with spar	0 6	
	Dark purple sandy shale	17 8	
	Conglomerate with pebble bed [see p. 284]	3 9	
	Purple sandy shale	22 1	
	Grey stone'	0 3	
	Dark sandy shale	5 9	
	Dark grey calcareous stone	2 9	
	Dark shale	6 10	
	Light stone; metal	7 10	
	Light stone with ironstone beds	6 2	
	Grey stone mixed with metal	5 8	
	Dark red dappled calcareous stone	6 3	
	Grey calcareous stone	0 6	

	Dark red stone	1 0	
	Limestone	7 4	
	Grey limestone	8 6	
	Limestone	2 6	718 4

No. 3 Boring: on the raised beach at Lhen Mooar (p. 281)

(Details published by Prof. W. Boyd Dawkins in Trans. Manch. Geol. Soc., vol. xxii., p. 598.) [NX 38280 01885]

Formation	Engineer's record	Thickness	Depth
		Ft. in.	Ft. in.
[Raised Beach]	Sand and shingle	12 0	
[Glacial]	Silt	6 0	
[Glacial]	Grey sand	48 0	
[Glacial]	Brown sand	26 0	
[Glacial]	Sand and shingle	18 0	
[Glacial]	Shingle	8 0	
[Glacial]	Grey sand	9 0	
[Glacial]	Shingle	40 0	
[Glacial]	Silt	0 6	167 6
	Carboniferous Limestone	66 0	233 6

<ref>The term "stone" from this place downwards in most cases refers to limestone.</ref>

No. 4 Boring: On the ayre opposite Knock-R-Dooney. (p. 284.)

(Details published by J. Todd in Yn Lioar Manninagh, vol. iii., p. 72.) [NX 40164 03040]

Formation	Engineer's record	Thickness	Depth
		Ft. in.	Ft. in.
[Raised Beach]	Sand with stones	16 0	
	Sand and gravel	20 0	
	Soft sandy clay with fragments of coal	40 0	
	Sandy clay	25 0	
[Glacial]	Sand with small pieces of coal	15 0	
	Sand	34 0	
	Silt	13 0	
	Gravel and clay	10 0	173 0
[Triassic St. Bees Sandstone]	Red sandstone	8 8	
	Red and grey sandstone	14 11	
	Red sandstone	23 3	
	Red and grey sandstone	7 8	
	Red sandstone	20 6	
	Red and grey sandstone	14 11	
	Red sandstone	22 2	
	Red and grey sandstone	20 6	
	Red sandstone	6 3	
	Red and grey sandstone	1 10	
:	Red sandstone	6 9	
	Red and grey sandstone	24 10	
	Red sandstone	13 7	

	Brown shale and red sandstone	1 10	
	Red and grey sandstone	3 1	
	Red sandstone	10 9	
	Red and grey sandstone	12 0	
	Red sandstone	13 8	
	Red and grey sandstone	12 4	
	Red sandstone	36 4	
	Red sandstone, and shale	16 9	
	Red sandstone	15 5	
	Red sandstone and shale	26 2	
	Red sandstone	1 6	508 8
[Permian ?:Lower Marls with Sandstone]	Brown shale	10 0	
	Red sandstone	4 7	
	Brown shale	7 8	
	Red sandstone	12 0	
	Brown dsandstone	7 0	
	Shale	26 0	
	Red sandstone	1 6	
	Shale	11 9	
	Sandy shale, variegated	0 6	
	Red sandstone, striated with shale	7 0	
	Sandstone with traces of coal	1 4	607 0
[Permian: Brockram Series]	Brown sandy shale containing small	29 4	
	Coarse red sandstone	3 6	
	Dark red stone	4 0	
	Dark red sandstone	3 11	
	Dark red stone	3 0	650 9
	Sandy shale	4 9	
	Dark red stone (calcareous)	4 4	
	Conglomerate	2 3	662 1
[Lower Carboniferous]	Dark red stone; brecciated	2 6	
	Purple sandstone with beds of brown and grey shale	13 5	
	Freestone	12 0	
	Purple sandstone	28 3	
	Purple shaly sandstone	6 0	
	Variegated sandy shale with iron stone nodules	6 6	
	Gypsum and shale	0 6	
	Variegated sandy shale with iron stone nodules	3 6	
	Dark shale	1 6	
	Variegated sandy shale with iron stone nodules	4 6	
	Dark purple shale with ironstone nodules	18 11	

	Dark purple shale with ironstone nodules and beds of fireclay	2 0	
	Variegated sandy shale with iron stone nodules	23 9	
	Dark shale	7 0	
	Shaly sandstone	2 2	
	Dark shale	4 0	
	Shaly sandstone	7 0	
	Dark shale with pyrites	4 6	
	Dark shale	5 0	
	Ironstone nodule	0 3	
	Dark shale	7 0	
	Ironstone nodule	0 3	
	Dark shale	3 0	
	Ironstone nodule	0 4	
	Dark shale	7 8	
	Dark sandy shale	1 10	
	Shaly sandstone	0 8	
	Dark shale with ironstone nodules	31 5	
	Black fireclay	0 6	
	Black shale with beds and balls of ironstone	5 9	
	Dark grey shaly sandstone	22 2	
	Grey shaly sandstone with ironstone nodules	14 6	
	Dark shale with ironstone nodules	20 9	
	Dark shaly sandstone	2 0	
	Dark shale with iron pyrites	4 6	
	Dark grey shaly sandstone	0 6	
	Dark shale with pyrites	6 3	
	Shaly sandstone	1 0	
	Dark shale	2 2	
	Grey limestone	3 0	
	Dark shaly limestone	0 10	
	Dark shale	1 6	
	Grey limestone	6 6	
	Hard grey stone	2 6	961 11

No. 5 Boring: On the Ayre opposite Ballagenney (See p. 286.)

(Details abridged from the borer's journal, communicated by Messrs Craine Bros.)

Formation	Engineer's record	Thickness	Depth
		Ft. in.	Ft. in
[Raised Beach]	Sand and stones	15 0	
[Glacial]	Gravel	27 0	
	Sand	36 0	
	Clay	34 0	
	Coarse sand and gravel with clay	26 0	

	Sand	73 8	
	Gravel	0 8	212 4
[Triassic St. Bees Sandstone and Lower marls = Passage Beds.]	Red sandstone	13 6	
	Red and grey sandstone	0 6	
	Red sandstone	5 9	
	Red sandstone with grey bands	20 3	
	Red sandstone striated with shale	1 0	
	Red sandstone with grey bands and shale partings	72 6	
	Sandstone with grey bands	142 2	
	Red sandstone with shale partings	1 0	
	do. with grey bands	111 11	
	Red shaly sandstone	1 4	
	Red sandstone with grey bands	127 6	
	Brown sandy shale	0 4	
	Red sandstone	0 6	
	Red and grey sandstone with shale partings	1 6	
	Red and grey sandstone	35 5	
	Sandstone plies [see p. 587]	0 6	
	Red sandstone with grey bands	33 6	
	Brown sandy shale	0 5	
	Red sandstone with grey bands	40 8	
	Red sandstone striated with brown shale	4 3	
	Red sandstone with grey bands	8 10	
	Brown shale	0 3	
	Red sandstone with grey bands	22 11	
	Red shaly sandstone with grey bands	2 0	
	Red sandstone with grey bands	43 3	
	Brown shale	0 4	
	Red sandstone with grey band	11 0	
	Red shaly sandstone	8 4	
	Red sandstone	3 0	
	Red sandstone striated with shale	3 7	
	Red sandstone	2 6	
	Red sandstone striated with shale	0 6	

	Red shaly sandstone	1 3	
	Red sandstone striated with shale	20 0	
	Red sandstone	1 9	
	Red sandstone and shale	47 9	1,004 1
[Permian Brockram Series]	Brown sandy shale with beds of grit	14 0	
	Conglomerate	0 6	
	Brown sandy shale	3 0	
	Brockram	19 6	1,041 1
Lower Carboniferous]	Purple sandstone	7 0	
	Shaly purple sandstone	2 6	
	Purple sandstone	6 5	
	Shaly purple sandstone	2 4	
	Darker purple sandstone	13 9	
	Variegated sandy shale	4 6	
	Dark sandstone; shells	7 3	
	Variegated sandstone	1 6	
	Purple and grey sandstone [plant-remains]	9 0	
	Purple and grey shaly sandstone	4 0	
	Purple and grey sandstone [plant-remains]	14 9	
	Purple and grey sandstone	9 3	
	Sandy shale	0 4	
	Grey sandstone and shale partings[plant-remains]	19 8	
	Dark shaly sandstone [casts of shells]	4 9	
	Grey sandy shale	3 9	
	Bluish grey shaly sandstone with brown beds [casts of shells]	27 7	
	Dark sandy shale	4 6	
	Dark red shale with ironstone nodules	14 0	
	Soft shale	4 10	
	Red shale	6 9	
	Hard sandy shale	6 8	
	Limestone with beds of shale	4 6	
	Calcareous sandy shale	3 6	
	Red sandstone	0 4	
	Shale	0 2	
	Limestone	0 9	
	Calcareous shaly sandstone	6 6	
	Limestone	4 2	
	Shaly limestone	2 3	
	Sandy shale	1 7	
	Red shale	0 9	
	Soft coal [no core, but traces of coal in the core-tube]	0 6	

	Sandy shale	0 6	
	Shaly sandstone	7 6	
	Limestone	0 8	
	Shaly sandstone	2 4	
	Limestone	2 10	
	Calcareous shale	6 0	
	Limestone	5 9	
	Shaly sandstone with gypsum	10 10	
	Sandy shale with gypsum	8 8	
	Shaly sandstone with gypsum	3 4	
	Shaly sandstone with beds of limestone	4 6	1,300 1

No. 6 Boring: at the Point Of Ayre. (See p. 290.)

(Details supplied by Messrs. Crain Bros.)

Formation	Engineer's record	Thickness	Depth
		Ft. in.	Ft. in.
[Raised Beach]	Shingle	16 0	
[Glacial]	Gravel	32 0	
	Sand and gravel	8 0	
	Sand	12 0	
	Sand and gravel	37 0	
	Hard sand	8 0	
	Clay	27 0	
	Sandy clay	8 0	
	Sand	6 0	
	Sandy clay with stones	10 0	
	Reddish clay	3 0	
	Sandy clay	5 0	
	Sandy clay with stones	10 0	
	Sandy clay	20 0	
	Sandy clay with stones	13 0	
	Silt	5 0	
	Gravel with shells	1 0	
	Sand	7 0	
	Muddy sand with shells	12 0	
	Reddish sand	36 0	
	Sand and gravel	2 0	
	Sand and gravel with pieces of coal	2 0	
	Gravel	35 0	
	Coarse gravel with clay	9 0	
	Reddish sand	24 0	
	Gravel	6 0	
	Stone [boulder]	0 8	
	Gravel and sand with clay	8 4	363 0
	Red marl with stones and gypsum	65 0	428 0
[Triassic:Saliferous Marls]	Brown marl with gypsum Disturbed marl	72 0	

Gypsum mixed with sandy Disturbed marl	2 0	
Brown and grey marl with marl. gypsum Disturbed marl	42 0	
Brown marl with gypsum	3 0	
Brown and grey marl with gypsum	8 0	
Grey marlstone with gypsum	13 0	
Brown and grey marl with gypsum	5 0	
Grey marlstone	2 0	
Brown and grey marl	2 0	
Grey marlstone	8 0	
Brown marl with veins of gypsum	2 6	
Brown marl with salt	0 8	
Brown marl	4 0	
Grey marlstone with beds of gypsum	2 0	
Grey marlstone with salt	0 2	
Grey marlstone with beds of gypsum	1 0	
Brown marl with veins of gypsum	2 11	
Brown and grey marl with 'beds and veins of gypsum	6 0	604 3
Salt (1)	12 6	
Brown and grey marlstone with salt	3 0	
Salt (2)	8 6	
Brown and grey marlstone with salt	6 6	
Salt (3)	1 6	
Brown and grey marlstone with salt	2 3	
Salt (4)	1 0	639 6
Brown and grey marlstone with salt	6 0	
Salt (5)	0 6	
Brown marl with salt	5 6	
Salt (6)	4 0	
Grey marlstone with salt	0 6	
Brown marl	11 6	
Salt (7) with about 50 per cent. marl	3 8	
Brown marl	7 0	
Salt (8) with about 25 per cent. marl	2 0	
Brown marl, with about 30 per cent. salt	1 4	
Salt (9)	0 6	
Brown marl	7 8	

Brown marl with salt	2 8	
Brown and grey marlstone	6 0	
Salt (10)	2 6	
Blue marlstone	1 4	
Blue marlstone with about 10 per cent. salt	2 10	
Salt (11)	16 0	7i 0
Brown marl	1 9	
Salt (12)	1 6	
Brown and grey marl	4 9	
Brown marl with salt	2 0	
Salt (13)	0 6	
Brown marl	2 0	
do. with salt	1 6	
Blue marlstone	3 0	
do. with salt	0 8	
Brown and grey marlstone	9 8	
Salt (14)	1 0	
Brown and grey marlstone	3 8	
Salt (15)	0 10	
Salt with about 20 per cent. marl	6 4	
Salt	2 10	
Salt with about 20 per cent. marl	4 0	
Blue marlstone	4 3	
Brown and blue marl with salt	9 4	
Salt (16)	1 9	
Brown and blue marl with about 30 per cent. salt	10 2	
Salt (17)	14 0	806 6
Brown and blue marl with salt and veins of gypsum	16 2	
Salt (18) with about 50 per cent, marl	2 10	
Brown and blue marl with veins of gypsum	4 4	
Salt (19) with about 50 per cent. marl	1 9	
Brown and blue marl with salt and veins of gypsum	2 4	
Salt (20)	1 9	
Brown and blue marl with salt, and beds and veins of gypsum	16 6	
Salt (21)	5 6	857 8
Brown marl with salt. Breccia	4 6	
Soft brown and blue marl with salt and gypsum	13 6	
Soft brown sandy marl with gypsum	25 4	
Soft brown marly sandstone	1 0	

	Brown sandy marl	12 4	
	Soft brown manly sandstone	3 4	
	Soft brown and grey sandstone	1 6	
	Blush grey sandstone	1 2	920 4

Journal of a boring in search of coal near Peel, made about the year 1870. (See p. 279.)

(Supplied by Messrs. Crain Bros., from an old record kept by the foreman of the work.)

Formation	**Engineer's record**	**Thickness**	**Depth**
		Ft. in.	Ft. in.
[Glacial]	Running sand	4 0	
	Sand and gravel	33 0	37 0
[Peel Sandstone]	Red sandstone with beds	17 9	
[Peel Sandstone]	Red sandstone	8 0	
[Peel Sandstone]	Red sandstone with soft beds	24 6	87 3
[Manx Slate Series]	Grey fakes'	1 3	
	Fireclay	16 3	
	Faky fireclay	24 0	
	Grey fakes	7 6	
	Faky fireclay	21 1	
	Light grey fakes with grey blaes	13 0	
	Faky fireclay with spar	4 0	
	Grey fakes	3 0	
	Faky fireclay	6 6	
	Grey fakes	6 3	
	Fakey fireclay	8 3	
	Grey fakes	6 0	
	Faky fireclay	5 3	
	Grey fakes	5 3	
	White sandstone, extra hard	6 6	
	Grey fakes	4 6	
	Green whinstone [Greenstone dyke ?]	14 0	
	Green whinstone soft	0 6	
	Blue whin stone	4 9	
	Soft parting	0 3	
	Coarse brown sandstone, hard		
	Faky fireclay	4 2	
	Grey fakes	3 4	
	Faky fireclay	14 6	
	Dark fireclay	3 6	
	Dark grey fakes and blaes'	1 6	
	Dark fireclay with spar	3 6	
	Light faky fireclay	13 4	
	Dark faky fireclay	4 9	
	Blue fireclay and spar	4 11	
	Light fireclay	2 10	

Grey sandstone, extra hard	3 1	
Grey fakes and spar	9 0	
Grey sandstone, extra hard	2 2	
Soft parting	0 4	
Grey Engle", extra hard	8 5	
Soft parting	0 4	
Grey sandstone, extra hard	13 1	
Light grey fakes with white spar	11 2	
Dark faky fireclay	4 11	
Blue fireclay and spar	6 4	
Grey fakes	6 5	
White spar, extra hard [Quartz vein 7]	6 7	
Dark fakes and spar	5 0	381 6

Note.—BLAES = shale. KINDLE =Hard grit. PLIES =thin parting. FAKES = sandy shale.