

HAMPSHIRE WELL-SECTIONS.

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It has been thought that an account of well-sections in the County would be a fit subject for publication in the Proceedings of the Hampshire Field Club, and I have therefore put together such sections as are in my possession and ready for printing, leaving some others, that for various reasons must stand aside, for another occasion. This paper therefore does not pretend to give an account of all unpublished well-sections in the County, and moreover an important tract is wholly left out, namely the Isle of Wight, for the reason that it will be thoroughly treated of in a Geological Survey Memoir that is now being printed.

Before describing our new well-sections it may be well to give a list of those that have already been published, with references to the works in which details may be found. It will be seen that these are few in number, singularly little having been recorded in our County, so that this paper, imperfect as it is, contains more well-sections than the total before published. In one case (Michelmersh) the published account is here reproduced, on account of a serious error in it, in another (Headley) because it occurs only in a daily newspaper, and in two others (Farnborough and Gosport Waterworks) further particulars are given.

Only such wells as have some geological interest are now noticed; those confined to one formation, as the Chalk, being passed over.

HAMPSHIRE WELL-SECTIONS ALREADY PUBLISHED.

- Aldershot Camp. Partly published by H. G. LYONS, *Quart. Journ. Geol. Soc.*, vol. xliii, p. 434 (1887). Reproduced, with additions.
- Aldershot Place (two). The Geology of the London Basin . . . pp. 445, 446, *Geological Survey Memoir* (1872).
- Dogmersfield Park. { PROF. PRESTWICH, *Quart. Journ. Geol. Soc.*, vol. x, p. 97 (1854), reprinted in Ewhurst. { The Geology of the London Basin.
- Farnborough. REV. A. IRVING, *Quart. Journ. Geol. Soc.*, vol. xli, p. 495. Reproduced, with additions.
- Gosport, Blockhouse Fort. . MAJOR-GEN. PORTLOCK, *Journ. Geol. Soc., Dublin*, vol. iv, p. 247 (1850).
- Gosport, Waterworks (No. 1 Well). J. PILBROW, *Quart. Journ. Geol. Soc.*, vol. xvi, p. 447. Reproduced, with additions.
- Headley. *Daily News*, 20th July, 1888. Now reproduced.
- Michelmerssh. E. SPON. Water Supply 1875. Now reproduced.
- Nursling (shallow well). J. W. ELWES. *Geol. Mag.*, dec., iii, vol. i, p. 549 (1884).
- Petersfield. H. ROBINSON, *Proc. Inst. Civ. Eng.*, vol. xc, pp. 98, 99 (1887).
- Portsmouth Dockyard. C. J. A. MEYER, *Quart. Journ. Geol. Soc.*, vol. xxvii, p. 81 (1871). Not a full account.
- Portsmouth. MAJOR-GEN. PORTLOCK, *Journ. Geol. Soc., Dublin*, vol. iv, p. 248.
- Southampton Common } RANGER. Report to the Local Board
Southampton, Northam } of Health . . . 1851.
- Southampton, Docks } T. W. SHORE, *Rep. Brit. Assoc.*,
Southampton, Railway Station } 1883, pp. 152, 153.
- Strathfieldsaye. REV. J. C. CLUTTERBUCK, *Journ. Roy. Agric. Soc.*, ser. 2, vol. i, p. 280, and The Geology of the London Basin . . . p. 446.
- Winchfield. E. SPON. Water Supply (1875) and Ed. 2, p. 236 (1885).
- Isle of Wight. Bembridge. R. F. GRANTHAM, *Trans. Surveyors' Inst.*, vol. xx, pt. v, plate (1888).
- Freshwater. Golden Hill. E. SPON. Water Supply, Ed. 2, p. 235 (1885).

In the following sections the figures for thickness and depth stand for feet, unless otherwise stated.

[Words in square brackets are my own.]

Aldershot.—D. Lines, South Camp. 1856.

Communicated by the War Office.

About 320 feet above Ordnance Datum.

Shaft about 34 feet, the rest bored. Water rose to 48½ feet from the surface.

		Thickness.	Depth.
[Bracklesham Beds]	Yellow loam	15½	15½
	Green sand	12½	28
	Grey sand	10	38
	Mixed green sand	6½	44½
	Dark green sand	1½	46
	Streaky blue clay	3	49
[? Bracklesham or Lower Bagshot]	Blue clay	4	53
	Black sand	15	68
[Lower Bagshot Beds]	Blue clay	20	88
	Mixed sand	22	110
	Stone [? only at bottom of bed]	4	114
	Mixed sand	1	115
	Mixed clay and sand	8	123
	Blue clay	6	129
	Yellow clay	1	130
	Sand and rock	5	135
	Mixed sand	1	136
	Blue clay	1	137
	Green sand	5	142
	Red sand	1	143
	Mixed sand	5	148
	Light [coloured] sand	2	150
	Blue clay	4	154
	Mixed clay	2	156
	Mixed sand	6	162
	Mixed clay and sand	6	168
	Blue clay	7	175
	Stone [? only at bottom of bed]	17	192
[London Clay.]	Blue clay	14	206
	Pebbles	1	207
	Blue clay	15	222
	Pebbles	1	223
	Blue clay	2	225
	Pebbles	2	227
	Blue clay	22	249
	Yellow stone	2	251
	Blue clay, streaked	67	318
	Blue clay	17	335
	Blue clay, streaked	8	343
	Blue clay	89	432
	Pebbles	1	433
	Blue clay [? sand at bottom] with water	67½	500½

There is a difficulty in defining the formations, and the occurrence of pebbles in the London Clay of this district is peculiar; perhaps the layers marked as pebbles may be broken up septaria. The well is not now used, I believe.

Aldershot.—Waterworks. Southern side of Boxall's Lane, half a mile S.W. of St. Michael's Church. 1878.

About 250 feet above Ordnance Datum.

Communicated by the Aldershot Gas and Water Company.

A second boring about 16 feet off. The water-level the same in both (14 feet 2 inches and 16 feet 3 inches below the surface), and not lowered by 24 hours pumping. Daily yield about 220,000 gallons (? more).

A third boring being made in 1884.

	Thickness	Depth.
Gravel and yellow clay [? weathered London Clay] ..	17	17
[London Clay] { Blue clay	110	127
{ Red and yellow dirty clay, with soft iron [basement-bed ?] ..	7	134
{ Pot clay	5	139
[Reading Beds, 59 feet] { (a) Light-red dirty clay with sand ..	7	146
{ (a) Light-red clay with sand ..	23	169
{ (b) Light-coloured pure sand ..	5	174
{ (b) Dark clay, with thin beds of sand ..	6	180
{ (c) Light and dark sandy clay ..	13	193
Chalk with flints. Water at a depth of 211 feet ..	46½	239½

Another account differs in some details, thus:—

(a) Grouped as light-red dirty clay, with soft iron,	30
(b) " " pure white clay	10½
(c) " " dark sandy clay	13½

SECOND BORING, 1881.

	Thickness.	Depth.
Loam and red-grey gravel	25	25
[London Clay, 107 feet.] { Blue clay, with a foot of claystone, from 59 to 60 feet deep in it ..	95	120
{ [Basement (Sand	6	126
{ -bed] { Sand and shells ..	6	132
{ Mottled clay	18	150
{ Coloured [mottled] sandy clays ..	5	155
{ Grey loamy sand	8	163
[Reading Beds, 65½ feet.] { Grey and brown sand	1	164
{ White sand	13	177
{ Blue clay	9	186
{ Black sandy clay	2	188
{ Live green sand	8½	196½
{ Pebbles	1	197½
Chalk with flints	44½	242

Alton.—Local Board Well, near the Stables at Ashdell. 1882.

From a memorandum of the late MR. W. CURTIS, communicated by Mr. F. CROWLEY, and from specimens and notes from the latter (1885).

Shaft 160 feet, bored 400.

Before boring there was often 32 to 33 feet of water in the well; but this was soon pumped out, and the quantity gradually decreased. Now there is 17 feet of water, which is not lowered much by pumping, and very soon fills up again.

	Thickness.	Depth.
Well dug [Chalk]	—	140
Lower Chalk }	68	208
Grey Chalk }		
Chalk Marl	50, or perhaps 80	258?
Chloritic Marl	10, " 15	268?
Malm Rock [Upper Greensand]	80	348
Gault	150	498
Gault (? partly hard Lower Greensand)	42	540

A specimen, marked 185 (meaning 185 feet down the bore), is grey hard sandy marl, like Malm rock.

A specimen marked 360 in grey clay (gault).

Bournemouth.—Gas and Water Works. 1876.

Sunk and communicated by MESSRS. S. F. BAKER and SONS.

	Thickness.	Depth.
[? Drift.]		
White sand	1½	1½
Yellow loam	3	4½
Yellow gravel	8	12½
Yellow loam	1½	14
Coarse gravel and stone	½	14½
Bright red sand	2	16½
Yellow sand	2½	19
Mottled clay	1	20
Yellow sand (water-bearing)	5½	25½
Fine grey sand	2½	28
Tough clay	5	33
Grey loam and sand	4	37
Grey sand (water-bearing)	9½	46½
Sharp grey sand	2½	49
Veins of loam and sand	2	51
Sharp grey sand (water-bearing)	3½	54½
Fine grey sand	6½	61
Sharp grey sand	5	66
Coarse grey sand (much water)	1	67
Clay, very compact	8	75
Dark clay, close and tough	5	80

Bournemouth.—Mont Dore. 1888.

Made and communicated by MR. J. M'WILLIAM.

Shaft, the last 25 feet with iron cylinders.

The well holds about 9,900 gallons of water, and it took two steam-pumps, working night and day, to keep the water down.

	Thickness.	Depth.
Loam and sand, mixed	4 ..	4
Light yellow or buff, compact clean sand, with layers of dark red sand or fine gravel	20 ..	24
Loose yellow sand	4 ..	28
[Bagshot Beds.] Hard blue clay, with here and there a layer of light-yellow sand	10 ..	38
Sand	2 or 2½ ..	40+
Blue clay	about 5 ..	45+
Hard sand, overlying the water-stratum	nearly 10 ..	55

Bramshaw.—Mr. Eyre's Estate. By pond S. of Bramshaw Hill.

Soil	Thickness.	Depth
Clay	1 ..	1
Dense grey sandy loam	3 ..	4
Wet sand, with a six inch band of ironstone full of good water	7 ..	11
[Bracklesham Beds.] Very hard sand, in parts nearly black with vegetable matter. No water	9 ..	20
Greenish sand crust	3 ..	23
Soft sand	½ ..	23½
Crust, as above, but harder } ferruginous {	4 ..	27½
Sand	¾ ..	28
Dingy blue clay reached	3 ..	31

Eling.—Langley Manor, Hunter's Hill. 1887.

Bored and communicated by MESSRS. ISLER, and from specimens.

Water-level 80 feet down. Yield 300 gallons an hour.

Old dug well	Thickness.	Depth.
Clay	— ..	28
Blue sandy marl [specimen of grey clay, with greenish sand]	7 ..	35
Stiff blue clay	39 ..	74
Sandy blue clay	8 ..	82
Stiff clay	4 ..	86
Sandy marl [specimens of green-grey clayey sand or sandy clay]	12 ..	98
[Barton and Bracklesham Beds.] Stone [specimen of hard calcareous clay]	27 ..	125
Sand [specimens of green-grey clayey sand or sandy clay, with bits of shell at 136 and 148: then specimen of green-grey clay]	1 ..	126
Sandy clay	31 ..	157
Sand	1 ..	158
	7 ..	165

		Thickness.	Depth.
[Barton and Bracklesham Beds.]	Stiff sandy clay [specimen of fine greenish-grey clayey sand at 178; of green sandy clay at 200; and of dull brownish clay, with a little greenish sand at 205]	140	205
	Stiff clay	6	211
	Stiff sandy clay	23	234
	Stiff green sand [specimen of hard brown rather sandy clay at 245; of brownish and greenish clayey sand, with re- mains of shell, at 247; and of greenish-grey firm clayey sand at 248]	76	310
			

Eyeworth.—*Schultze Gunpowder Co's Works, about 6 miles N.W. of Lyndhurst.* 1888.

From specimens, taken at every ten feet of depth, and from information from MR. R. W. S. GRIFFITH, Manager.

Shallow pit and then a boring to 200 feet. Very small supply of water, which rose some 60 feet (? more), but was pumped down in a few hours. A little later about 6 feet was silted up.

1. Blackish-brown loamy earth (alluvial wash)
2. Pale brownish or buff clay, slightly sandy.
3. Dull brown (greyish) clay, or sandy clay.
4. Fine clayey green sand.
5. Brownish-grey sandy clay.
6. Greenish-grey sandy clay or clayey sand.
7. Calcareous stone (2 to 3 feet) and impure pyrites
[? in sand or clay]
8. Fine green sandy clay or clayey sand.
9. Light-grey sandy clay.
10. " " more sandy.
11. Pale brownish-grey clay.
12. Light-grey clean sand, blowing; gave water at first
13. Dark-grey sand, drying compact.
14. Pale brownish-grey sandy clay, with vegetable
matter.
15. Sand, like 13, but of a lighter colour.
16. Sandy clay, like 14.
17. Sand, like 15.
18. Pale clay, almost a pipe-clay.
19. Light-brownish-grey sand, with pieces of vegetable
matter (lignite).
20. Said to be like 19. A heap, by the boring, full of
pieces of lignite.

Farnborough.—*Waterworks. Western side of Alexandra Road, just S.E. of Alma Cottages.* 1884.

About 260 feet above Ordnance Datum.

Sunk by MESSRS. TILLEY AND SON, and from specimens (to 185 feet).

Water-level 23 feet down, until 29th July, 1884, when it

was pumped down to 41 feet, and the fixed level was then reduced to 29 feet.

		Thickness.	Depth.
	Gravel (8 feet and iron-bound, in a trial-boring)	7	7
[Upper Bagshot Sand 128½ feet.]	Brown loamy sand, rather coarse	33	40
	Buff sand (and water) rather coarse	33	73
	Yellow clayey sand, fine	8	81
	Green loam (turning grey when drier)	12	93
	Fine green sand and water (turning grey when drier)	29	122
[Bracklesham Beds, 31½ feet.]	Light-grey fine sand and water	13½	135½
	Dark-grey clay, with some large flint pebbles	2	136½
	Green-grey loam	17	153½
	Flint pebbles, in green-grey clayey sand	3½	156½
	Green-grey loam and sand, with pebbles	10	166½
[Lower Bagshot Sand, 62 feet.]	Fine grey sand, with water (? and loam)	22	188½
	Green sand and water	22	210½
	Green sand, with thin layers of clay	3	213½
	Strong green loam, with layers of clay	12	225½
	Green sand and water	3	228½
	London Clay	31	259½

The divisions of the Bagshot Series are hard to make out, and the thickness given to the Upper division is more than one would expect; but some of the specimens looked like Bracklesham Beds, the green being an evanescent colour, from dampness. The Lower Bagshot Sand on the other hand is thinner than one would expect. Whether the bed described as London Clay is all truly so may also be a question, and some of it may turn out to belong to the loamy passage-beds from the sand into the clay.

Fordingbridge.—Gasworks. By the stream, at the western end of the village. 1887.

Bored and communicated by MESSRS. TILLEY.

About 90 feet above Ordnance Datum.

Water, from the sand at 125 feet, rose to 13 feet above the ground.

		Thickness.	Depth.
	Ballast [River Gravel]	14	14
[London Clay, 124½ feet.]	Sand and clay	14	28
	Sand and pebbles	2	30
	Sand and clay, with a foot of hard stone at the base	30	60
	Blue clay, with 6 inches of hard stone 24 feet down, and again at the base	32	92
	Sand and clay, with 17 inches of stone 12 feet down	nearly 33½	125½
	Sand and water	3	128½
	Clay	7	135½
	Sand, shale and pebbles [? basement-bed]	3	138½

		Thickness.	Depth.
[Reading Beds, 73½ feet.]	Clay and sand	6 ..	144½
	Green loamy sand, with 4 inches of stone at the base	over 11½ ..	156½
	Light-brown clay	3½ ..	160
	Brown clay	2 ..	162
	Coloured [mottled] clay	40 ..	202
	Dead sand	10 ..	212
Chalk		7 ..	219

This section seems to show a thinning of the London Clay at the outcrop, the Bagshot Beds being shown as coming on here, on the Geological Survey Map (Sheet 15).

Gosport.—Messrs. Mumby and Co.

Communicated by MESSRS. W. HILL AND CO.

		Thickness.	Depth.
[Bracklesham Beds.]	Clays and sand	55 ..	55
	Green sand and water	12 ..	67
	Clay	1 ..	68
	Green sand	4 ..	72
	Light [coloured] sand	4 ..	76
	Blue clay	11 ..	87
	Sandy clay	22 ..	109
	Blue clay	16 ..	125
[Lower Bagshot Beds, 34 ft.]	Blue clay and pyrites	14 ..	139
	Black pebbles	1 ..	140
	Green sand and water	8 ..	148
	Black pebbles and sand	3 ..	151
	Green sand and water	11 ..	162
[London Clay.]	Sand and water	11 ..	173
	Sandy clay	15 ..	188
	Stiff sandy clay	8 ..	196
	Stiff clay and pebbles, with some pyrites	1 ..	197
	Shale	1 ..	198
	Light [coloured] sand and water (ferruginous)	21 ..	219
	Stiff clay	30 ..	249
	Clay and shells	1 ..	250
	Stiff clay	27 ..	277
	Dark sand, with shells and clay	4 ..	281
	Clay	18 ..	299
	Clay-stone	1 ..	300
	Blue sandy clay	12 ..	312
	Stiff blue clay, with a layer of pyrites at 330 feet	48 ..	360

Messrs. Hill classed the beds down to 281 feet as Bracklesham and Lower Bagshot; but the sandy London Clay clearly ranges up to 173 feet.

Gosport.—Waterworks. Bury Cross.

There are four wells here. No. 1 is the most easterly, in the eastern Engine House. No. 2 is close by, to the N.W., just outside the Engine House. No. 3 is merely a pumping shaft, by the western Engine House. No. 4 is further west, by the north-western corner of the field beyond the works. The water from No. 2 flows into No. 1 by a pipe. Nos. 1, 3 and 4 are connected by a conduit at the base of the shafts.

Total supply, in 1885, about 300,000 gallons a day.

For analysis see "The Water Supply of Sea-side Watering Places" by G. W. WIGNER, pp. 151, 152 (1878).

No. 1 WELL.

J. PILBROW, *Quart. Journ. Geol. Soc.*, vol. xvi, pp. 447-449 (1860). Corrections and additions from the Waterworks Company, and from specimens kept in their office.

Shaft 10 feet. Large cylinders to a depth of 83 feet, smaller to about 110 (? rather less). The rest bored.

Water rose to 9 feet below the surface. Would now rise to about 25 feet from the surface; but is pumped down to about 80 feet, and never left to rise higher than to about 35. Quality good.

Yield only tested to about 500,000 gallons a day, at about 70 feet from the surface. In 1885 about 7000 gallons an hour pumped.

		Thickness.	Depth.
		Ft. In.	Ft. In.
[River Drift, 9½ feet.]	Soil (specimen of brown loam)	1 6 ..	1 6
	Gravel	8 0 ..	9 6
	Mottled clay (specimen brown and grey, and sandy)	2 3 ..	11 9
	Blue clay, with sand and pyrites. Water at a depth of 25 feet. (specimens of brown laminated sandy clay, of dark grey ditto, and of brownish sandy clay) ..	15 6 ..	27 3
[Bracklesham Beds, about 294 feet.]	Light-coloured sand, with pyrites and small shells (specimen of grey clayey sand with small <i>Ostrea</i>)	5 10 ..	33 1
	Sand and shells. At 52 feet more loamy and full of shells. List of fossils, by PROF. MORRIS, given. Water increasing just below 45 feet (specimen of sand with green grains and <i>Nummulites</i>)	34 2 ..	67 3

		Thickness.	Depth.
	Greensand (specimen with shells)	2 9 ..	70 0
	Greensand, lighter [in colour] (specimen finer and with shells)	5 0 ..	75 0
	Light-green sand (specimen of compact clayey grey sand) ..	5 0 ..	80 0
	Light-coloured sand (specimen of green-grey sand with shells) ..	3 0 ..	83 0
	Clay and sand (specimen marked 85)	1 0 ..	84 0
	Sand and shells, compact and full of shells at 86 feet (specimens of grey sand, with <i>Cardita</i> and <i>Turritella</i>)	11 0 ..	95 0
	Sand, shingle, and shells (specimen of grey sand with <i>Cardita</i>) ..	9 0 ..	104 0
	Laminated clay (specimen, marked 104, of brown-grey clay with sand partings)	2 9 ..	106 9
	Blue clay and sand (specimen of brown-grey laminated clay at 108, and of brown clay below)	11 6 ..	118 3
	Black peat, woody (specimens of peat with brown clay)	4 6 ..	122 9
	Stiff blue and green clay (speci- men brown)	16 0 ..	138 9
	Blue clay and sand (specimen brown)	12 6 ..	151 3
[Bracklesham Beds, about 294 feet.]	Dark sand and water (specimen of grey sand, coarser than any other, the rest being all fine) ..	2 0 ..	153 3
	Blue clay and sand (specimen brown)	8 1 ..	161 4
	Green sand (specimen with bits of clay)	1 0 ..	162 4
	Stiff blue clay (specimen brown, with a little sand, ? trace of shell)	21 5 ..	183 9
	Dark green sand, with peat clay and pyrites (specimen of brown- grey compact sand with peaty streaks)	18 0 ..	201 9
	Green sand and water (specimen of fine light-coloured sand with dark grains)	20 6 ..	222 3
	*Blue [light-coloured] clay and sand [48]	49 3 ..	271 6
	Clay, sand and shells [no speci- men]	1 0 ..	272 6
	Blue [light-brown] clay and [green] sand. At 290½ feet hard blue clay	27 6 ..	300 0
	Blue clay and black [flint] pebbles	3 0 ..	303 0
	Blue clay, crusty [no record of this in another account] ..	0 9 ..	303 9
[Lower Bagshot]	Light-coloured sand [clayey at the bottom] and water ..	26 0 ..	329 9

		Thickness.	Depth.
[London Clay]	Sandy clay and black pebbles ..	1 3 ..	331 0
	Hard clay [these two together, in specimens, as clay, the depth being made 331½ feet] ..	2 3 ..	333 3

* From this point the specimens differ slightly from the published account, and the version in square brackets is taken from them ; but of course it does not follow that the whole of each bed was like the specimen.

It should be noted that specimens of bluish-grey clays, etc. are liable to turn brown after long exposure. Hence probably some of the differences in the above account.

The REV. O. FISHER (*Quart. Journ. Geol. Soc.*, vol. xviii, p. 76) from an examination of the specimens, when fairly fresh, gave the following abstract :—

Laminated clay, weathered, at a depth of 11 feet 9 inches.

Laminated clay and dark sand, 37 feet 3 inches.

Nummulina lævigata bed at 67 feet 3 inches.

Very green sand, with a few specimens of *N. lævigata*, at 75 feet.

Turritella bed, a conglomerate of shells, with *Cardita planicosta*, at 95 feet.

Cardita bed ; shells rather smaller at 104 feet.

Shaly and peaty clays at 109 feet.

He remarked—"I should say that the water was obtained in the London Clay series, and that the Bracklesham Beds ended at a depth of 201 feet 9 inches. The green sand (with water), 20 feet 6 inches thick, would then belong to the Lower Bagshot sands."

I think, however, that the Bracklesham Beds reach further down, their base being shown by the pebbles of the specimen from below 300 feet. In this case the 26 feet of sand below is Lower Bagshot, as is most likely from the fact that it is the chief water-bearing bed. The London Clay therefore would be only just touched. The specimens from the latest well (No. 4) agree with this classification, and so does the account of the well at the Royal Clarence Yard.

NO. 4 WELL.

? Shaft about 40 feet (with Bores to 120, 220, and 330 feet).

From specimens in the Company's office.

It must, of course, be understood that the whole of the thicker beds are not likely to follow the character of a single specimen taken from one part ; thus specimens of sand may come from a bed largely composed of clay.

					Thickness.		Depth.
[River Drift, 12ft.]	{	Brown loam	..	..	3	..	3
		Gravel	..	..	9	..	12
		Brown and grey (discoloured) clay	..	..	1	..	13
		Grey clay and sand, laminated, with pyrites	..	..	10	..	23
		Light-grey and greenish sand, partly clay : small shells	..	..	57	..	80
		Green-grey sand and shells	..	..	17	..	97
		" "	..	..	5	..	102
		Brown clay	..	..	15	..	117
		Sand and peat	..	..	3½	..	120½
		Clay and sand	..	..	19	..	139½
[Bracklesham Beds, 29½ feet.]	{	Light-coloured sand	..	..	4½	..	144
		Clay with sand (specimen mashed up)	..	..	22	..	166
		Hard clay	..	..	35	..	201
		Light-grey sand	..	..	22	..	223
		Clay and sand, laminated	..	..	16	..	239
		Clay with a little sand	..	..	59	..	278
		Sandy clay and flint pebbles	..	..	5	..	303
		Light-coloured sand with small flint pebbles	..	..	4	..	307
		Light-coloured sand	..	..	13	..	320
		Clay, sandy clay, and iron-pyrites	..	..	14	..	334

The base of the Bracklesham Beds was therefore struck at exactly the same depth as in No. 1 Well; but in the later well there may be a less thickness of the Lower Bagshot Sand, and there is less water found. The sand, from 20 to 22 feet thick, below the depth of 201 feet, may be the same bed that occurs, in a like position, near Southampton.

At the more northerly well of the Royal Clarence Victualling Yard (there is no record of the southerly one apparently) the base of the Bracklesham Beds is not quite 40 feet down, so that we have the means of calculating the fall of the beds between the two sites (about 1 in 25).

A new boring (decreasing from 8 to 4 inches diameter) in this well, from the base of one of the old borings, made and communicated by MR. W. HILL, of Gosport.

The water found at the bottom, which they were only just able to touch, rose to the surface.

		Thickness.	Depth.
Old shaft, about 40 feet, and boring (9 inches diameter)		—	218
[Bracklesham Beds.]	{ Sand, with a little clay	8	226
	{ Stiff brown clay	2	228
	{ Brown sandy clay	21	249
	{ Stiff brown clay	34	283
	{ Sand and clay, with water	12	295
[Bagshot Sand.]	{ More sand; water	8	303
	{ Darker sand, with more water	17	320

		Thickness.	Depth.
[London clay, 327 feet.]	Sandy clay	10	330
	Clay	7	337
	Sandy clay, with a few black [flint] pebbles	11	348
	Clay	1	349
	Dark sandy clay	10	359
	Hard yellowish clay	3	362
	Sand, with a little clay and pebbles ..	6	368
	Clay, with a little coarse grey sand, a few pebbles, and some water ..	61	429
	Sandy clay much easier to work ..	25	454
	Hard clay	102	556
	Sand and water (which rose to within 19 feet of the surface)	18	574
	Very hard stone	2½	576½
	Sandy clay, getting harder	12½	589
	Strong brown clay, with 8-inch stone, at about 517 feet	58	647
	Pure Stamshaw [mottled] clay ..	43	690
	Light-brown clay	6	696
	Sandy clay (Stamshaw) [mottled]. Specimen of brecciated-looking mottled sandy clay, grey, red, and whitish, at 700 feet	5	701
	Stamshaw [mottled] clay and sand in about equal parts	4	705
	Ditto milder, light-brown with deep red veins. Specimen, grey-and- brown, at 730 feet	25	730
	Very fine close bluish and black clay Stamshaw [mottled clay], very bright red. Vein of snuff-coloured sand at 745. Some water. Specimen of red clay, with but little light-grey mottling, at 745 feet	11	741
		6	747

The Chalk must be almost immediately beneath.

Headley.—170 yards north of the Church tower. For Mr. Delamotte. 1888.

Communicated by PROF. T. R. JONES.

Shaft throughout, with 3 feet of water when digging was left off.

		Thickness.	Depth.
[Lower Green- sand (Hythe Beds).]	Brickwork	—	8
	White sand	16	24
	Rock	2	26
	White sand	8	34
	Rock	3	37
	White sand	12	49
	Three pieces [? beds] of rock ..	7	56
	White sand, with water	19	75

The sand between the layers of stone is so hard as to be a soft stone.

Headley Park.—1888. (*Daily News*, 20th July, 1888).

A bore. Water rose to 9 feet above the surface, which is 210 feet above Ordnance Datum, at first at the rate of about 200 tons a day, but increasing to that of 290. Upon the tube being cut down $2\frac{1}{2}$ feet the overflow increased to 480 tons, or 110,000 gallons, daily. The water has been analysed and found to be of the finest quality.

Hythe.—*Winterton Hall*, N.W. of house (*in field*). 1885.

Communicated by MR. G. F. L. GILES, and from specimens. Field overflowed by high water spring tides (reclaimed land?).

Water, from the last bed but one, rises to the top of the bore-pipe and cannot be lowered more than 40 feet.

		Thickness.	Depth.
[Alluvium.]	Yellow clay	8	8
[Drift.]	Yellow gravel, very compact	10	18
	Blue clay [specimens of grey clay, rather sandy]	17	35
	Sandy blue clay } [Specimens of rather sandy grey clay.] {	2	37
	Green sand	1	38
	Blue clay. [Specimens, 39—41, grey sandy clay.]	2	40
	Green sand; great quantity of water. [Specimens, 42—44, fine grey clayey sand.]	4	44
	Blue clay	3	47
	Blue clay with sand	3	50
	Blue clay	1	51
	Blue clay with sand	2	53
	Green sand	3	56
	Blue clay with sand	11	67
	Blue clay with much sand	11½	68½
	Blue clay with sand	9	77½
[Barton Beds and Bracklesham Beds.]	Green sand. [Specimens of fine clayey sand]	2	79½
	Blue clay with sand. [Specimens, 80—85, 87, 88, grey sandy clay; 86, 89—91, grey clayey sand]	11½	91
	Hard blue clay. [Specimens 92, 93, grey sandy clay; 94 grey clayey sand; 95 green-grey sand]	4	95
	Hard blue clay [Specimens of grey clay]	6	101
	Hard blue clay with sand. [Specimens of grey, partly greenish, clay, some rather sandy]	22	123
	Hard blue clay. [Specimens of grey clay, some slightly sandy, some slightly greenish]	19	142
	Hard blue clay with sand. [Specimens grey clay]	3	145
	Blue sandy clay	1	146
	Blue sand with very little clay	3	149
	Blue sand with more clay. [Specimen brownish]	1	150

		Thickness.	Depth.
(Barton and Bracklesham Beds.)	Hard blue clay, very little sand	[Specimens of grey and greenish	3 153
	" " with sand	rather sandy	3 156
	" " less sand, and with a mass of stone	clays, more or less with green grains]	1 157
	Hard blue clay.. ..		2 159
	Hard blue clay with a few small pieces of shell [Specimens of greenish-grey and brownish clays, some sandy]		9 168
	Very hard brownish clay, with a few shells	[Specimens of brown clays, with a little	6 174
	Green sandy clay	green sand at 176.]	2 176
	Brown mottled clay, with a few small shells		4 180
	Green sand with streaks of clay, and a few small shells	[Specimens of brownish with green	4 184
	Blue sandy clay	sand at 183.]	1 185
	Hard brownish-blue clay [specimens of brownish and slightly greenish sandy clay]		3 188
	Green sandy clay, with fragments of shells [specimens greenish-grey]		2 190
	Very hard blue clay, with a little sand, and fragments of shells [specimens of greenish-grey sandy clay, at 191, 192, 193]		3 193
	Green sandy clay		5 198
	Green sand, with a large quantity of fresh water		3 201
	Green sand, with more clay		1 202

It is hard to make a division between the Barton Beds and the Bracklesham Beds. Judging, however, by the Geological Survey Map (Sheet 11), one would expect but little of the former.

Michelmersh.

E. SPON. "Water Supply. The Present Practice of Sinking and Boring Wells." pp. 176, 177, 8vo. Lond. 1875, Ed. 2, (1885) pp. 221, 222.

Shaft 400 feet [but the total only 300½].

Water rose 19 feet in the shaft, and is abundant.

	Thickness.	Depth.
Surface soil	4 ..	4
Dark clay [Reading Beds]	27 ..	31
Chalk	250 ..	281
Calcareous sand	2½ ..	283½
Upper Greensand	17 ..	300½

This section is practically impossible. The whole thickness of the Chalk would have to be pierced before reaching the Upper Greensand, and that thickness is probably 800 feet at least. It should be noted that the bed classed as Upper Greensand is undescribed, and therefore we are given

no reason for such classification, I have no doubt but that the bed in question is simply a hard layer in the Upper Chalk. No further particulars are procurable.

Milton.—Portsmouth Lunatic Asylum, 1885.

Made and communicated by MR. W. HILL, of Gosport.

Cylinders 48 feet, the rest bored.

Greatest height of water 11 feet down.

		Thickness.	Depth
Mould	 up to	1½	1½
[? Drift.]	{ Brickearth	5	6
	{ White running sand	29	35
	{ Ordinary gravel	2½	37½
	{ Blue-bine clay	42½	80
[London Clay 290½ feet.]	{ Hard sandstone [? septaria]	3	83
	{ Blue clay and sand mixed	23	106
	{ Hard blue clay	82	188
	{ Hard clay-boulder [? septaria]	0½	188½
	{ Hard blue clay	8	196½
	{ Black sand	3½	200
	{ Hard sand-boulder [? septaria]	3	203
	{ Dark green sand with water	22	225
	{ Hard boulder [? septaria]	1½	226½
	{ Hard blue clay	78½	305
	{ Rock with metal	1½	306½
	{ Stiff light-red clay	10½	316½
	{ Pipe-clay	1½	318½
	{ Brown clay, resembling brickearth	10	328½
	{ Light-red clay, with layer of sand 3 to 4 inches thick	6½	335
	{ Black loamy sand	5½	340½
[Reading Beds, 98½ feet.]	{ Dark-red clay	2½	343
	{ Grey clay	3½	346½
	{ Red plastic clay	75½	422½
	{ Hard stone	1½	424
	{ Plastic clay and stones	3	427
Chalk, with occasional bands of flints		177	604

Except for the occurrence of "ordinary gravel" beneath the white sand one would certainly class the latter as Bagshot. Perhaps the names, etc., of the two beds have been transposed by accident.

Monks' Sherborne.—The Rectory (within 10 feet of the eastern wall). 1887.

Made and communicated by MESSRS. LEGRAND & SUTCLIFF.

Shaft 30 feet [? old well], the rest bored.

		Thickness.	Depth
[London Clay.]	{ Clay and septaria	30 ..	30
	{ Clay with shells	5 ..	35
	{ Mottled clay ..	25 ..	60
[Reading Beds, 67 feet.]	{ Sandy clay ..	16 ..	76
	{ Mottled clay ..	9½ ..	85½
	{ Hard clay ..	14½ ..	100
	{ Black sand ..	2 ..	102
Chalk and flints		28 ..	130

Netley.—Royal Victoria Hospital.

Sections from A. BEAMISH, Lieut. R.E., dated 1867 (and 1869?), with further information from Major NIXON, R.E. (1886).

I. NORTH WING.

Shaft 40 feet, the rest bored. Water-level 16 feet down. (Figures, in brackets from another account, by Major R. BULLEN, R.E.)

		Thickness. Ft. in.	Depth. Ft. in.
Gravel		1 to 16 6 ..	16 6
[Bracklesham Beds.]	{ Hardened sand (29)	37 2 ..	53 8
	{ Mottled sandy clay (11-ft. 9-in.)	1 9 ..	55 5
	{ Hard clay ..	1 0 ..	56 5
	{ Greenish-yellow sand ..	27 0 ..	83 5
	{ Light-coloured clay ..	6 0 ..	89 5
	{ Light-grey clay ..	11 0 ..	100 5
	{ Hard clay ..	5 0 ..	105 5
	{ Sand and clay, with fossils	11 0 ..	116 5
	{ Coarse grit sand ..	9 0 ..	125 5
	{ Fine running sand ..	6 0 ..	131 5
	{ Dark chocolate [-coloured] sand	7 6 ..	138 11
	{ Grey sand, full of shells (11)	11 1 ..	150 0
	{ Mottled sand, with clay and shells (9)	10 0 ..	160 0
	{ Dark green sand, mixed with clay (21-ft. 1-in.)	20 0 ..	180 0

2. SOUTH WING (850 feet from the above).

Shaft 37 feet, the rest bored. Water-level 16 feet down.

		Thickness.	Depth.
[Bracklesham Beds.]	{ Brickearth ..	0½ ..	0½
	{ Green sand ..	5 ..	5½
	{ Hard clay ..	1 ..	6½
	{ Green clay and small shells ..	2½ ..	9
	{ Dark brown clay ..	4 ..	13
	{ Rather stiff green clay and large shells	9 ..	22
	{ Green clay, with fossils?	6 ..	28
	{ Greenish sand ..	89 ..	117
	{ Stiff clay, with bed of white sand	12 ..	129
	{ Stiff clay ..	12 ..	141
	{ Very stiff clay ..	20 ..	161
	{ Green sand ..	15 ..	176

3. LAUNDRY WELL.

Shaft 45 feet, the rest bored. Water-level 14 feet down.

		Thickness	Depth.
Not observed		—	60
	Sand	20	80
	Stiff grey clay, with pieces of black turf material.. .. .	9	89
	Dark greyish or greenish slightly loamy sand	36	125
	Dark-green sand	21	146
	Dark-grey sand, with shelly particles	4	150
	Light-grey and greenish sand.. .. .	10	160
	Grey mottled clay	7	167
	Chocolate [coloured] loamy sand	3	170
	Black turfy soil	2½	172½
	Coarse light-grey crystalline sand	9½	182
	Stiff clay	5	187
	Chocolate [coloured] loamy sand	3	190
	Fine yellow quicksand	3	193
	Black turfy soil	3½	196½
[Bracklesham Beds.]	Dark-grey sand	4½	201
	Dark loamy sand	1	202
	Clay	4½	206½
	Black turfy soil	1	207½
	Dark stiff clay.. .. .	3½	211
	Stiff blue clay.. .. .	8	219
	Mottled clay	18	237
	Greenish sand	15	252
	Hardened sand	1	253
	Light-greenish sand	4	257
	Light-brown and grey stiff clay	16	273
	Grey sand	2	275
	Stiff clay	1½	276½
	Light-green sand, with pieces of hardened yellow sand	13½	290
	Stiff light-blue clay	20	310
	Hard black clay	1	311
	Stiff dark clay	9	320
[Lower Bagshot Beds.]	Black [flint] pebbles	8	328
	Light-green sand	3	331

North Stoneham.—Red Lodge.

Communicated by MR. W. E. DARWIN.

		Thickness.	Depth.
Gravel ..		11	11
	Sand	3	14
	White clay	4	18
[Bracklesham Beds.]	White sand	8	26
	Brown clay	15	41
	Black clay	9	50
	Brown sand, with water	9	59
	Black clay or mud (offensive)	4	63

North Stoneham.—Red Lodge Nursery; close to the house.

From a Drawing in the possession of the Corporation of Southampton.

230 feet above High Water Level.

	Thickness.	Depth.
Shaft, the rest bored	about —	50
Yellow sand ..	10	60
Blue clay ..	26	86
Black sand and clay ..	20	106

Southampton.—Mr. Payne's Well, near St. Paul's Church.

From a Drawing in the possession of the Corporation.

60 feet above High Water Level.

	Thickness.	Depth.
Shaft, the rest bored	about —	22
[Bracklesham { Yellow sand	12	34
Beds.] { Blue sand	10	44
{ Black sand and clay	20	64

(? The total should be 56, in which case the shaft is probably only 14 feet.)

Southsea.—Southsea Brewery, Mr. Long's. New Well, 1887,

Made and communicated by MESSRS. ISLER.

Shaft 19 feet, the rest bored.

Water-level, at rest, 61 feet down. Supply, through a 4-inch pump 60 feet long, 18 gallons a minute, inexhaustible.

	Thickness.	Depth.
Made ground and gravel	19	19
Blue clay	37	56
Light [coloured] sandy clay	36½	92½
[Bracklesham { Greenish sand, with little water	9	101½
Beds.] { Blue clay with stones	3½	105
{ Green live sand	22	127
{ Tough blue clay	61½	188½
{ Clay and pebbles	3	191½
[? Bracklesham { Sand, with water; no supply [=brackish?] 16½		208
Beds.] { Loamy sand	39	247
{ Live sand, with mudick } with water { 24		271
{ Coarse sand } no supply { 3½		274½
[Lower Bagshot Sand.] { Live sand	3½	278
{ Sandy clay and pebbles	1	279
{ Tough clay, stony	42	321
{ Very hard stone	2	323
{ Green sand, with bands of stone and shells: with water: no supply [=brackish]	28½	351½
[London Clay.] { Tough sandy clay	33½	385
{ Tough blue clay	28	413
{ Sandy clay, with bands of stones	29½	442½
{ Sand, with mudick and shells [Specimens of sandy limestone, with <i>Pectunculus</i> , about 443, and of pyrites.] 20		462½