SAMPLING

of

TASMANITE SHALE OF LATROBE DISTRICT

All the sampling was carried out underground in the workings of Goliath Cement Co. and Tasmanite Shale Oil Co. Plans of the mines showing the position and number of each sample are appended. The positions of the samples were determined with the idea of spreading them throughout the mines as far as possible, with particular regard to the newer workings. Some of the older workings were either water-logged, fallen in, or filled up with mullock and in these sampling could not be undertaken.

(1) CHARACTERISTICS OF THE SEAM

Generally it may be said that the Tasmanite shale seam is made up of three bands or beds the upper and lower ones of which are shale, while the middle band is more in the nature of a mudstone. The three bands contain Tasmanite spores but the quantity of spores in each section varies. The top shale is the richest in spores and, therefore, in oil yield, while the middle mudstone band is by far the poorest.

The two shale bands, which are somewhat arenaceous, proved remarkably tough to break when dry thus differing from the mudstone band, which is harder and slightly brittle. Distributed sporadically through the seam, small waterworn pebbles of quartzite are occasionally found. These are usually up to three inches in diameter, but often are six inches and occasionally are of the dimensions of boulders the largest of which was 30 inches in diameter. In places, particularly, towards the top of the seam or immediately above it, the pebbles become more concentrated and the rock assumes the nature of a conglomerate.

Partings, along which the shale breaks away, generally occur at the top and the bottom of the seam respectively. At times the positions of the partings differ slightly from the above and it is then found that they may v be a few inches above or below the top and/or the bottom of the seam. For instance, in the Tasmanite Shale Oil Co's Mine, portion of the lower shale has been extracted from a parting now represented by the mine floor. Below the floor some three to six inches of poor shale has been left, and this gradually mefges into the underlying mudstone. Other partings separate the middle band from the two shale bands.

The dip of the seam is generally even and gradual but here and there some of the underlying mudstone projects into the lower portion of the seam, thus producing an uneven floor in these places when mined.

Many small faults and several larger ones traverse the seam.

The latter introduce displacements from one foot up to twenty feet, thereby adding to the difficulty of working.

The following table shows the average thickness of the seam in each mine together with those of its component parts.

TABLE I.

Section of Seam	Sample No.	Reg. No.	Ash per cent	Sulphur per cent	Specific Gravity	Thickness ft.	Thickness ins.	Oil yield (deduced from ash content) Gals. per ton
Top shale	IC	837	70.10	2.35	1.90	2	0	44.8
Middle Band	IB	759	91.00	2.64	2.49	1	2	6.3
Bottom shale	IA	814	79.40	2.86	2.21	2	0	25.4
Top and bottom shale				2.62	2.06	4	0	34.4
Whole seam				2.63	2.15	5	2	27.0
Top shale	2C	768	73.76	2.70	1.95	2	2	36.7
Middle band	2B	760	92.76	2.59	2.42	0	11.25	3.6
Bottom shale	2A	751	75.70	2.91	2.04	1	9.5	32.6
Top and bottom shale				2.80	1.99	3	11.5	34.8
Whole seam				2.75	2.07	4	10.75	27.8
Top shale	3C	838	72.48	2.24	1.95	1	11.5	39.5
Middle band	3B	761	90.74	3.28	2.41	1	1	6.6
Bottom shale	3A	752	75.80	3.08	2.04	1	11.5	32.4
Top and bottom shale				2.67	2.00	3	11	35.9
Whole seam				2.82	2.08	5	0	28.5

Table I cont'd page 2.

Top shale	4C	769	76.42	2.51	2.06	2	7	31.4
Middle band	4B	762	90.94	2.70	2.35	1	6	6.4
Bottom shale	4A	753	75.10	2.86	2.04	1	8	34.0
Top and bottom shale				2.65	2.05	4	3	32.4
Whole seam				2.66	2.13	5	9	24.9
Top shale	5C	770	76.80	2.48	2.04	2	6.5	30.4
Middle band	5B	763	89.86	2.66	2.47	1	7.5	8.0
Bottom shale	5A	754	77.70	2.88 Eschka 2.87 Fusion	2.07	1	9.5	28.4
Top and bottom shale				2.65	2.03	4	4.5	29.6
Whole seam				2.72	2.17	5	11.5	22.9
Top shale	6C	771	72.80	2.28	1.94	1	11	38.9
Middle band	6B	764	92.16	2.44	2.52	1	2	4.6
Bottom shale	6A	755	77.70	2.95	2.10	1	9.5	28.4
Top and bottom shale				2.62	2.02	3	8.5	33.6
Whole seam				2.57	2.14	4	10.5	25.4
Top shale	7C	772	65.00	3.00	1.78	1	8	57.0
Middle band	7B	765	89.50	2.53	2.42	1	5	8.5
Bottom shale	7A	756	77.00	2.88	2.06	1	8	30.0
Top and bottom shale				2.94	1.92	3	4	42.5
Whole seam				2.79	2.07	4	9	30.6

Table I, con'd. page 3.

Top shale	8C	773	71.50	2.61	1.94	2	1	41.9
Middle band	8B	766	85.36	2.82	2.29	0	11.25	14.8
Bottom shale	8A	757	84.62	2.69	2.24	2	0	16.2
Top and bottom shale				2.65	2.09	4	1	28.4
Whole seam				2.69	2.12	5	0.25	25.6
Top shale	9C	774	65.20	2.47	1.83	1	6.5	56.5
Middle band	9B	767	89.00	2.58	2.45	1	7.5	9.3
Bottom shale	9A	758	76.60	2.80	2.02	1	8.5	30.9
Top and bottom shale				2.65	1.93	3	3	42.4
Whole seam				2.62	2.10	4	10.5	29.6
Top shale	10C	839	65.84	2.30	1.82	1	7.75	55.0
Middle band	10B	826	88.80	1.94	2.48	1	5.5	9.4
Bottom shale	10A	815	76.40	2.71	2.11	1	8	31.3
Top and bottom shale				2.52	1.97	3	3.75	42.2
Whole seam				2.31	2.12	4	9.25	30.5
Top shale	11C	840	76.20	2.44	2.07	2	11.5	31.7
Middle band	11B	827	90.10	2.81	2.56	1	0.5	7.6
Bottom shale	11A	816	75.60	2.77	2.09	1	8.75	32.9
Top and bottom shale				2.56	2.08	4	8.25	32.1
Whole seam				2.62	2.16	5	8.75	26.9

Table I, cont'd. page 4

Top shale	12C	841	79.40	2.29	2.11	3	2.5	25.4
Middle band	12B	828	90.20	2.18	2.53	0	11	7.5
Bottom shale	12A	817	75.30	2.92	2.09	1	8.5	33.6
Top and bottom shale				2.51	2.10	4	11	28.2
Whole seam				2.44	2.17	5	10	24.4
Top shale	13C	829	67.60	2.72	1.86	1	8.75	50.6
Middle band	13B	842	89.70	1.90	2.47	1	7	8.3
Bottom shale	13A	818	77.70	2.68	2.12.	1	11	28.4
Top and bottom shale				2.70	2.00	3	7.75	38.2
Whole seam				2.42	2.14	5	2.75	27.7
Top shale	14C	843	74.40	2.14	2.00	2	0.25	35.5
Middle band	14B	830	91.70	1.87	2.59	1	4.5	5.2
Bottom shale	14A	819	81.00	2.84	2.25	2	3.25	22.3
Top and bottom shale				2.53	2.13	4	3.5	28.1
Whole seam				2.35	2.24	5	8	21.7
Top shale	15C	844	76.56	2.77	2.07	2	11.75	31.0
Middle band	15B	831	91.04	2.05	2.56	1	1	6.2
Bottom shale	15A	820	78.68	2.70	2.15	1	11.5	26.6
Top and bottom shale				2.74	2.10	4	11.25	29.2
Whole seam				2.60	2.18	6	0.25	24.4

Table I. cont'd page 5

Top shale	16C	845	76.36	2.22	2.05	2	825	31.5
Middle band	16B	832	90.90	2.10	2.53	0	10.25	6.5
Bottom shale	16A	821	80.62	3.44	2.26	0	8.25	23.0
Top and bottom shale				2.49	2.09	3	4.5	29.6
Whole seam				2.40	2.18	4	2.75	24.2
Top shale	17C	846	75.00	2.65	2.04	3	0.25	34.1
Middle band	17B	833	90.78	2.04	2.50	1	2	6.6
Bottom shale	17A	822	77.04	2.69	2.10	1	8.25	30.0
Top and bottom shale				2.66	2.06	4	8.5	32.6
Whole seam				2.52	2.15	5	10.5	26.5
Top shale	18C	871	78.54	2.22	2.11	2	10.5	27.0
Middle band	18B	834	89.70	2.73	2.50	1	5	8.3
Bottom shale	18A	823	78.30	2.66	2.12	1	10	27.5
Top and bottom shale				2.39	2.11	4	8.5	27.2
Whole seam				2.54	2.20	6	1.5	22.2
Top shale	19C	872	80.44	1.97	2.17	3	1	23.4
Middle band	19B	835	91.34	2.21	2.58	1	0.75	5.8
Bottom shale	19A	824	78.10	2.73	2.12	1	10	27.9
Top and bottom shale				2.25	2.15	4	11	25.0
Whole seam				2.24	2.23	5	11.75	21.1

Table I. cont'd Page 6

Top shale	20C	873	76.10	2.07	2.03	3	0.75	31.9
Middle band	20B	836	89.90	3.53) Eschka 3.57) Peroxide	2.56	1	2	8.0
Bottom shale	20A	825	77.72	(2.78 Eschka (2.80 Peroxide	2.12	1	9	28.4
Top and bottom shale				2.34	2.09	4	9.75	30.6
Whole seam				2.62	2.18	5	11.75	25.4
Top shale	21C	908	69.90	2.91	1.89	1	9.5	45.1
Middle band	21B	891	89.30	3.10	2.53	1	3.75	8.8
Bottom shale	21A	874	75.24	2.53	2.05	1	10	33.8
Top and bottom shale				2.71	1.97	3	7.5	39.1
Whole seam				2.83	2.12	4	11.25	29.5
Top shale	22C	909	75.86	2.61	2.04	2	10	32.4
Middle band	22B	892	89.90	3.98	2.62	1	1.5	8.0
Bottom shale	22A	875	76.62	2.74	2.09	1	9	30.9
Top and bottom shale				2.66	2.06	4	7	31.8
Whole seam				2.97	2.17	5	8.5	26.1
Top shale	23C	910	72.00	2.77	1.94	1	6.75	40.6
Middle band	23B	893	89.44	2.46	2.51	1	4	8.5
Bottom shale	23A	876	77.70	2.43	2.09	1	11	28.4
Top and bottom shale				2.58	2.03	3	5.75	33.7
Whole seam				2.54	2.16	4	9.75	25.5

Table I. cont'd page 7

Top shale	24C	911	73.38	2.23	1.97	2	1	37.8
Middle band	24B	894	91.62	2.27	2.56	1	0.5	5.3
Bottom shale	24A	877	77.00	2.50	2.10	1	9.75	30.0
Top and bottom shale				2.36	2.02	3	10.75	34.0
Whole seam				2.34	2.16	4	11.25	26.8
Top shale	25C	912	72.50	3.57	1.96	1	10.25	39.5
Middle band	25B	895	90.24	2.22	2.52	1	5.5	7.5
Bottom shale	25A	878	73.38	2.76	2.02	1	5	36.6
Top and bottom shale				3.21	1.97	3	3.25	38.2
Whole seam				2.85	2.15	4	8.75	27.1
Top shale	26C	913	72.84	3.57	1.98	2	1	38.9
Middle band	26B	896	91.34	2.25	2.55	1	2.25	5.8
Bottom shale	26A	879	74.90	2.51	2.05	1	3.75	34.3
Top and bottom shale				3.15	2.01	3	4.75	37.1
Whole seam				2.87	2.15	4	7	27.5
Top shale	27C	914	72.40	2.64	1.95	1	8.75	39.9
Middle band	27B	897	90.12	2.36	2.55	1	2	7.6
Bottom shale	27A	880	76.00	2.55	2.06	1	8.5	32.0
Top and bottom shale				2.59	2.00	3	5.25	35.8
Whole seam				2.52	2.14	4	7.25	27.3

Table I, cont'd page 8

Top shale	28C	916	77.58	2.66	2.10	2	9.5	28.9
Middle band	28B	915	91.60	2.60	2.60	1	0.5	5.3
Bottom shale	28A	881	76.28	2.85	2.07	1	7.5	31.6
Top and bottom shale				2.73	2.09	4	5	29.9
Whole seam				2.70	2.19	5	5.5	24.3
Top shale	29C	917	70.40	2.95	1.92	1	9.75	44.10
Middle band	29B	899	90.18	2.24	2.50	1	6	7.55
Bottom shale	29A	882	75.10	2.91	1.92	1	7.25	34.0
Top and bottom shale				2.93	1.97	3	5	39.2
Whole seam				2.68	2.13	4	11	27.9
Top shale	30C	918	73.34	3.35	2.00	1	11.5	37.8
Middle band	30B	900	91.68	2.24	2.56	1	1.75	5.2
Bottom shale	30A	883	77.00	2.87	2.10	1	9	30.0
Top and bottom shale				3.12	2.05	3	8.5	34.0
Whole seam				2.87	2.17	4	10.25	26.0
Top shale	31.C	919A	73.40	2.23	1.99	2	3	37.6
Middle band	31B	901	91.30	2.72	2.56	0	11	5.8
Bottom shale	31A	884	76.70	2.69	2.09	1	10.75	30.6
Top and bottom shale				2.45	2.03	4	1.75	34.3
Whole seam				2.51	2.13	5	0.75	28.1
Top shale	32C	919	71.32	2.61	1.92	1	10.5	42.1
Middle band	32B	902	91.48	2.88	2.57	1	1	5.5
Bottom shale	32A	885	75.60	2.80	2.06	1	10	32.9
Top and bottom shale				2.71	1.99	3	8.5	37.4
Whole seam				2.75	2.12	4	9.5	28.6

Table I, cont'd page 9

Top shale	33C	920	70.60	2.74	1.88	1	10.75	43.8
Middle band	33B	903	90.90	2.38	2.52	1	1	6.5
Bottom shale	33A	886	76.68	2.78	2.10	1	9	30.6
Top and bottom shale				2.76	1.98	3	7.75	37.1
Whole seam				2.66	2.11	4	8.75	28.7
Top shale	34C	921	64.10	2.74	1.77	1	5.5	59.2
Middle band	34B	904	88.70	3.08	2.44	1	9	9.5
Bottom shale	34A	887	80.42	2.91	2.15	2	3.5	23.4
Top and bottom shale				2.85	2.00	3	9	35.7
Whole seam				2.93	2.14	5	6	26.2
Top shale	35C	922	71.00	2.74	1.90	2	1	42.9
Middle band	35B	905	90.32	2.66	2.51	1	1	7.3
Bottom shale	35A	888	75.58	3.58	2.06	1	10	32.9
Top and bottom shale				3.15	1.97	3	11	38.0
Whole seam				3.02	2.09	5	0	30.0
Top shale	36C	923	68.24	2.81	1.84	1	10.25	49.0
Middle band	36B	906	90.00	2.49	2.46	1	4.75	7.8
Bottom shale	36A	889	75.00	2.98	2.01	1	10	34.1
Top and bottom shale				2.90	1.92	3	8.25	41.3
Whole seam				2.77	2.07	5	1	30.3
Top shale	37C	924	72.18	2.63	1.93	2	0	40.2
Middle band	37B	907	91.52	2.40	2.53	1	0.25	5 .4
Bottom shale	37A	890	76.90	3.21	2.08	1	10.5	30.2
Top and bottom shale				2.92	2.00	3	10.5	35.2
Whole seam				2.77	2.11	4	10.75	27.4

Table I, cont'd page 10

Top shale	38C	967	70.50	2.88	1.96	2	2.75	43.9
Middle band	38B	956	90.64	3.03	2.59	1	0	6.7
Bottom shale	38A	945	74.12	3.58	2.04	1	7.5	36.1
Top and bottom shale				3.18	1.99	3	10.25	40.5
Whole seam				3.20	2.12	4	10.25	32.0
Top shale	39C	968	65.10	3.57	1.76	1	10.75	56.7
Middle band	39B	957	88.86	3.34	2.47	1	10	9.4
Bottom shale	39A	946	76.20	3.17	2.07	1	8	31.7
Top and bottom shale				3.37	1.90	3	6.75	44.0
Whole seam				3.36	2.10	5	4.75	30.1
Top shale	40C	969	66.56	3.10	1.89	1	9	53.3
Middle band	40B	958	91.80	2.47	2.55	1	6	5.1
Bottom shale	40A	947	74.88	3.17	2.04	2	0	34.3
Top and bottom shale				3.14	1.97	3	9	42.8
Whole seam				2.91	2.13	5	3	29.9
Top shale	41C	970	64.56	2.79	1.77	1	4.5	58.2
Middle band	41B	959	86.30	2.47	2.32	1	11	13.5
Bottom shale	41A	948	74.82	4.36	2.06	1	5	34.5
Top and bottom shale				3.65	1.92	2	9.5	45.3
Whole seam				3.11	2.08	4	8.5	30.8

Table I, cont'd page 11

Top shale	42C	971	77.20	4.65	2.11	2	0	29.6
Middle band	42B	960	85.80	2.17	2.32	2	0	14.2
Bottom shale	42A	949	72.48	2.86	1.85	1	8.5	39.5
Top and bottom shale				3.88	1.99	3	8.5	33.8
Whole seam				3.22	2.10	5	8.5	26.2
Top shale	43C	972	81.86	2.33	2.18	1	0	20.7
Middle band	43B	961	91.16	2.06	2.49	1	4.75	7.5
Bottom shale	43A	950	73.90	2.53	2.10	1	11	26.2
Top and bottom shale				2.46	2.13	2	11	24.2
Whole seam				2.32	2.24	4	3.75	18.2
Top shale	44C	973	68.14	2.39	1.83	2	3.5	49.1
Middle band	44B	962	89.50	2.25	2.46	1	5	8.5
Bottom shale	44A	951	75.10	2.50	1.98	1	8.5	34.0
Top and bottom shale				2.44	1.89	4	0	42.4
Whole seam				2.38	2.04	5	5	31.7
Top shale	45C	974	73.36	2.58	1.94	2	0	37.8
Middle band	45B	963	89.80	2.72	2.47	0	11	8.1
Bottom seam	45A	952	73.32	3.06	1.97	1	8.5	37.8
Top and bottom shale				2.80	1.95	3	8.5	37.8
Whole seam				2.78	2.06	4	7.5	30.7

Table I, cont'd page 12

Top shale	46C	975	71.70	2.22		1.89	2 6	41.2
Middle band	46B	964	90.58	1.44	Eschka	2.43	1 0	6.9
				1.50	Fusion			
Bottom shale	46A	953	74.48	2.40		2.00	1 9.25	35.4
Top and bottom shale				2.30		1.93	4 3.25	38.7
Whole seam				2.12		2.03	5 3.25	31.5
Top shale	47C	976	67.40	2.47		1.78	2 0.5	51.0
Middle band	47B	965	90.24	2.13		2.46	1 1	7.5
Bottom shale	47A	954	75.76	2.13		2.01	1 10.5	32.5
Top and bottom shale				2.30		1.89	3 11	41.6
Whole seam				2.25		2.01	5 0	32.6
Top shale	48C	977	73.34	1.84		1.95	2 2.25	37.8
Middle band	48B	966	91.20	2.33		2.48	0 11.25	6.0
Bottom shale	48A	955	75.20	3.02		2.03	1 7.5	33.8
Top and bottom shale				2.35		1.98	3 9.75	36.0
Whole seam				2.35		2.08	4 9	29.0

TABLE II

Section of Seam.	Mine		Sulphur per cent.	Specific Gravity.	Thickness ft. ins.		Thickness ft. ins.	Oil Yield Gallons per ton
Top Shale	Goliath	Range	1.97 to 3.57	1.78 to 2.17	1 - 6.5	to	3 - 2.5	23.4 to 57.0
		Average	2.54	2.00	2 - 2.99			36.3
	Tasmanite	Range	1.84 to 4.65	1.76 to 2.18	1 - 0	to	2 - 6	20.7 to 59.2
		Average	2.78	1.90	1 -10.93			44.3
Middle Band	Goliath	Range	1.87 to 3.98	2.29 to 2.62	0 -10.25	to	1 - 7.5	3.6 to 14.8
		Average	2.52	2.50	1 - 2.55			7.2
	Tasmanite	Range	1.44 to 3.34	2.32 to 2.59	0 -11	to	2 - 0	5.1 to 14.2
		Average	2.54	2.45	1 - 4.20			8.6
Bottom Shale	Goliath	Range	2.43 to 3.44	2.02 to 2.26	0 - 8.25	to	2 - 3.25	16.2 to 36.6
		Average	2.77	2.10	1 - 8.95			29.65
	Tasmanite	Range	2.13 to 4.36	1.85 to 2.15	1 - 5	to	2 - 3.5	23.4 to 39.5
		Average	3.01	2.03	1 - 9.48			32.7
Top and Bottom Shale	Goliath	Range	2.25 to 3.21	1.92 to 2.15	3 - 3.0	to	4 -11.25	25.0 to 42.5
		Average	2.65	2.04	3 -11.95			33.3
	Tasmanite	Range	2.30 to 3.88	1.89 to 2.13	2 - 9.5	to	4 - 3.25	24.2 to 45.3
		Average	2.90	1.96	3 - 8.41			38.5
Whole Seam	Goliath	Range	2.24 to 2.97	2.07 to 2.24	4 - 2.75	to	6 - 1.5	21.1 to 30.6
		Average	2.61	2.15	5 - 2.50			26.22
	Tasmanite	Range	2.12 to 3.36	2.01 to 2.24	4 - 3.75	to	5 - 8.5	18.2 to 32.6
		Average	2.77	2.09	5 - 0.62			29.12

TABLE III

Section of Seam.			Sulphur Per Cent.	Specific Gravity.	Thickness ft. ins.	Oil Yield Gals. per ton.
Top and Bottom Shale.	I		2.77	2.00	3 - 10.18	35.74
	II		2.72	2.02	3 - 10.84	34.79
	III		2.72	2.02	3 - 10.94	34.66
Whole Seam	I	Each Mine of equal "weight"	2.69	2.12	5 - 1.61	27.63
	II	Weighted according to number of samples (33:15).	2.66	2.13	5 - 1.91	27.09
	III	Weighted according to areas represented by the sampling (2.5:1).	2.65	2.13	5 - 1.96	27.01