XI.—Analyses of Queensland Soils.

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THE accompanying analyses of soils from a sugar plantation in Queensland may not, perhaps, be without interest to some, inasmuch as they are from a plantation which was almost exempt from the so-called "disease" or rust, at a time when most of the surrounding plantations had lost a very large proportion of their crops.

The samples were collected with great care, and the top-soil kept distinct from the subsoil.

The analyses were made upon those portions of the air-dried soils which passed through a sieve of 30 holes to the inch, so as to obtain samples of fair average composition, the coarser parts being determined separately; the presence of pebbles, gravel, coarse sand, and large fragments of vegetable fibre would necessarily have caused a great want of uniformity in composition.

In the case of soil No. 3, the results of the analyses are given both with and without the pebbles, gravel, and other similar matters, on account of the presence of a very large proportion of such foreign substances: for had the percentage composition been stated in the ordinary way only, a given weight of the soil would appear to be far richer in certain constituents than is actually the case. In other instances, where the amount of these pebbles was not so large, I have not considered it necessary to state the results in both ways.

The analysis of the soil marked No. 4 will afford an idea of the character of the soil of recently cleared scrub land, *i.e.*, land which had been prepared for cultivation,* but had not been cropped.*

The soil marked No. 5 is an example of a poor alluvial soil, which yielded a diseased crop, and No. 6 may be taken as a soil of good quality.

Analyses of Sugar-cane Soils from the Mary River, Queensland.

No. 1. Surface Soil.—A rich-looking alluvial soil, of a grey-brown colour when dry, rather lumpy; a fair amount of vegetable fibre present, but easily friable.

Subsoil.—Of a light clay colour, lumpy, but friable; the amount of vegetable fibre present is, as might be expected, considerably less than in the top-soil.

No. 2. Surface Soil.—Of the same colour as No. 1 top-soil, but of a rather lighter shade, of fine grain, and but slightly lumpy; the amount of vegetable fibre present is not large.

* "Report upon the Diseases in the Sugar Cane," Queensland, by A. Liversidge. Sydney, 1876.

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	1.		2.		3.		4.	5.	6.
	Surface-soil.	Subsoil.	Surface-soil.	Subsoil.	Surface-soil.	Subsoil.			
Silica and substances insoluble in hydrochloric acid	84.89	78.52	85.39	85.97	84.51	35.435	75.08	39.687	82.95
Carbon	1.46	1.05	1.73	0.67	4.45	1.866	0.56	0.296	2.01
Nitrogen	0.15	0.09	0.16	0.10	0.21	0.888	0.04	0.021	0.19
Soluble silica	0.13	0.09	0.23	0.06	0.08	0.083	0.33	0.174	0.04
Alumina	3.82	6.01	3.36	5.39	2.37	0.994	7.65	4.044	4.08
Ferric oxide	1.56	4.03	1.41	0.13	0.02	0.009	4.09	2.162	3.25
Ferrous oxide	0.76	0.49	0.85	0.63	0.55	0.231	0.29	0.153	—
Manganous oxide	0.03	traces	0.02	traces	0.02	0.009	—	—	traces
Lime	0.43	0.21	0.31	0.18	0.32	0.032	traces	—	0.46
Magnesia	0.04	traces	0.04	0.02	0.06	0.025	traces	—	0.01
Potash	0.17	0.11	0.15	0.10	0.32	0.134	0.12	0.063	0.22
Soda	—	0.24	0.29	—	0.31	0.130	0.09	0.048	0.37
Chloride of sodium	0.98	0.04	0.09	0.25	0.11	0.046	0.24	0.127	0.13
Phosphoric acid (P_2O_5)	0.09	0.07	0.13	0.03	0.23	0.096	0.02	0.011	0.06
Sulphuric acid	0.04	0.02	0.04	0.03	0.03	0.013	0.03	0.016	0.37
Carbonic acid	0.39	traces	0.22	0.10	0.26	0.109	traces	—	traces
Moisture expelled at 120° C.	1.93	3.68	1.98	2.55	2.15	0.901	4.41	2.331	0.71
Combined moisture	3.13	5.35	3.60	3.79	4.00	1.677	{ 6.79* 4.41	{ 3.589* 2.331	2.00
Undetermined constituents							{ 0.26	{ 0.138	3.62
Associated with the above in the air-dried soil:—	100.00	100.00	100.00	100.00	100.00	41.930	100.00	52.860	100.00
Sand, gravel, stones, &c.	1.30 per cent.	1.85 p.c.	1.10 p.c.	1.10 p.c.	—	57.66	0.87 p.c.	1.48 p.c.	5.10 p.c.
Woody fibre	0.15	0.11	0.04	0.04	—	0.41	0.10	0.16	0.13

The sand, gravel, stones, &c., include all those portions of the soil which, after gentle crushing, failed to pass through a sieve of 30 holes to the square inch.

* The combined moisture was in this case determined by heating to redness and collecting the water by means of a chloride of calcium tube. Part of this water was of course derived from the combustion of the diffused organic matter.

Subsoil.—This soil possesses much the same characteristics as No. 1 subsoil. It is, however, a shade lighter, and not quite so lumpy.

No. 3. Surface Soil.—Of a rich dark-brown colour, very loose and friable, but much mixed with large jasper and other pebbles; the amount of the vegetable fibre very noticeable.

Subsoil.—A clayey soil, mottled with red; plastic when wet; dried into lumps; contains much gravel; vegetable fibre almost absent.

Soil No. 4.—From new scrub land. A rich brown loamy soil; contains a fair amount of vegetable fibre, and but little sand.

Soil No. 5, which had yielded “diseased” rappoe cane. The air-dried soil was of grey-brown colour, very sandy, and loose, of but poor appearance. A small quantity of vegetable fibre present.

Soil No. 6, which had yielded a healthy crop of rappoe cane. Of brown colour, with yellow shade; dried into rather stiff lumps, with clay-like appearance; contained a small proportion of vegetable fibre. Apparently of fair medium character.