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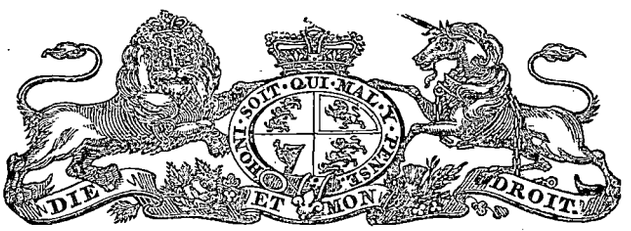


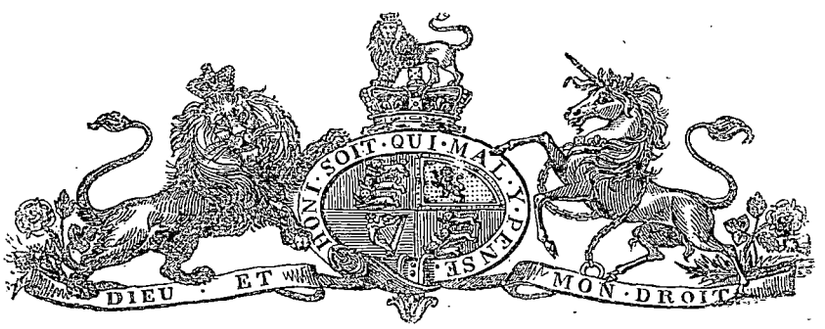
1891.

PARLIAMENT OF TASMANIA.

GOVERNMENT ANALYST:

REPORT FOR **1890.**

Presented to both Houses of Parliament by His Excellency's Command.



Government Laboratory, Hobart, 8th June, 1891.

SIR,

I HAVE the honor to enclose herewith detailed statement of examinations made in this Laboratory during the year 1890, with notes giving details of some of the results obtained.

Apart from the increase of six per cent. in tea samples, the analyses, &c., made for the Government, and for the Municipalities, show increases of twenty-eight, and four per cent. respectively on the numbers for the previous year, the total also being above that for any other year.

The number and nature of examinations required in connection with suspected cases of poisoning and various criminal charges was exceptionally heavy, and I would again call attention to the ease with which such a powerful poison as Arsenic can be procured, and to the recommendations relating to this subject in my Report for 1889.

The necessity for analysis of Manures is shown by the details given under the heading Guano.

Apart from this, various efforts have been made to direct the attention of farmers to recent methods which would enable them to obtain the manures most suitable for different crops, both as to quality and quantity, the easy and simple tests (made by the farmers themselves), embracing at the same time a trial of manure, soil, and climate.

I have the honor to be,
Sir,
Your obedient Servant,

W. F. WARD, *A.R.S.M., Government Analyst.*

The Honorable the Chief Secretary.

STATEMENT of Analyses and Examinations made in the Government Laboratory during the Year 1890.

Substance examined.	*For the Government.*	*For Municipalities.*	*For Private Individuals.*	TOTAL.
Tea	2042	...	...	2042
Milk	...	111	5	116
Spirits	1	44	1	46
Ale and Beer, Dandelion	5	...	1	6
Water	17	8	5	30
Essences	2	...	2	2
Bread	1	...	...	1
Butter	...	...	1	1
Meat	...	...	2	2
Honey	...	...	2	2
Salt	2	...	...	2
Tobacco	7	...	...	7
Medicine	...	...	2	2
Soil	1	...	2	3
Guano	1	...	11	12
Blood, &c.	2	...	...	2
Sundry for Poison	29	...	3	32
Clothing and Weapons	17	...	...	17
Wire Netting, Wall Paper	...	...	2	2
Sulphate of Copper, Wire, &c.	3	...	...	3
Explosives	2	..	...	2
Limestone	2	...	1	3
Cement	3	...	5	8
Flint	...	...	1	1
Coal	5	...	6	11
Kerosene	55	...	...	55
Oil	2	...	...	2
Ambergris, &c.	...	...	2	2
Tin Ore	...	...	12	12
Ore and Mineral for Gold, Silver, Lead, &c.	51	...	376	427
TOTALS	2248	163	442	2853

TEA (2042.)

This number is greater than that for any previous year.

MILK (116.)

The samples were for the most part forwarded by Mr. J. G. Bushman, the Sanitary Officer for Launceston. One sample contained "Colostrum," or "Beastings," and was therefore unfit for human consumption, at least in an uncooked state. Thirteen others contained added water, varying in proportion from four up to as much as thirty-three per cent. The following are extreme results of analysis :—

	Specific gravity.	Solids, not fat. Per cent.	Butter fat. Per cent.	Total solids. Per cent.
1.	1021	5·87	2·70	8·57
2.	1021	6·00	3·74	9·74
3.	1033	9·07	4·25	13·32
4.	1032·5	9·26	6·20	15·46

Nos. 1 and 2 represent approximately a mixture of two measures of milk with one of water.

SPIRITS (45.)

Six samples only were found to be below the legal alcoholic strength, the range being from 26 to 31 per cent. under proof. Four samples were rum and two brandy.

A so-called methylated spirit, examined for the Collector of Customs, was found to contain only a very small proportion of wood spirit, and therefore to be insufficiently "destroyed" or rendered unfit for human consumption.

DANDELION ALE AND BEER (6.)

These varied in strength between 0·75 and 2 per cent. of alcohol.

ESSENCES, &c. (2.)

"Raspberry Essence" contained 25 per cent., and "Foam Syrup" 6 per cent., of alcohol.

WATER (30.)

The following are the more notable results of waters examined for the Central Board of Health :—

Locality.	Parts per Million.			Grains per Gallon.	
	Free Ammonia.	Albumenoid Ammonia.	Nitrogen in Nitrates.	Chlorine in Chlorides.	Total Solids.
1. Brighton	0·02	0·11	0·05	28·0	91·
2. Moorina, Well	0·20	0·42	2·47	4·0	14·
3. Ditto	0·12	1;00	0·82	2·2	18·
4. Ditto	0·12	0·20	0·44	2·2	6·
5. St. Helen's, water-hole	0·34	4·25	None.	4·8	31·
6. Triabunna	0·04	0·64	Trace.	3·3	16·
7. Ditto	0·04	0·64	Trace.	16·0	41·
8. George's River	0·03	0·32	0·16	1·4	7·
9. Hobart	None.	0·02	0·05	0·45	4·4

In No. 1 the proportion of mineral matter was excessive, much chloride of magnesium, which produced the usual medicinal effects of magnesian salts, being present. Nos. 2, 3, 4 were all seriously contaminated, while No. 5 was filthy in the extreme, and quite unfit for the use of cattle. Nos. 6 and 7 were much discoloured by vegetable matter; No. 8 was a somewhat impure river water. No. 9 is a good water for comparison. Eight samples were examined for the Hobart Corporation, but no details as to locality, &c. were received.

A sample, which had evidently been put into an imperfectly washed bottle, was found to contain no less than 72 grains of sulphuric acid per gallon.

SALT (1).

This was imported as manure, but was found to be quite fit for pickling and other purposes, and therefore liable to duty unless mixed with soot or otherwise destroyed.

TOBACCO (7).

Seven samples submitted with Government tenders were found to vary within the following limits :—

	Per cent.
Ash	12·9 to 17·1
Sand	2·2 to 5·8
Moisture	13·0 to 18·0

GUANO (12).

The manure usually sold here under the name of guano consists mainly of phosphate and carbonate of lime, with more or less sand and water. It contains little or no ammonia or other nitrogen-yielding material, and practically no potash, and is therefore far from being a *complete* manure. The phosphate of lime also is insoluble in water, but this disadvantage may to some extent be remedied by reducing the guano to a fine flour.

The following results of analysis illustrate some of the variations in composition which may be met with. No. 3, however, is exceptional in containing definite quantities of ammonia and potash salts.

	1	2	3
*Phosphoric Acid	16·1	24·2	14·43
Potassium Chloride	0·5	0·2	1·60
Sodium Chloride			1·20
Ammonia	...	...	2·70
Lime	18·7	39·8	17·07
Oxide of Iron	2·5	...	...
Sand	41·0	8·3	29·60
Organic Matter, &c.	...	...	14·40
Carbonic Acid	20·4	25·2	...
Water	...	...	19·00
Not determined	0·8	2·3	...
	100·0	100·0	100·0
*Equivalent to Phosphate of Lime	35·15	52·83	31·5

Extreme results obtained were—

	Minimum per cent.	Maximum per cent.
Phosphoric Acid	8·0	30·0
Equivalent to Phosphate of Lime	17·5	65·5

Apart from their deficiency in nitrogen and potash, the use of these phosphates without further treatment with sulphuric acid to increase their solubility is opposed to modern theory, which favours feeding the plant itself by numerous top-dressings of soluble manures rather than by the general manuring of the soil with less soluble material.

BLOOD, &c. (2).

Some of the blood and a portion of the stomach of a sheep supposed to have died from anthrax or splenic fever were received from the Inspector of Stock. These were carefully examined, directly and by cultivation, but no trace of the bacillus causing that disease could be discovered.

SUNDRY FOR POISON (32). CLOTHING AND WEAPONS (17).

These were examined in connection with several cases, real or suspected, of poisoning of human beings, and one of murder by violence, five supposed cases of poisoning in animals, and three or four charges of felony.

In addition to the time required for these examinations, many of them very long and tedious, eleven or twelve days were occupied in attending Coroners', Police, or Supreme Courts in various parts of the Colony.

The death of two horses was evidently attributable to over-feeding with wheat.

WIRE NETTING, WALL-PAPER (2).

These were examined in support of claims for marine insurance; the netting was found to be damaged by sea-water, and the paper by vinegar.

SULPHATE OF COPPER, WIRE, ROSIN (3).

The Sulphate of Copper was largely mixed with Sulphate of Iron; this latter salt, which is present in all commercial Sulphate of Copper to a greater or less extent, renders it more or less unfit for use in galvanic batteries. This, with corroded wire, and rosin for soldering, were tested for the Superintendent of Telegraphs.

EXPLOSIVES (2).

Some Gun-cotton stored in water and in contact with wood lining a torpedo was found to develop a considerable growth of fungus, and to be somewhat discoloured; on testing, it was proved that so far as this discolouration extended inwards the cotton was slightly acid; the acidity was, however, apparently derived from the wood, and was not due to decomposition of the Gun-cotton. The spores of the fungus, as well as the conditions favourable to its growth, were probably attributable to the wood.

An explosive examined as to safety for storage contained a small proportion of Picrate of Potash, in addition to the usual ingredients of Gunpowder.

LIMESTONE AND FLINT (4).

These were tested as to fitness for use either for making cement or as flux in lead-smelting.

CEMENT (8).

Some of these, together with the water used to mix with them, were forwarded by the Engineer-in-Chief and the Government Architect.

COAL (11).

Several samples pointed to improvement in the future supply of Coal.

The ash, usually in excess in Tasmanian Coal, was in three cases 2·6, 6·2, and 8 per cent., while a trial of one of these (by Thompson's Calorimeter) showed its steam-raising power to be equal to that of good Newcastle Coal.

To show how utterly misleading the analysis of one or two selected specimens may be, the following results obtained from different pieces of Lignite, *forwarded as one sample*, are given :—

Fixed Carbon	19·2	34·0
Volatile Matter	36·3	32·8
Ash	23·1	4·0
Moisture	20·0	28·0
Sulphur.....	1·4	1·2
	100·0	100·0

KEROSENE (55).

One sample received from the Colonial Storekeeper, and eight of those forwarded by the Inspector of Customs, were found to "flash" at a temperature two or three degrees below the legal limit, and were reported accordingly.

MINERALS AND ORES (427).

Few notable results were obtained, the highest yield of Silver being at the rate of 1442 ounces per ton. Iron Ore was examined for the Inspector of Customs to determine whether it had undergone any preparation, or was a purely natural product, a question involving payment or non-payment of duty. This ore was imported for use in gas purifiers, but a suitable material has since been found in this Colony.

Some 50 Ores, &c. were tested for the Secretary of Mines. Many cases of mistaking more or less impure Iron minerals for true "Gossan," the decomposed portion of mineral veins, were met with during the year.

W. F. WARD, *A.R.S.M., Government Analyst.*

WILLIAM THOMAS STRUTT,
GOVERNMENT PRINTER, TASMANIA.