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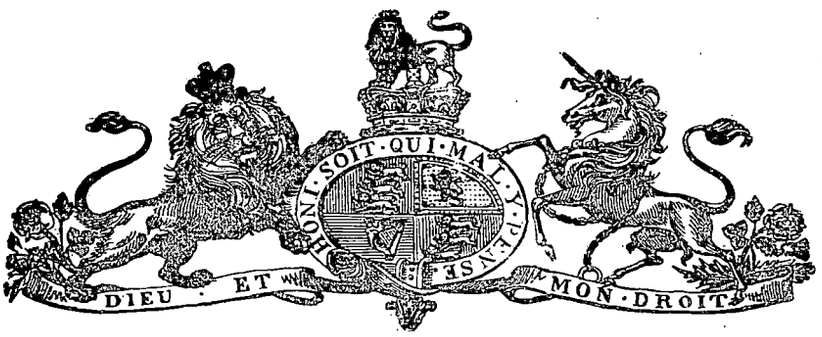
PARLIAMENT OF TASMANIA.

GOVERNMENT ANALYST:

REPORT FOR **1887.**

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



REPORT of the Government Analyst for the Year 1887.

Government Laboratory, Hobart, 31*st May*, 1888.

SIR,

I HAVE the honor to forward herewith Report on the work of this Laboratory for the year 1887, with notes on many of the results obtained.

Much delay, with consequent inconvenience to importers, and not unfrequent damage to mail matter in transit, having arisen from the necessity for sending through the Post Office samples of all kerosene imported for test here, the arrangements described at the end of Report were made, by which consignments of this oil can now be tested at the port of entry.

Apart from the examinations of this substance and of tea, the number (330) of general analyses, &c. shows a very marked increase over that of the four preceding years (215, 224, 241, 232); and with this increased demand it would have been impossible to deal with the aid of a single Laboratory Assistant had not arrangements been made for referring the samples of tea in the first instance to a Taster.

It is to be regretted that the erection of the proposed new Laboratory, with provision for the instruction of students in connection with the Technical School, should not yet have been begun.

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

W. F. WARD,
Associate Royal School of Mines,
Government Analyst.

The Hon. the Chief Secretary.

STATEMENT of Analyses and Examinations made in the Government Laboratory during the Year 1887.

Substance examined.	*For the Government.*	*For Municipal Districts.*	*For Private Individuals.*	TOTAL.
Tea	26	1	...	27
Spirits	3	4	1	8
Methylated Spirits	6	...	...	6
Hop Bitters	6	...	...	6
Ale and Beer	...	8	3	11
Mead	...	1	...	1
Wine	1	...	...	1
Milk	...	57	2	59
Water	5	8	11	24
Butter	...	1	...	1
Sugar	6	...	...	6
Flour	1	...	...	1
Salt	...	...	1	1
Baking Powder, &c.	...	...	5	5
Ores and Minerals	31	...	114	145
Coal	...	...	11	11
Limestone	...	...	9	9
Clay	...	...	4	4
Cement	9	...	...	9
Boiler Deposit, &c.	4	...	...	4
Manure	...	...	2	2
Phosphorus	3	...	...	3
Kerosene	24	...	2	26
Sundry, in Criminal Cases	11	...	...	11
	136	80	165	381

[NOTE.—Figures in parentheses show number of separate examinations made in each case.]

TEA (27).

Twenty samples were forwarded by the Collector of Customs, nineteen of which were of such inferior quality that their compulsory re-exportation was recommended. Of five samples accompanying tenders of supply for the Public Service, one only fulfilled the *minimum* requirements of a genuine tea.

One tea examined for the General Hospital was not considered of sufficiently good quality for the use of invalids.

SPIRITS (8).

A brandy submitted with a tender was not thought good enough for hospital use.

A rum retailed at Swansea was 44½ per cent. under proof, the lowest legal strength for this spirit being 25 per cent. under proof.

METHYLATED SPIRIT (6).

Two samples referred for test by the Collector of Customs were found to be insufficiently methylated. This point being disputed by the importer, four other retail samples were procured and examined for purposes of comparison, when the six spirits arranged themselves in two groups, with contents of 4 and 7 per cent. respectively of methyl alcohol, both the spirits in dispute containing the smaller proportion. "Methylated spirits of wine is a mixture of 90 per cent. of rectified spirit with 10 per cent. of commercial methyl alcohol (wood naphtha). The acetone and other constituents of the wood naphtha are so difficult to remove that the spirit is considered to be permanently unfitted for drinking purposes, and, therefore, is subject to much lower duty." For this reason, and in view of the fact that these spirits could have been used for the adulteration of whisky, the preparation of druggists' tinctures, &c., to the consequent detriment of the revenue, it was recommended that they should only be admitted at the lower duty after the addition of a further quantity of wood naphtha, or of a small proportion of turpentine.

HOP BITTERS (6).

These contained from 16 to 28 per cent. of proof spirit. Objection was made to the classification of this stimulant (by the Customs) as a spirituous liquor, on the ground that the alcohol contained in it was necessary as a preservative; but, even disregarding the great variation of the proportion in different bitters, this objection appears to be sufficiently answered by reference to the well-known preservative action of hops in malt liquors containing comparatively little alcohol.

ALE AND BEER (11).

One beer contained an excess of salt.

An unsound beer swarmed with the "disease germs" of Pasteur.

MEAD (1).

This contained nearly 30 per cent. of proof spirit.

MILK. (59).

Twenty of these milks were found to be either watered, skimmed, or not of "proper substance, nature, and quality," *i.e.*, they contained less than eleven and a half (11·5) per cent. of total solids, including butter fat in due proportion to other constituents, but excluding any added salt, soda, &c. Of these samples five were retailed in Hobart, and thirteen in Launceston, and proceedings were taken against the vendors.

Some doubt having been expressed as to applicability of the above (English) minimum standard in this colony, the following average percentages of the results of examination have been taken :—

	Hobart.	Average total Solids.
8	Milks above standard	12·92
5	Milks below standard	10·67
13	Milks together	12·06
	Launceston.	
29	Milks above standard	12·50
13	Milks below standard	10·80
42	Milks together	11·98
	Hobart and Launceston.	
37	Milks above standard	12·59
18	Milks below standards	10·77
55	Milks together	12·00

The above figures show, therefore, that the total solids in fifty-five samples taken from both ends of the island, *including eighteen classed as adulterated*, amount, on the average, to 12·0 per cent., or 0·5 per cent. above the proportion which previous analyses had shown to be a by no means unreasonable requirement for a genuine milk.

The milk of a single cow, especially if she be ill-fed, may fall below this standard, and this point was pleaded in defence in some of the prosecutions.

It was ruled, however, that, even if unadulterated, the milk was not of "proper substance, nature, and quality," and fines were inflicted; no advantage being taken of the suggestion that to substantiate this plea, the cows should be milked in the presence of a witness, and the analyses repeated.

The highest and lowest results obtained were respectively 14·74 and 9·5 per cent. of total solids; fifty-five per cent. of water would be required to reduce the one to the other.

WATER. (24).

A sample from Scottsdale, suspected in connection with an outbreak of Typhoid Fever, contained, in addition to much other impurity, fibres of dyed cotton and wool, presumably from clothing.

Two waters, forwarded by the Inspector of Machinery, were found to owe their corrosive action on steam boilers to the presence of chloride of magnesium, and the addition of carbonate of soda (washing soda) was recommended.

Various samples taken from different parts of Hobart during the epidemic of Typhoid Fever were, with one exception, found to be pure, at least as far as can be judged from the results of analysis.

The exception was the water from the Cascades Reservoir, which two years before had been deemed suspicious, owing to its liability to receive pollution; and the impurities having increased to a marked extent, the water was condemned as unfit for human consumption, a condemnation fully confirmed after inspection of the line of supply to this reservoir.

The following results of analysis are stated in parts per million of water :—

	Marquis of Hastings Reservoir.	Cascades Reservoir.
Free Ammonia	0·005	0·047
Albuminoid Ammonia	0·030	0·145
Nitrogen as Nitrates	Minute trace	0·011
Chlorine	7·14	15·72
Organic matter (approximate)	2·14	3·86
Total Solids	57·14	82·86

A water was examined for the Engineer-in-Chief as to its power of acting on cement. A mineral water contained a large quantity of aperient magnesium salts, with, however, much common salt.

Six waters were tested for the cause of their destructive action on machinery, and a remedy recommended.

A water found to produce deleterious effects on man and beast contained the following :—

	Grains per gallon.
Carbonate of Lime	24·25
Carbonate of Magnesia	6·76
Chloride of Magnesium	12·35
Chloride of Sodium	34·23
Carbonate of Iron, Silica, Sulphuric Acid as Sulphates, &c.	2·41
	80·00

BUTTER. (1.)

Rancid when retailed in Hobart. The vendor was prosecuted by the police, and a fine inflicted.

Pure butter-fat, *free from curd*, is but little liable to become rancid, hence the great advantage of the recently introduced mechanical cream separator.

SUGAR. (6.)

A better quality than that of one of the samples was recommended for Hospital use.

With the remaining five samples were found, amongst much other impurity, various large portions of a cockroach, and the greater part of an enormous centipede, four or five inches in length. These sugars were not considered fit for human consumption.

ORES AND MINERALS. (145.)

These included a series of sixteen samples, examined on behalf of the Government, to test the value of the "Full Moon" district; also a considerable number of silver ores from various parts of the Colony, and a few from the Broken Hills district; the highest yield by a picked sample being at the rate of 166 ounces per ton, with a little gold. The unreliability of single assays has lately been well shown by testing two different portions of the same specimen, one portion having been found to contain about twice as much silver as the other.

Arsenical Pyrites was proved to be the cause of the "sickening" of Mercury in a case of faulty gold amalgamation.

COAL. (11.)

The analysis of a coal or other mineral of commercial value being frequently preliminary to the application for a lease of mineral lands, it very frequently happens that, as in these cases, no information is given as to whence the samples were procured.

LIMESTONE AND CLAY. (13.)

Complete analyses were made of all these samples for the Maria Island Company, with a view to test their suitability for the manufacture of cement.

CEMENTS. (9.)

Examined as to quality for the Engineer-in-Chief.

BOILER DEPOSIT, &c. (4.)

This deposit was found to contain no less than 40 per cent. of a patent lubricant, to the use of which the formation of the deposit was attributed by the Inspector of Machinery, who forwarded samples for analysis. The lubricant was found to collect and cement together the rust, clay, &c., in the water.

PHOSPHORUS. (3.)

Examined by request of the Inspector of Stock, with reference to a report that recent consignments of phosphorus were inferior in rabbit-poisoning power to those formerly received. The report probably owed its rise to the considerable change of colour produced by long keeping or exposure to light of this substance: the latter, however, if sufficiently prolonged, diminishing, and not increasing its poisonous properties.

KEROSENE. (24.)

The beneficial deterrent effect of the Act regulating the importation of this oil is well shown by the fact that only one kerosene below the standard of safety was detected in Hobart, and one at Torquay. The latter was re-tested in this Laboratory, and the result of the evidently careful testing of the Customs Officer confirmed. These oils were only two to three degrees below standard.

SUNDRY, IN CRIMINAL CASES, &c.

These included the detection of much arsenic in a bottle of Champagne, various microscopic examinations in connection with charges of criminal assault, &c., and the removal of an unfounded suspicion of attempts to poison.

Seven days were occupied in attending various Courts to give evidence, including two journeys to Launceston. Ten days in addition were, at the instance of the Collector of Customs, devoted to visiting the Ports of Circular Head, Emu Bay, Ulverstone, Formby, and Launceston, and instructing the Customs officers stationed there in the method to be employed, and the precautions to be taken, in the testing of kerosene, for which purpose a suitable modification of the necessary apparatus had been devised, and the required number constructed in Hobart. The thermometers to be used were adjusted by comparison at 100° F. with a standard instrument kindly lent by the Meteorological Observer.

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

WILLIAM THOMAS STRUTT,
GOVERNMENT PRINTER, TASMANIA.