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PARLIAMENT OF TASMANIA.

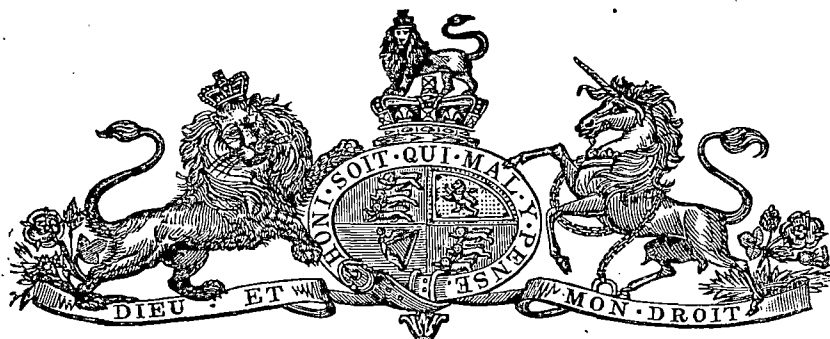
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GOVERNMENT ANALYST:

REPORT FOR 1889.

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



## GOVERNMENT ANALYST.

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### *REPORT for 1889.*

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*Government Laboratory, Hobart, 8th July, 1890.*

SIR,

I HAVE the honor to enclose herewith a statement of the numbers and nature of examinations made in this Laboratory during the year 1889, with notes on the principal results obtained.

Disregarding the large increase under "Tea," and in spite of some decline in "Silver-Lead Ores," these numbers show an increase of 12 per cent. on those for 1888, which latter exceeded the record of any previous year. I must again acknowledge the cordial co-operation which alone has rendered this possible.

I would desire particularly to call attention to a recent trial, the evidence in which showed that while *uncoloured* arsenic can only legally be sold in the presence of a third person as witness, yet a preparation which I found to be simply arsenic tinted by the admixture of only  $1\frac{1}{2}$  per cent. of oxide of iron, can be sold without such witness. I would therefore strongly recommend some revision of the Act regulating the sale of poisons, including provision for the compulsory addition of a large and definite proportion of colouring matter, such as the green oxide of chromium, to all solid preparations of arsenic or strychnine, whereby both accidental and intentional poisoning would be diminished, and at the same time detection facilitated.

In view of the approaching removal of the Laboratory to permanent quarters in a wing of the new Technical School, I would trace shortly the steps by which this most necessary improvement has been effected. The probability of the more or less remote foundation of a teaching institution resembling a School of Mines was first mentioned by the Hon. J. W. Agnew on my engagement in 1881, but the partial collapse of tin mining and the ensuing depression rendered this for a time impracticable. The dangerous condition of the temporary Laboratory in September, 1885, however, rendered some change necessary, and on my representation the sum of £4000 was placed on the Schedule of that year's Loans Bill, nominally for "Offices for the Government Analyst," but including provision for the nucleus of a "School of Mines or of Science." For various reasons which need not be now enumerated, and after the examination of five proposed sites, and the careful consideration of some ten sets of plans, the matter (which in February, 1888, had been placed in the hands of the Technical Committee), was finally decided by the adoption of a site in Bathurst-street, on which a building is now being erected to largely fulfil, although under another name, my original proposal.

I have the honor to be,

Sir,

Your obedient Servant,

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

*The Honorable the Chief Secretary.*

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*STATEMENT showing Number of Analyses and Examinations made in the Government Laboratory during the Year 1889.*

<i>Substance Examined.</i>	<i>For the Government.</i>	<i>For Municipal Districts.</i>	<i>For Private Individuals.</i>	<i>TOTAL.</i>
Tea .....	1928	...	...	1928
Spirits.....	3	64	2	69
Ale and Beer .....	4	...	5	9
Milk .....	...	74	4	78
Water .....	36	16	8	60
Bread and Flour.....	4	...	1	5
Tobacco .....	2	...	...	2
Sundry for Poison .....	11	3	5	19
Silver Lead Ore.....	23	...	364	387
Gold Quartz and Tailings.....	5	...	55	60
Iron and Nickel Ore .....	6	...	3	9
Other Ore or Minerals.....	3	...	46	49
Gems.....	...	...	3	3
Coal and Shale .....	2	...	4	6
Limestone .....	...	...	5	5
Clay.....	3	...	...	11
Manure .....	...	...	9	9
Kerosene.....	40	...	...	40
Paris Green .....	2	...	...	2
Sundry .....	8	...	3	11
<b>TOTALS.....</b>	<b>2080</b>	<b>157</b>	<b>525</b>	<b>2762</b>

**TEA (1928).**

Fifty-eight samples yielding less than thirty per cent. of extractive matter, or less than three per cent. of soluble ash were reported for re-exportation. The minimum standard of the English Society of Public Analysts (which is also embodied in the New Zealand Act) being apparently too high for a large proportion of the tea imported here, a reduction of standard to the extent of about ten per cent. was made during the year.

**WINE AND SPIRITS (69).**

A "dark" brandy complained of at the Hobart Hospital was found to contain nearly six ounces of solid matter; chiefly sugar, burnt and unburnt, per gallon. The use of "pale" brandy as containing far less solids was recommended.

Of fifty-four samples forwarded by the Launceston Sanitary Officer, seven rums, one brandy, and one whisky were found to be deficient in strength, ranging from thirty-one to fifty-two per cent. under proof. The retailers, I believe, received a caution.

Some spirits imported as methylated were found to be sufficiently pure to admit of their being used for the adulteration of whisky; further addition of naphtha, which was also examined, was recommended.

**ALE AND BEER (9).**

Several samples of ale and beer were examined for cause of deterioration, &c.; in one imported ale three distinct species of the "disease germs" of Pasteur were detected. Two ginger-beers contained respectively 1·7 and 0·9 per cent. of alcohol.

**MILK (78).**

Of these ten were found to contain from 10 to 34 per cent. of added water, part of the cream had been taken from two, and some eight or ten others were of very doubtful quality. Two extreme results are given—

	<i>Rich milk.</i>	<i>Watered milk.</i>
Butter fat .....	6·20	1·82
Solids, not fat.....	9·28	5·62
Total solids.....	15·48	7·44
Specific gravity.....	1032·4	1021·

Thirty-seven milks from Launceston gave an average of 12·11 per cent. of solids; the same number from Hobart averaged 12·16 per cent.—all watered and doubtful samples being included in each case. Fifty-five similar samples examined in 1887 gave a mean of 12 per cent., so that the English minimum of 11·5 per cent. of solids for a milk of "proper substance, nature, and quality" is fairly applicable here.

The following results of analysis of milks from the same dairy illustrate well the effect produced by watering :—

No. 1.—Sample taken by police.

No. 2.—Sample sealed at same time, and returned by police to vendor.

No. 3.—Mixed milk of sixteen cows.

	1	2	3
Butter fat .....	3·74	3·70	3·82
Solids, not fat .....	6·86	6·80	8·90
Total solids .....	10·60	10·50	12·72
Mineral salts .....	0·56	...	0·72
Specific gravity .....	1024·6	...	1032·5

Nos. 1 and 3 were fresh ; No. 2 was sour, having been kept some days. The added water in 1 and 2 amounted to 23 per cent.

#### WATER (60).

Most of these waters, from all parts of the country, were examined for the Central Board of Health, and many of the results are more fitly detailed in the Annual Report of that body. To these may be added various samples from the Zeehan silver-field, from the New Town Charitable Institution, from a State School, from the Launceston and other Local Boards of Health, and the following relating to the Hobart supply :—

	PARTS PER MILLION.			GRAINS PER GALLON.	
	Free Ammonia.	Albumenoid Ammonia.	Nitrogen in Nitrates.	Chlorine in Chlorides.	Total Solids.
<i>Marquis of Hastings</i> Reservoir .....	None.	0·02	0·05	0·45	4·4
New Reservoir .....	0·015	0·10	0·05	1·2	8·6
Creek running into New Reservoir .....	0·04	0·16	0·08	4·8	21·0
Ditto .....	0·06	0·18	0·08	4·4	19·0
Tap Water, after heavy rain .....	0·05	0·31	0·08	0·8	8·9
Ditto .....	0·04	0·28	0·10	0·9	16·0
Ditto .....	0·04	0·66	0·10	0·9	—

The first analysis represents the supply at its best ; the others show more or less serious departure from this high degree of purity.

A water received from the Manager of the Government Railways yielded as follows, the proverbially impure "Thames water at London Bridge," being given for comparison :—

	Free Ammonia.	Albumenoid Ammonia.	Nitrogen in Nitrates.	Chlorine in Chlorides.	Total Solids.
Water from Oatlands .....	0·54	3·19	0·30	119·0	255·0
Thames Water .....	1·02	0·59	—	—	—

1. "When the *free ammonia* exceeds 0·08 part per million, it almost invariably proceeds from the fermentation of urea into carbonate of ammonia, and is a sign that the water in question consists of diluted urine in a very recent condition. In these instances the water will likewise be found to be loaded with chlorides." (*Wanklyn.*)

2. "The principle of the method is measurement of the nitrogenous organic (albumenoid) matter in waters, by the quantities of (albumenoid) ammonia yielded by the destruction of the organic matter (animal or vegetable)." (*Wanklyn.*)

A water found to produce medicinal effects was also examined during the year. It contained fifty-five grains of solids per gallon ; and these were only in part salts of magnesia,—these salts being present in much greater quantity in the Oatlands water.

From the above, this latter was evidently contaminated with urine. It yielded more than six times as much albumenoid, or organic ammonia as Thames Water ; and, indeed, more than has been obtained from many sewage effluents. In addition, it contained a very great excess of mineral salts, and largely chloride of magnesium, which is known to act as a specially strong corrosive in boilers, and as a purgative in man and

animals. Yet it was this filthy mixture which an anonymous letter writer to the Press selected as a fitting subject for his championship, in opposition to the opinion, founded on these facts,—that such water was “unfit for use of man, beast, or engine.”

A small quantity of water from Bourke (New South Wales), which was obtained by boring, was found to contain thirty-six grains per gallon of mineral salts, mainly carbonate and chloride of sodium, (salt). The amount of combined chlorine was 7·5 grains per gallon.

#### TOBACCO (2).

In one sample, submitted with a tender for the Public Service, the moisture reached the high total of 20·5 per cent.

#### BREAD AND FLOUR (5).

Bread from the Launceston Hospital contained no less than 40 per cent. of water, although it was, when examined, at least four days old. It was badly made from inferior flour,—being of dark colour, sour to taste and smell, and becoming extremely mouldy in a short time. It was, of course, reported as absolutely unfit for the use of invalids.

#### SUNDRY FOR POISON &c. (19.)

Strychnine was found in three cases, and arsenic in one; in several others the suspicion that poison had been given to domestic animals appeared to be quite unfounded.

The “trumpet lily,” frequently grown in gardens, having, when eaten by a child, produced symptoms of poisoning, was examined, and found to yield a small quantity of atropine.

A water supposed to have had poison added to it was found to be so much polluted as to be of a decidedly dangerous character.

#### GEMS. (3.)

The sapphires were opaque and worthless as gems, the so-called rubies proved to be zircons.

#### SILVER-LEAD ORE. (387.)

A large number of these yielded satisfactory results, picked specimens of galena from Mount Zeehan up to 220 ounces of silver per ton, and from the Scamander 143 ounces; while several from the Heazlewood district gave from 1200 to nearly 4000 ounces.

#### GOLD QUARTZ AND TAILINGS. (60.)

Various ores of peculiar character from the Carthage mine yielded up to 14 ounces of gold per ton, an unusually high proportion of silver being also associated with the gold. “Tailings” with gold in the proportions of 6, 8, and 10 dwts. up to 86 and 123 (!) ounces per ton were also examined.

#### IRON AND NICKEL ORE. (9.)

Several iron ores were tested as to their suitability for fluxing purposes in the smelting of silver-lead ores; three in connection with the report on the Mount Zeehan field made to the Government by Mr. Provis.

Specimens of ore yielding more than 20 per cent. of metallic nickel were shown to be “zaratite” or “emerald nickel,” a comparatively rare mineral; these were found in the Heazlewood district; the zaratite being associated in alternate layers with magnetic oxide of iron (magnetite).

#### OTHER ORES. (49.)

These included tin ores from Stewart’s Island, New Zealand, “tailings” containing 0·25 per cent. of tin; sulphide of antimony yielding 55 per cent. of metal, and other antimony ores with silver in the proportion of 12 ounces per ton.

#### COAL AND SHALE. (6.)

The three following results of analysis were obtained from portions of a newly discovered seam of coal; No. 1 being a general sample, No. 2, a selected portion of No. 1, and No. 3, a later large specimen.

	1	2	3
Fixed carbon .....	55·0	61·1	62·1
Gases, &c., volatile at red heat .....	23·7	29·0	27·3
Mineral matter (Ash) .....	16·6	6·0	6·2
Sulphur .....	0·5	0·2	0·4
Water lost at 212° F. ....	4·2	3·7	4·0
	100·0	100·0	100·0

The evaporation power as determined by Thompson’s Calorimeter was, in the case of No. 3, equal to that of good Newcastle coal; this coal, therefore, if fairly uniform in quality, will be of great value. Other coals gave 10·5 and 15·2 per cent. of ash.

## LIMESTONE (6).

These were tested with a view to their use as furnace fluxes, or in the manufacture of cement.

## CLAY AND OCHRE (9).

These were examined as to their suitability for making paint.

## MANURE (9).

These were more or less highly phosphatic guanos, varying, however, considerably in the proportion of phosphoric acid present.

## KEROSENE (40).

Two oils "flashing" at 97°, and one at 98° were reported for re-exportation.

## PARIS GREEN (2).

These were received from the Director of the Botanical Gardens; both were bought under the same name for the purpose of spraying fruit trees; one consisted honestly of arsenite of copper, the other was a chromium colour containing neither arsenic nor copper, and practically useless for the destruction of the codlin moth, grub, and other insects.

## SUNDRY (11).

These included some metallic sodium, a remnant from a bottle-full on which water had been poured, with the result that a very violent explosion occurred, fortunately unattended with injury; also various examinations for the Customs and Telegraph Departments.

It has been found desirable from time to time to call attention to the use of trade or other terms which, whether purposely or unintentionally, are likely to be generally misleading, or to lead to confusion of language; the two totally different "Paris Greens" mentioned above may be instanced, and also the following:—

1. "Amygdaline."—This is a white crystalline solid, obtained from bitter almonds, but a liquid imported here under that name for use in soap-making, consisted of turpentine and nitro-benzol; with reference to the latter, it is stated that "bad effects have been produced by the use of soap scented with nitro-benzol, to give it an almond odour, especially where hot water has been used in washing."

2. "Borax Paraffin."—This contained no borax, but was intended to be used in washing linen, &c., in conjunction with borax soap.

3. "Chromate."—Finds of so-called "chromate," (in addition to those of chromate of lead on Mount Dundas), which have from time to time been chronicled, appear to consist either of ochreous oxides of iron, or of clays coloured thereby; "chromite" on the other hand is the mineralogical name for chrome iron ore.

4. "Nickel Silver."—The white brass commonly called "German Silver," consists of copper, zinc, and nickel, on this silver is deposited to form "electro-plate;" or nickel to form "nickel-plate" or "nickel-silver;" this last term was further misapplied to the nickel ore mentioned above.

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

Hobart, July, 1890.