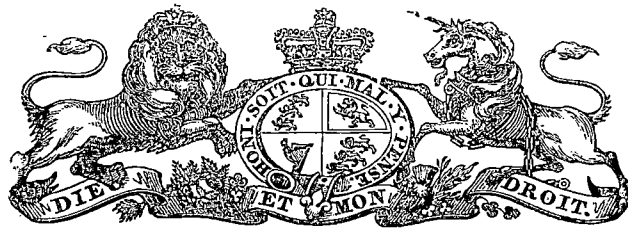


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1892.

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PARLIAMENT OF TASMANIA.

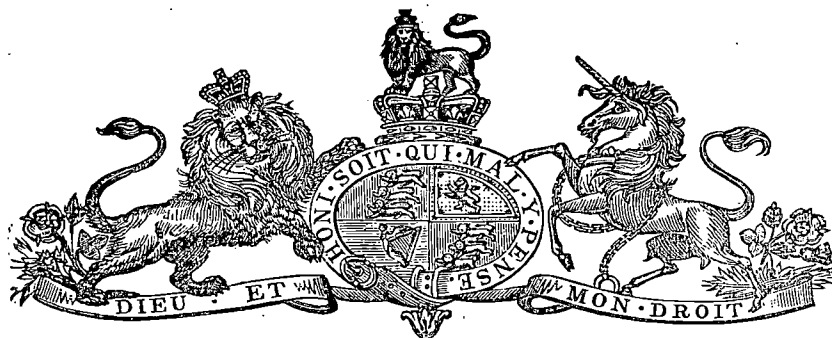
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GOVERNMENT ANALYST:

REPORT FOR 1891.

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



SIR,

*Government Laboratory, Hobart, 28th June, 1892.*

I HAVE the honor to forward herewith a summary of the analytical work of this Department for the year 1891, with brief references to the more important results obtained.

Apart from the tea examined for the Customs, the number of samples received again shows an increase of nearly seven per cent. on that for the previous year.

The permanent quarters for the Department will shortly be ready for occupation, and the improved arrangements and more ample space will then permit this work to be organised more completely than has hitherto been possible in cramped temporary quarters.

It is hoped that opportunity may thus also be afforded for the gradual extension of the teaching work contemplated, so that instruction may be given by day, in addition to evening classes. With this double end in view, I took advantage of my recent leave of absence to visit, in Victoria, a considerable number of technical institutions, and laboratories devoted to more or less special Government work, as well as those of the University.

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 1891.*

<i>Substance examined.</i>	<i>For the Government.</i>	<i>For Municipalities.</i>	<i>For Private Individuals.</i>	<i>TOTAL.</i>
Tea .....	1636	...	...	1636
Milk .....	...	87	1	88
Spirits .....	5	6	3	14
Methylated Spirits .....	3	...	1	4
Hop Ale, &c. ....	12	...	...	12
Yeast .....	...	...	3	3
Water .....	6	6	11	23
Meat .....	...	...	1	1
Drugs .....	3	...	...	3
Chemicals .....	2	...	3	5
Soil .....	...	...	3	3
Manures .....	1	...	12	13
Blood .....	4	...	2	6
Sundry for Poison .....	10	2	2	14
Clothing, &c. ....	6	...	...	6
Limestone .....	...	...	7	7
Hydraulic Lime .....	...	...	2	2
Coal .....	10	...	16	26
Clay .....	...	...	3	3
Kerosene .....	38	...	...	38
Iron Ore for Flux or Paint .....	3	...	7	10
Ambergris .....	1	...	...	1
Tin Ore .....	...	...	5	5
Tailings .....	3	...	1	4
Ore for Metals, chiefly Silver .....	47	...	501	548
Testing Gold-saving Appliance .....	...	...	22	22
Sundry .....	...	...	5	5
	1790	101	611	2502

## 4

### TEA (1636).

Twenty Teas were examined for the Colonial Storekeeper in connection with tenders for the supply of stores; the remainder, with few exceptions, were Customs samples.

### MILK (87).

Most of these were forwarded by the Sanitary Officer, Launceston. Twenty samples were reported as adulterated by the addition of water, ranging in amount from five to twenty per cent.; two others were found to be deficient in cream. The following figures, per 100 parts of milk, are given for comparison:—

	Butter Fat.	Solids not Fat.	Total Solids.
<i>Minimum</i> standard .....	3·0	8·5	11·5
Mean of 120,540 samples.....	4·1	8·8	12·9
Results obtained, high.....	6·38	9·04	15·40
Ditto .....	8·23	8·89	17·12
Ditto, low .....	3·03	6·59	9·62
Ditto .....	2·94	6·84	9·78

The standard given is that fixed as a *minimum* for milk of "proper substance, nature, and quality" by the Society of Public Analysts.

This average composition for a very large number of samples was obtained by Dr. P. Vieth from the results of eleven years' work in the laboratory of the Aylesbury Dairy Company, London. The averages from month to month were found to vary between the following limits:—

Butter Fat .....	3·6 to 4·6 per cent.
Solids not Fat .....	8·6 to 9·1 per cent.
Total Solids.....	12·4 to 13·6 per cent.

### SPIRITS (18).

A sample of Rum was found to have a nauseous bitter taste; but as it was forwarded in an old medicine bottle, it was considered probable that the spirit acquired this flavour after sale. Three Methylated Spirits examined for the Inspector of Customs were insufficiently methylated, and therefore not "destroyed" to an extent which would prevent their consumption as a beverage.

### HOP ALE, &c. (12).

Tested for the Excise, and found to contain from 0·26 to 1·41 per cent. of alcohol.

### WATER (23).

Several samples were tested as to fitness for brewers' use, and one for the Engineer-in-Chief which had caused much corrosion in a boiler. This was found to be due to the presence of chloride of magnesium.

It was necessary to largely qualify the condemnation of various waters, owing to doubt as to cleanliness of the bottles or corks used for the samples. The following figures for two samples of Launceston water illustrate the probable effects of neglecting the precautions detailed in the "Instructions for Sampling," compiled by me some years ago, and printed and issued by the Central of Health:—

	Clean.	Dirty.
Free Ammonia .....	0·008	0·06
Albuminoid Ammonia .....	0·055	0·28
Chlorine in Chlorides .....	0·7	1·0

The ammonia is given in parts per million parts of water, the chlorine in grains per gallon.

The meaning of the difference may be best shown by the following extracts from Wanklyn's "Water Analysis":—

1. "When the 'Free Ammonia' exceeds 0·08 part per million it is almost invariably a sign that the water in question consists of diluted urine in a very recent condition. In these instances the water will likewise be loaded with chlorides."
2. "If the 'Albuminoid Ammonia' amount to less than 0·05 part per million the water belongs to the class of very pure water."
3. "'Albuminoid Ammonia' over 0·15 ought to condemn a water absolutely."

Comparison may also be made between the Hobart supply at its purest (1) and the water from the Upper Macquarie-street Reservoir (Cascades) (2):—

	1	2
	Parts per million.	
Free Ammonia.....	None	0·04
Albuminoid Ammonia.....	0·02	0·40
	Grains per gallon.	
Chlorine in Chlorides.....	0·45	0·8
Total Solid Matter.....	4·40	12·0

Taking into consideration not only these figures, but also the course and surroundings of the water, and the fact that the impurity is still greater than that shown by former analyses, the contents of the Cascades Reservoir supplied to the adjoining institutions were condemned (not for the first time) as "quite unfit for human consumption."

One water was forwarded in a tin which had been used for kerosene, and imperfectly cleansed afterwards.

### MEAT (1.)

This was German sausage, part of a lot sold by public auction. It was found to be absolutely unfit for human food.

## DRUGS (3.)

These were examined for poisonous substances, with negative results.

## CHEMICALS (5.)

Two were tested for the Superintendent of Telegraphs. Three others were "Sheep Dip," alleged to have produced symptoms of poisoning.

## MANURES (13.)

The results obtained again show great variability in the composition of various manures sold under the same names of "Guano" or "Bonedust." The following will illustrate this:—

Guano—"As it is." 15.5 per cent. of moisture.  
 ,, "As it should be." 2.2 "

*Bone Dust.*

Phosphate of Lime.	Ammonia.	Sand.
21.4	2.60	18.6
19.0	0.96	6.8
33.0	4.50	—
32.7	—	26.7

*Mixed Manures.*

		Potash and Soda Salts.
2.2	0.60	—
9.6	0.32	0.8

"The phosphate of lime should range from 44 to 55 per cent. according to the purity of the bones, and the more finely ground these are the more speedy their action.

"The Royal Agricultural Society recommends that farmers should insist upon a guarantee of 45 per cent. of phosphate of lime. The average of a large number of examinations gives 3.5 per cent. of sand, &c. insoluble in acid."

Some system of check on the quality of manures sold as "Guano" or "Bone Dust," with guarantee of a certain composition in mixed manures also, appears to be necessary, and may be hoped for from the recently appointed Council of Agriculture.

## BLOOD (6).

These were either stains on clothing examined in connection with criminal charges, or blood taken from diseased animals and examined for the Inspector of Stock. In the latter the bacilli of Anthrax or Cumberland disease were found.

## SUNDRY FOR POISON (14).

These included various matters from a case of suicide with Paris Green; phosphorised wheat for the Inspector of Stock; and wheat found to be impregnated with strychnine, which had been used for maliciously poisoning domestic animals.

In connection with the question of the sale of Poisons, the following recommendations for the amendment of the present Act were made, as tending to the better protection of life, human and animal:—

1. Clause 7 to read:—No person shall sell any Arsenic or Strychnine or any preparation of the same respectively, or any poisonous mixture, unless such poison shall be mixed before the sale or delivery thereof with Green Oxide of Chromium and the double Tartrate of Chromium and Potassium in the following proportions, neither more nor less:—Arsenic, Strychnine, or other poison, sixteen ounces; Oxide of Chromium, three ounces; Tartrate of Chromium and Potassium, one ounce, and so in proportion for any greater or less quantity. Provided always, &c.
2. The words "nor to the sale of fly poison papers or packets of poisonous mixtures" to be omitted from Clause 14.

Public attention having been strongly directed to the possibilities connected with fly-papers, as shown in the Maybrick trial, I would further recommend a provision that—

3. Fly-papers shall contain a proportion of the double Tartrate of Chromium and Potassium equal in weight to the poison contained therein.

4. Importation of packets of poisons which do not fulfil the above conditions to be prohibited.

The advantages of the use of Oxide of Chromium in definite proportion have been thus detailed:—It is bright green, of high colouring power, is insoluble in water, dilute acid, or alkali, is not affected by ignition, and could be detected even after cremation; is unabsorbed if taken internally, and so could be quantitatively determined and the amount of poison estimated even if no trace of poison itself remained, and this as readily after prolonged inhumation as before.

The double Tartrate of Chromium and Potassium is soluble, and would strongly colour water, &c., which might be used in an attempt to separate the poison from the insoluble Oxide of Chromium or from the fly-papers.

Chromium is not a natural constituent of the body, is not used internally as medicine, and is not likely to be present in any article of food or drink.

In conclusion, although the admixture recommended will undoubtedly add to the cost of vermin killers, &c., this would appear to be a small matter in comparison with the removal of all possibility of accidental administration, and the practical certainty of detection in other cases, with consequent valuable deterrent effect.

## CLOTHING (6).

Examined in connection with criminal charges.

## LIMESTONE AND LIME (9).

Various Limestones were examined, with satisfactory results as to fitness for use as flux in smelting operations.

Two Hydraulic Limes showed the following differences:—

	Per cent.	Per cent.
Lime .....	66.7	55.6
Loss at red heat .....	1.8	7.6

## COAL (26).

Several Coals of promising character, and yielding no more than 6.2 to 9.2 per cent. of mineral matter (ash), were tested.

A Coal from the neighbourhood of Swansea, which formed a good coke on heating, had the following composition:—

	Per cent.
Fixed Carbon .....	56.7
Matter lost at red heat.....	29.7
Mineral Matter (Ash).....	9.2
Moisture lost at 212° F. ....	4.4

## KEROSENE (38).

No sample was found to be below standard, and none was referred as doubtful from any of the out-ports. A very marked improvement has taken place in the quality of the kerosene imported.

## IRON ORE (10).

These varied between 14 and 78 per cent. of Peroxide of Iron, and 8 to 77 per cent. of Silica. A sample forwarded for the Museum of the Imperial Institute had the following composition:—

	Per cent.
Iron Peroxide.....	78.00
Silica .....	8.50
Alumina .....	1.45
Phosphoric Acid.....	0.45
Combined Water .....	8.80
Moisture lost at 212° F. ....	2.40
Not determined .....	0.40
	<u>100.00</u>

Chromium, sulphur, titanium not present in appreciable quantity.

## AMBERGRIS (1).

This was part of an unusually large find, but it was not of first-rate quality.

## ORE FOR GOLD, SILVER, &amp;c. (50).

Small picked specimens yielded at the rates of 19,130 and 20,210 ounces of silver per ton; other results were 985,987, and 1729 ounces.

A test of one ore for zinc showed 22 per cent. of that metal, which seriously interfered with the smelting of the ore for lead and silver.

A sample of Gold Quartz, lodged with the Secretary of Mines in support of an application for a reward claim, yielded at the rate of—

	oz.	dwt.	grs.	
Gold .....	32	13	8	per ton.
Silver .....	7	3	7	„

## TESTS OF GOLD-SAVING APPLIANCE (22).

Having regard to the importance of the subject, and the promising nature of this appliance, the majority of these tests were made gratuitously; the trials made by the inventor, however, were unfortunately by no means exhaustive.

## SUNDRY (5).

These included two Minerals not largely met with in Tasmania—"Epsomite," or Sulphate of Magnesia; and "Halotrichite," or "Feather Alum," a hydrous-sulphate of alumina and iron.

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