THE HEALTH OF HOBART.

BY

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DURING the years 1887, 1888, 1889, and 1891, the City of Hobart, in common with the principal cities of Australia, was visited by a most severe and extraordinary epidemic wave of typhoid fever. Although, locally, the general death-rate from all causes, and for all ages, was not materially increased above the years preceding the epidemic, still the mortality of persons in the prime of life, especially males between the ages of 20 and 35 years, was unusually large. The alarm caused by this severe visitation very naturally raised a keen enquiry into the sanitary condition of the city; and many intelligent persons, believing that the epidemic was mainly or solely due to local causes, and particularly to defective drainage and other imperfect sanitary provisions, have since made vigorous and continuous demands for a drastic reform of our sanitary system. To aid in this praiseworthy endeavour, statistical comparisons with other Australian cities are by such persons frequently placed before the people with the object of showing that, but for our defective system of sanitation, the typhoid epidemic would not have appeared, or that its intensity, at least, would have been very much reduced. During the last three years, fortunately, the city has been free from typhoid in the epidemic form, and the death-rate from this and all other preventible causes have never been so low. Whatever may be the cause or combination of causes which, during the last three years, have raised the City of Hobart into a healthier state than that of any other period of its history, and have constituted it pre-eminently as among the healthiest cities of the world, it is obvious that local, artificial, or sanitary provisions have had very little to do with it, for a similar fall in preventible causes of death, if not so great, is distinctly traceable throughout Australia and Tasmania, generally during the same period, as shown in the following table :—

DEATH-RATES (1884-95), *in Four Australasian Capitals, from all Causes, and from Preventible Causes alone.*

(Per 1000 Persons living.)

	Total Death Rate. *All Causes.*				Death Rate. *From Preventible Causes.**			
	Hobart.†	Sydney.‡	Melbourne.‡	Adelaide.§	Hobart.	Sydney.	Melbourne.	Adelaide.
1884	23·47	22·31	20·54	28·55	17·19	21·95	20·07	...
1885	24·15	23·20	20·15	*	18·93	23·84	19·56	...
1886	22·58	21·26	20·42	23·67	17·73	20·96	19·90	...
1887	24·41	17·85	21·25	23·15	19·03	17·16	20·69	...
1888	21·38	19·14	20·51	22·69	17·35	18·42	19·97	...
1889	20·54	18·39	23·38	21·41	16·63	17·64	22·84	...
1890	19·98	15·39	19·63	23·05	15·74	14·78	19·10	...
1891	22·67	16·48	19·05	24·57	17·49	16·01	18·60	22·20
1892	20·97	13·56	15·99	20·77	16·70	13·20	15·63	19·17
1893	20·27	15·57	17·07	24·86	16·45	15·23	16·61	23·14
1894	16·95	14·12	15·55	19·47	13·49	13·63	15·07	18·00
1895	14·90	13·19	15·97	14·86	11·84	12·81	15·49	13·39
Mean 1884–93	22·04	18·31	19·80	23·63	17·42	17·92	19·30	21·50¶
Mean 1894–5	15·92	13·65	15·76	17·16	12·66	13·22	15·28	15·70
Per cent. Decrease	27·76	25·46	20·41	27·38	27·32	26·23	20·83	26·97

* Deaths from preventible causes include deaths from all causes save deaths from "senile decay" or "old age." † Corrected for deaths occurring in Hospital, and from causes which originated outside the Registration Districts. ‡ Includes suburbs.
§ City only. ¶ Mean of Years 1891-93.

Enthusiasts for reform or improvement of our local sanitary system, unfortunately, like all enthusiasts, are ever prone to exaggeration, and many of them still continue to speak of the local sanitary condition and health as unexceptionally bad, and in both respects inferior to other Australian cities. These incorrect and unguarded statements have produced much alarm locally among the naturally timid, and have done much harm to the reputation of the city as a health resort by scaring away visitors from other Colonies.

The protest from our Premier, Sir Edward Braddon, against these inaccurate alarmist statements will, it is hoped, help to repress them, and draw attention to the fact already stated—viz., that during the last three years the city has never been in such a healthy condition, and that it now stands pre-eminently one of the healthiest cities in the world.

HEALTH STATISTICS.

Although it is difficult to account for it, it is not the less true, that mistrust of statistics is very general. On all hands one hears the remark "You can prove anything by figures." "Figures can be made to lie." But a similar retort can more justly be made to apply to all worded statements or arguments. The true and sufficient reply to this taunt is, "Without accurate statistics or measures, you can know, compare, or prove nothing."

It is true that statistics are likely to be misinterpreted or mishandled by persons who lack the necessary knowledge of the subject to which they relate, or who lack training in statistical science. Almost everyone, however, thinks that he can understand figures, and easily read their true meaning. But the mere mathematical or arithmetical side of statistics, paradoxical as it may appear, plays a minor part in the statistical investigation of any subject. As Longstaff, the eminent statistician, well observes, "The primary requisite is a logical mind and a sound logical training; the second (and not less important) is a good general knowledge of the subject to which the figures under consideration relate. Only a chemist is likely to derive information from a new chemical experiment; in like manner the statistician must be now a banker, now a farmer, now a merchant, now a doctor, according as he is

manipulating figures relating to currency, crops, tariffs, or causes of death." Even then, in comparisons between different countries, he must be in possession of a good up-to-date library of statistical reference, and be able by experience to determine readily good from bad authority, and have a wide knowledge of the best sources of information. The knowledge and exact signification of the current statistical terms are all essential; for not a little confusion and conflicting opinion arise from misinterpretation of the true significance of terms in common use among statisticians. As the demonstration and acceptation of the truth of the statements made by me regarding the present healthy condition of Hobart largely depend upon clearly understanding the difference between a "Total Death Rate" and a "Health Standard Rate"; in discerning and separating preventible causes of death from the non-preventible; and in marking the difference, proportion, and effect which in age and sex determine a General Death Rate—quite apart from any consideration of health,—it is necessary at the outset that such preliminary remarks as have been made should be carefully weighed, and that a few simple illustrations should be given to enable the uninitiated to comprehend the difficulties of statistical comparison between different periods and different places, without which a true estimate cannot be formed of the comparative healthiness of different cities. No two cities, or two periods in the same place exactly, agree in the age or sex combination of their respective populations; but, such is the remarkable influence of these factors in the actual determination of a general death-rate that, unless such differences are strictly determined and allowed for, it is as likely as not that the healthiest period or the healthier place would be placed erroneously in the worst position, while the least healthy period or the least healthy city might appear erroneously in the best.

The following illustration of the disturbing effect of great disproportion of numbers at different ages is taken from the two divisions of the Registration District of Hobart for the year 1894:—

Year 1894.

	Hobart City.	Hobart Suburbs.	Both.
Per cent. proportion of persons living :			
0–5 years	12·83	12·92	12·85
5–65 years	82·87	78·06	81·64
65 years and over	4·30	9·02	5·51
Per cent. proportion of deaths :			
0–5 years	28·87	11·27	23·23
5–65 years	45·95	25·98	39·55
65 years and over	25·18	62·75	37·22
Deaths per 1000 persons living at each age group :			
0–5 years	36·79	19·59	32·38
5–65 years	9·07	7·46	8·67
65 years and over	95·70	156·10	120·95
Total Death Rate for all ages without allowing correction for disproportion in age groups	16·36	22·44	17·91
Health Standards — Death Rate for all ages corrected for age disproportion	17·10	16·63	17·11
Health Standards — Death Rate for ages under 65 years corrected for age disproportion	21·79	9·19	11·90

The preceding table affords one of the best illustrations of the misleading effect of taking the Total Death Rate for All Ages as a Comparative Health Standard between places or times when there is any material difference in the proportion of people living at the principal age groups whose normal death-rates differ so widely. In "The Tasmanian Official Record, 1892," pp. 208-220 it has been clearly demonstrated "that the ordinary reference of the proportion of total deaths to the number of persons living is not *in itself* in any sense a *Comparative Health Standard* as popularly understood; and that all comparative methods which ignore proportional age-groups living, and make no allowance for the value of longevity, are utterly misleading in most cases when unguardedly used as comparative standards of health." In a communication to the Royal Society of Tasmania in the year

1887, a simple method was introduced by me for correcting the misleading total death-rate for all ages where living age-groups in different places or times differ in proportion with each other respectively. This method has the effect of converting the ordinary death-rate into a most effective Comparative Health Standard, and has received the commendation of our leading authorities in vital statistics, and has since been widely adopted.

The method referred to divides the ages living into three principal groups—0-5, 5-65, 65 and over; and as it has been ascertained by reference to the average numbers living in different countries that these groups constantly bear the proportion to each other of 3, 18, 1, nearly, these simple numbers were selected as the best and most convenient for converting the ordinary misleading death-rate for All Ages into a most effective and truthful Health Standard.

The method for effecting this correction as used in the preceding table of comparison was illustrated as follows:—

Let A = Proportion of ages living 0 — 5 years = 3
B = „ „ 5 — 65 „ = 18
C = „ „ 65 and over = 1
R^a = Death-rate actually yielded by ages living 0 — 5
R^b = „ „ „ 5 — 65
R^c = „ „ „ 65 and over
D = Relative or Comparative Health Standard for all ages.

$$\text{Then } \frac{A R^a + B R^b + C R^c}{A + B + C} = D$$

By this method the superior health condition of Hobart Suburbs is revealed in comparison with the City. Notwithstanding (owing to the abnormal proportion of ages 65 and over in the former), the total death-rate of the Suburbs was 22·44 per 1000 living, while the City only showed 16·36 per 1000 living; the correction for age disproportion having the effect of reducing the former to 16·63 per 1000 living, and increasing the latter to 17·10 per 1000 living. The limitation to deaths under 65 years of age is also most significant in confirming the accuracy of the Health Standard as a true measure of Relative Health.

Ordinary Total Death-rate disregards Longevity.

But the fundamental objection to all unqualified Total Death-rate indices, when used as Comparative Health

Standards, is, that a life terminating one hundred years after birth is reckoned only to be of the same health value as a life terminating one hour after birth; and that the death of an octogenarian caused by "old age" or "senile decay"—a non-preventible cause—adds as much to the rate as the death of a child or youth from preventible causes, such as smallpox, diphtheria, or typhoid fever.

It is clear, therefore, before a true comparison can be made between the health of different places, or between different periods in any one place, the non-preventible deaths due to "old age," or the natural termination of a healthy life, should be eliminated, and the comparison strictly confined to preventible causes, or, otherwise, the healthiest place in the world might seem the worst, and the most unhealthy the best.

In the comparisons between the present and the past of Hobart and between the death-rates of different cities, this plan has been carefully carried out in the following tabular comparisons.

The adoption of this course is all the more necessary when we come to consider the remarkable longevity of the inhabitants of Hobart as compared with other places, as indicated in the following table :—

PROPORTION of Persons who die of "Senility" or "Old Age" in various Cities to Total Deaths from all causes.

Hobart Suburbs	1	in every	3	persons who die.
Hobart and Suburbs.....	1	„	5	„
Hobart, City only	1	„	7·65	„
Adelaide	1	„	14	„
Average of eight principal Cities of Scotland	1	„	31	„
London	1	„	35	„
Melbourne	1	„	39	„
Sydney	1	„	40	„

As over 20 per cent. of the total death-rate of Hobart is composed of the numbers of those who die of "old age," it will be seen how misleading it would be to compare its health with the other cities named on the basis of the total death-rate from all causes, including preventible and non-preventible.

Indeed, if there be anything to fear in our Death-rate statistics, it is, that anyone who comes to reside in this City has the chance of 1 in 5 that he will prolong his life to extreme old age.

PAST AND PRESENT HEALTH OF HOBART COMPARED.

The following table contrasts the proportions of deaths from preventible causes under the great classes of Disease for the years 1894-5 with the average proportion from corresponding causes in the preceding ten years, and also with the abnormal epidemic year 1887.

DEATHS per 100,000 persons living.

	Average of		Epidemic Year 1887.	Years 1894–5, above + or below —.	
	Years 1894-5.	10 Years 1884-93.		Average Decade, 1884-93.	1887.
Zymotic Diseases	170	266	416	— 96	— 246
All other Preventible causes—					
Parasitic Diseases	5	8	16	— 3	— 11
Dietic Diseases	6	22	46	— 16	— 40
Constitutional Diseases	249	275	282	— 26	— 33
Developmental Diseases	37	48	62	— 11	— 25
Local Diseases	657	852	767	— 195	— 110
Violence	70	74	98	— 4	— 28
Ill-defined Diseases	87	197	216	— 110	— 129
Total other Preventible Diseases	1111	1476	1587	— 365	— 476
All Preventible Diseases.	1281	1742	1903	— 461	— 622

The rate of 12·81 per 1000 persons living is a remarkably low death-rate for any city in respect of all preventible causes of death. It is lower than the average of the preceding ten years by 33 per cent., and lower than that of the epidemic year by 33 per cent.

Confining our attention to Zymotic diseases alone, which include nearly all the principal infectious and contagious diseases, and therefore coming well within the scope of sanitary concerns, we find that the death-rate—1·70 per 1000—from all such forms of disease during years 1894-5 was 37 per cent. below the average of the preceding ten years, and as much as 59 per cent. below the epidemic year 1887.

There can be no doubt, therefore, that Hobart has been in a most healthy condition during the last two or three years, and compares most favourably with any former period in her history.

The following table shows more particularly the principal specific causes of death from preventible diseases for the same periods, shown in the order of their importance :—

DEATHS per 100,000 persons living.

From	Average of		Epidemic Year 1887.	Years 1894-5, above + or below —.	
	Years 1894-5.	Ten Years 1884-93.		Mean of Ten Years 1884-93.	Epidemic Year 1887.
Non-preventible cause—					
Senile Decay, "Old Age"..	326	462	538	— 136	— 212
Preventible causes—					
Heart Diseases, various ...	130	163	193	— 33	— 63
Phthisis	129	147	171	— 18	— 42
Atrophy and Debility	80	179	193	— 99	— 113
Cancer.....	61	77	75	— 16	— 14
Diarrhœa and Dysentery...	53	102	170	— 49	— 117
Pneumonia	52	79	82	— 27	— 30
Typhoid, &c.....	50	81	200	— 31	— 150
Bronchitis	48	88	36	— 40	+ 12
Apoplexy	33	62	59	— 29	— 26
Convulsions	29	65	69	— 36	— 40
Premature Birth	27	42	53	— 15	— 26
Drowning	27	20	23	+ 7	+ 4
Diphtheria.....	21	26	26	— 5	— 5
Fractures, Contusions	15	16	23	— 1	— 8
Dentition	11	17	26	— 6	— 15
Paralysis	3	33	26	— 30	— 23
All others	512	554	478	— 42	+ 34
All Preventible Diseases ...	1281	1742	1903	— 461	— 622

From the preceding table it is seen that the decline in the death-rate from all preventible causes in the last two years is traceable in every one of the principal specific causes of death, with the exception of a slight increase in deaths from Drowning, Bronchitis, and all other minor specific causes relative to 1887. The most marked fall is to be found under *Atrophy* and *Debility*, *Diarrhœa* and *Dysentery*, *Typhoid*, *Pneumonia*, and *Convulsions*. The figures, as a whole, are eminently satisfactory, and confirm the statement already made, that Hobart during the last two and even three years has never been in a healthier condition. That it compares also most favourably among the healthiest cities of the world will be demonstrated in the tables and facts which follow.

Hobart compared with other Towns and Cities.

The following table compares the death-rate from preventible diseases in Hobart with corresponding death-rate in other cities of Australia and Great Britain :—

Deaths from Preventible Causes only in various Cities and Towns.

(Death-rate per 1000 *persons living.)*

	Period.	All Preventible Causes.	Zymotic Diseases.
Hobart	1895	11·84	—
Hobart, mean	1894–5	12·26	1·70
Sydney, mean	1894–5	13·22	—
Melbourne, mean	1894–5	15·28	—
Adelaide	1894–5	15·70	—
Hobart, mean	1884–93	17·42	—
Coatbridge	1893	17·52	3·53
Aberdeen	1893	17·57	2·07
Sydney, mean	1884–93	17·92	3·06
Leith	1893	18·72	3·48
Edinburgh	1893	19·25	2·85
Melbourne, mean	1884–93	19·30	2·26
Average of 100 English towns, mean	1884–93	19·40	—
Govan and Partick	1893	20·09	5·11
London	1893	20·20	3·71
Greenock	1893	20·33	4·47
Paisley	1893	20·48	3·77
Perth (Scotland)	1893	20·99	3·65
Adelaide, mean	1891–93	21·50	3·65
Dundee	1893	21·69	4·50
Glasgow	1893	22·63	4·49
Kilmarnock	1893	23·67	7·22

The figures for eliminating "old age," and so confining comparisons to Preventible Causes only, are not available in respect of many other cities and towns of Great Britain and Australia with which Hobart compares most favourably. Among the 117 cities and towns where this elimination was rendered possible, Hobart, by a long lead, takes the first position as a city of health. Sydney takes the second. The worst in order being the town of Kilmarnock, in Scotland.

The superiority of Hobart and Sydney as healthy cities is further confirmed by a comparison of the principal specific causes, as in the following table, whose figures, as in other tables, are taken directly from the Blue Books of the several Registrars-General. The figures for Great Britain and Australia refer to the year 1893; those for Hobart to the mean of the two years 1894-5.

Deaths from Principal Specific Causes in Sixteen Cities and Towns of Great Britain and Australasia.

(Per 100,000 persons.)

Principal Specific Causes.	Hobart.	Sydney.	Aberdeen.	Coatbridge.	Leith.	Edinburgh.	Melbourne.	Govan & Partick.	London.	Greenock.	Paisley.	Perth (Scotland.)	Dundee.	Adelaide.	Glasgow.	Kilmarnock.	Average of principal Scotch Towns.
Heart Disease, var.	130	*	*	*	*	*	—	*	160	*	*	*	*	*	*	*	159
Phthisis	129	—	201	160	185	163	—	170	187	160	229	203	180	—	225	234	199
Atrophy & Debility	80	—	*	*	*	*	—	*	67	*	*	*	—	*	*	*	67
Cancer	61	—	84	48	69	114	—	40	80	48	59	60	69	—	65	72	72
Diarrhœa and Dysentry	53	—	57	77	59	41	—	65	79	77	65	93	129	—	80	206	77
Pneumonia	52	—	115	152	169	135	—	192	165	152	171	136	210	—	210	155	179
Typhoid	50	56†	11	58	24	16	68†	12	17	29	71	13	27	—	20	155	25
Bronchitis	48	—	180	179	162	182	—	176	240	179	197	199	274	—	220	182	206
Apoplexy	33	—	70	53	58	67	—	44	51	53	55	139	67	—	68	107	66
Convulsions	29	—	*	*	*	*	—	*	51	*	*	*	*	*	*	*	35
Premature Birth	27	—	*	*	*	*	—	*	*	*	*	*	*	*	*	*	*
Drowning	27	—	*	*	*	*	—	*	8	*	*	*	*	*	*	*	7
Diphtheria	21	39†	29	32	49	23	—	27	76	21	39	13	23	36	31	28	29
Dentition	11	—	10	3	8	9	—	15	11	3	39	17	3	—	15	14	13
Paralysis	3	—	39	54	37	43	—	19	28	54	62	63	42	—	42	21	42
Scarlet Fever	—	—	12	16	52	21	—	21	37	3	22	43	3	—	39	100	28
Measles	—	—	20	48	78	61	—	239	38	204	81	53	148	—	128	41	112
Influenza	26	—	52	10	14	34	—	4	*	29	20	30	10	—	12	45	20
Whooping Cough	—	—	5	64	34	61	—	108	54	46	41	76	85	—	105	110	79
Small-pox	—	—	1	—	14	—	—	—	5	—	—	3	1	—	4	—	2

* Not ascertained. † Mean of 17 years.

INFANTILE MORTALITY.

There is another very sensitive index to the comparative health of different times and places, viz., deaths under one year compared in proportion with births. The following table shows the infantile mortality in the principal towns and cities of Great Britain and Australia, based, when not otherwise stated, on the average of the years 1877 to 1886:—

Infantile Mortality in Towns of Great Britain and Australasia.

(Deaths under 1 year to 1000 Births.)

Preston	218	Twenty-eight English Towns	161
Dundee (1893)	218	Newcastle	160
Leicester	201	Wolverhampton	159
Blackburn	187	Halifax	159
Liverpool	183	Sunderland	157
Salford	178	Plymouth	157
Bolton	177	Kilmarnock (1893)	157
Nottingham	175	Govan (1893)	157
Manchester	174	Leith (1893)	156
Brisbane (1883 to 1887)	174	Brighton	148
Norwich	173	Edinburgh (1893)	148
Adelaide (1884 to 1887	172	Glasgow (1893)	146
Leeds	172	Bristol	145
Cardiff	169	Derby	143
Huddersfield	169	Paisley (1893)	142
Oldham	169	Wellington (1883 to 1887).	142
Melbourne (1878 to 1888).	169	Portsmouth	138
Sydney (1878 to 1888)	168	Birkenhead	137
Birmingham	164	Perth (1893)	135
London (1893)	164	Greenock (1893)	134
Sheffield	163	Aberdeen (1893)	125
Bradford	162	Hobart (1895)	125
Hull	161	Hobart (1894)	108

Here, again, the favourable position taken by Hobart as contrasted with 65 principal towns in Great Britain and Australasia is shown in that its infantile mortality is by far the lowest of all, as in all deaths from every preventible cause.

CONCLUSION.

Particular climates and latitudes favour the development of certain diseases, to which they are in some cases peculiarly restricted; and in widely distributed diseases, such as the Zymotic, particular climates and latitudes, independently of sanitary conditions, have a direct influence in favouring or

lowering the intensity of any attack. Of course altitude and other local circumstances may powerfully counteract the general influences in some places ; but, nevertheless, speaking in a broad way, it is apparent that the attacks of Typhoid diminish in intensity in either hemisphere in passing from the equatorial to polar latitudes ; and just the reverse of this happens in other diseases, such as Bronchitis.

Therefore, the hygiene or healthiness as a whole of any one locality cannot be properly estimated in contrast with any other by a restricted reference to the intensity or otherwise of any one particular form of disease. In making contrasts of this kind between place and place, conclusions based upon any single form of disease would to a certainty be very misleading and unsatisfactory : the general effect of all forms of preventible diseases is alone satisfactory and conclusive.

In the three preceding tabular comparisons, which conclusively establish the fact that the present health condition of Hobart has never been so good, and that it is preeminently one of the most healthy cities in the world, every care has been taken to make a particular and thorough contrast of all the principal causes of preventible disease, and the results shown are so obvious that even the most ignorant or the most sceptical who gives the matter any attention cannot fail to be convinced by them ; and that figures logically, carefully, and consistently arrayed are most eloquent agents in support of truth, are not in any way affected by the vulgar platitude that "figures may be made to prove anything." But even figures cannot make the false appear true unless they are mishandled.

In this connection a curious ethical consideration presents itself. Why is it that people who are specially noted for the readiness with which they accept palpably crude and foolish statements and opinions, without the slightest effort exerted to test their truth, should also be the people who are most ready to express the greatest mistrust of figures, and to strain at or resist carefully reasoned conclusions if distasteful, even though supported by the very best authority? I do not, however, anticipate that it can possibly be distasteful to anyone to accept the conclusions regarding the healthful condition of Hobart established in the preceding statements and tabular comparisons.

The inhabitants of this beautiful city, instead of using unreasoning expressions of discontent with their present local condition, should indeed be grateful to God that there are few, if any, cities of the world that enjoy such highly favourable health conditions, and so genial a climate. Those who praiseworthily endeavour to increase and maintain the good health of

the city by care and improvement of all sanitary provisions, should not mar their good work by giving any encouragement to unwarranted alarmist statements regarding the general good fame and health of the city we live in, and which, at the present time, is the most healthy of any city known to me.

DEATH Rate per 100,000 persons under each of the great divisions of diseases in four Metropolitan Cities during 1894.

	Melbourne.	Sydney.	Adelaide.	Hobart.	
				1894.	**1895.**
I. Specific Febrile or Zymotic Diseases.....	162	232	218	180	182
II. Parasitic Diseases.....	5	5	3	14	6
III. Dietic Diseases.....	19	14	20	3	8
IV. Constitutional Diseases..	328	236	383	281	248
V. Developmental Diseases.	111	106	150	382	336
VI. Local Diseases.....	782	653	683	751	661
VII. Violence	81	74	45	90	72
VIII. Ill-defined, &c.....	67	92	90	90	90
All Causes.....	1555	1412	1592	1791	1603
Less "Old Age"	48	45	123	346	306
All Preventible Causes ..	1507	1367	1469	1445	1297

DEATHS under 1 Year per 1000 Births, 1894.

MELBOURNE.	SYDNEY.	ADELAIDE.
122	133	119

PERCENTAGE of Deaths from "Old Age" to All Deaths, 1894.

MELBOURNE.	SYDNEY.	ADELAIDE.	HOBART.	
3·06	3·19	7·70	19·32	19·09*
	Actual Number.			
210	190	49	123	111*
	Per 100,000 mean Population.			
47·5	45·0	122·6	346	306*

* Year 1895.

DEATHS of Persons 65 Years and over.

	Actual Number.			
MELBOURNE.	SYDNEY.	ADELAIDE.	HOBART.	
1894.	**1894.**	**1894.**	**1894.**	**1895.**
1359	731	160	237	189
	Per cent. to Total Deaths.			
19·78	11·27	20·56	37·21	32·48
	Per 100,000 mean Population.			
308	175	400	666	521

Hobart and Suburbs.

Population, Deaths, and Death-rate, under Principal Specific Causes, for the Year 1895.

	Actual.			Relative.		
	City.*	Suburbs	Both.*	City.	Suburbs	Both.
Estimated Mean Population—						
0–5 years	3467	1199	4666	12·83	12·92	12·85
5–65 years	22,390	7246	29,636	82·87	78·06	81·64
65 and over	1161	837	1998	4·30	9·02	5·51
All Ages	27,018	9282	36,300	100·00	100·00	100·00
Deaths—						
0–5 years	123	29	152	34·55	15·68	28·09
5–65 years	151	56	207	42·42	30·27	38·27
65 and over	82	100	182	23·03	54·05	33·64
Total: Preventible	321	109	430	90·17	58·93	79·48
Total: Non-preventible	35	76	111	9·83	41·07	20·52
Total: Both	356	185	541	100·00	100·00	100·00
Death-rate per 1000 persons living—						
0–5 years	..	..	..	35·48	24·19	32·58
5–65 years	..	..	..	6·74	7·73	6·99
Under 65 years	..	..	..	10·60	10·07	10·47
65 and over	..	..	..	70·63	119·47	91·10
Ditto, Preventible only	..	..	..	48·23	26·29	39·03
All Ages: Preventible	..	..	..	11·88	11·74	11·84
All Ages: Non-preventible	..	..	..	1·30	8·19	3·06
Total	..	..	..	13·18	19·93	14·90
Health Standard— Deaths from all preventible causes, corrected for age disproportion	..	..	..	12·54	10·81	11·94
Deaths from all causes, corrected for age disproportion	..	..	..	13·56	15·05	14·30
Principal Specific Causes—				Per 100,000 persons living.		
Non-preventible Causes—						
Old Age	35	76	111	130	819	306
Preventible Causes—						
Heart Disease, various	24	14	38	89	151	105
Phthisis	27	9	36	100	97	99
Atrophy and Debility	21	9	30	78	97	83
Pneumonia	18	7	25	67	75	69
Typhoid	14	6	20	58	65	55
Diarrhœa and Dysentery	21	3	24	78	32	66
Cancer	17	2	19	63	22	52
Bronchitis	9	1	10	33	11	27
Apoplexy	8	2	10	30	22	27
Premature Birth	7	2	9	26	22	25
Drowning	—	5	5	—	54	14
Convulsions	5	2	7	18	22	19
Diphtheria	5	1	6	18	11	16
Fractures	2	2	4	7	22	11
Dentition	4	—	4	15	—	11
Paralysis	—	3	3	—	32	8
All Preventible Causes	321	109	430	1188	1174	1184

* Hospital Deaths, &c. referred to the District in which the cause of death originated.

DISCUSSION.

Mr. Mault (Engineering Inspector of the Central Board of Health), in opening the discussion, said that Mr. Johnston in his very able paper had so completely proved that Hobart was one of the healthiest cities in the world, and that the only true method of usefully comparing the health conditions of towns was, not by considering their respective "Total Death Rates," but by regarding their "Health Standard Rates," as to leave the main purpose of the paper beyond discussion. But, while fully agreeing with this main purpose, there were several portions of the paper he could not agree with. For instance, Mr. Johnston in his opening sentences, after referring to the very low death-rates from preventible diseases during the last three years in Hobart, says:—"Whatever may be the cause or combination of causes which, during the last three years, have raised the City of Hobart into a healthier state than that of any other period of its history, and have constituted it pre-eminently as among the healthiest cities of the world, it is obvious that local, artificial, or sanitary provisions have had very little to do with it, for a similar fall in preventible causes of death, if not so great, is distinctly traceable throughout Australia and Tasmania generally during the same period, as shown in"—a table which he gives. That was a very astonishing statement, especially as the table that is said to prove it proves nothing of the kind, but only shows that there has been going on for some time a coincident diminution of death-rates in the various Australian Colonies. The cause of this coincidence was surely not far to seek, especially as the cause of a similar diminution in the home countries was well known to be better sanitary administration.

From the passing of the Registration Act of 1838 in England till the year 1875, in which the present Public Health Act was passed, the rate of mortality, though varying greatly from year to year—the differences being sometimes more than 4 to the 1000—continued to average for the whole period 22·55 to the thousand living. But on the passing of the Act improved sanitation began immediately to tell on the death rate: for the first five years, that is 1875-1879, the mean rate was 21·2 to the 1000; for the next five years it was reduced to 19·6 to the 1000; and during the next five years it was further reduced to 18·6 to the 1000. And the rate was not only lowered, but it was steadied. Once, three years after the passing of the Act, the rate rose about 0·6 to the 1000, but since then it has never risen more than 0·4 to the 1000. With regard to the reduction effected, it is a remarkable fact that the maximum

death-rate since the year 1880 has never attained the height of the minimum death-rate of all antecedent time in England.

Now, to compare English and Australian experience by the aid of the information given in Mr. Johnston's table. The table as it stands is not satisfactorily arranged, as it compares the experience of ten years with that of two. But, if divided, as has been done with the English tables, into three equal periods, a fair comparison can be made, especially as Mr. Johnston's table begins at about the period of the passing of most of the Australian Health Acts. The effect of the passing of these Acts is thus shown in the death-rates of the chief cities of the Colonies in the order given by Mr. Johnston—

	Death-rates in the periods		
	1884-1887.	1888-1891.	1892-1895.
Hobart.....	23·65	21·14	18·27
Sydney.....	21·15	17·35	14·11
Melbourne.....	20·59	20·64	16·14
Adelaide	25·12	22·93	19·99

—the rates being to the thousand living. To attribute this diminution to anything but the coinciding adminstration of the Health Acts in all the colonies shows an ignorance of the scope of these Acts and of the manner in which they are carried out, especially in connexion with infectious diseases, which are the most amenable to adminstrative action, and are the chief causes of periodical variations in death-rates. Every such disease has to be notified to the Central Board, and immediately upon such notification the local sanitary authority has to inspect the premises where the case has occurred, and report the measures that have been taken to remove the cause and prevent the spread of the disease. These measures alone have had a great effect upon the death-rate ; but apart from them, the routine work of the Inspectors of the local boards, especially in the larger towns, has also had the result of preventing much disease. And still further, in some of the colonies, in addition to the general provisions of the Health Acts with respect to milk and food, special legislation provides for dairy and slaughter-house inspection. How all these sufficient causes for the amelioration of life conditions in these colonies—paralleled as they are by the action of similar causes elsewhere—can be overlooked or set aside, and their results attributed to such cosmic influences as periodicities in the revolution of Jupiter or of the prevalence of sun-spots, passes comprehension.

That some cosmic influences affect the irregular ebb and flow of mortality rates is not denied. A diagram of the mortality

in England from 1848 to the present time shows a very irregular but very marked tidal action; but it also shows—and this is the most important fact it does show—that up till 1875 there was no controlling influence over this tidal action, but that since that date an influence, growing more and more potent as sanitary administration grows more and more efficient, is so controlling the tide as to now almost obliterate all traces of periodical rise and fall.

If, instead of taking the general death-rate, the death-rate of one of the infectious diseases that are the most amenable to sanitary effort be taken, this controlling influence is yet more clearly seen. Take typhoid fever, for instance. In Mr. Johnston's table of deaths from the principal specific causes the line for typhoid fever deaths is singularly treated. For the British towns the deaths from this fever are recorded for one year; for Hobart the mean rate for the last two years is given; for Sydney and Melbourne the mean of 17 years is taken; and the rate for Adelaide is not given at all. With such divergence of data no real comparison can be made. But if the rate for the three Australian towns for 1894 be taken, the real condition of the towns mentioned will be, for each 100,000 people :—

London	17
Average of principal Scotch towns	25
Sydney	29
Adelaide	35
Hobart	50

Mr. Johnston says :—"In making contrasts of this kind between place and place, conclusions based upon any single form of disease would to a certainty be very misleading and unsatisfactory : the general effect of all forms of preventible diseases is alone satisfactory and conclusive." This may be true from a statistician's point of view when regarding general healthiness or unhealthiness, but from a sanitarian point of view the real value of statistics is to point out where and how sanitary work is most needed and can best be done. As already mentioned, typhoid is one of the diseases most amenable to the influence of sanitary work, especially drainage, and the figures just given point out that Hobart, though a very healthy place, may be made yet more healthy by the prevention of typhoid. Before the passing of the Health Act in England the average death-rate from typhoid fever was 89 in 100,000, as compared with 21 now. At Sydney it was 102 in 1885, and is 29 now. At Adelaide there has been a corresponding reduction. Why should not similar work be done here ?

There is a point in connection with the healthiness of Hobart that should be more widely known—its comparative freedom

from consumption. This is probably due to the unusual dryness of the air as shown by the great divergence between the readings of dry and wet bulb thermometers. This is not one of the least of the claims of Hobart to be the sanitorium of Australasia.

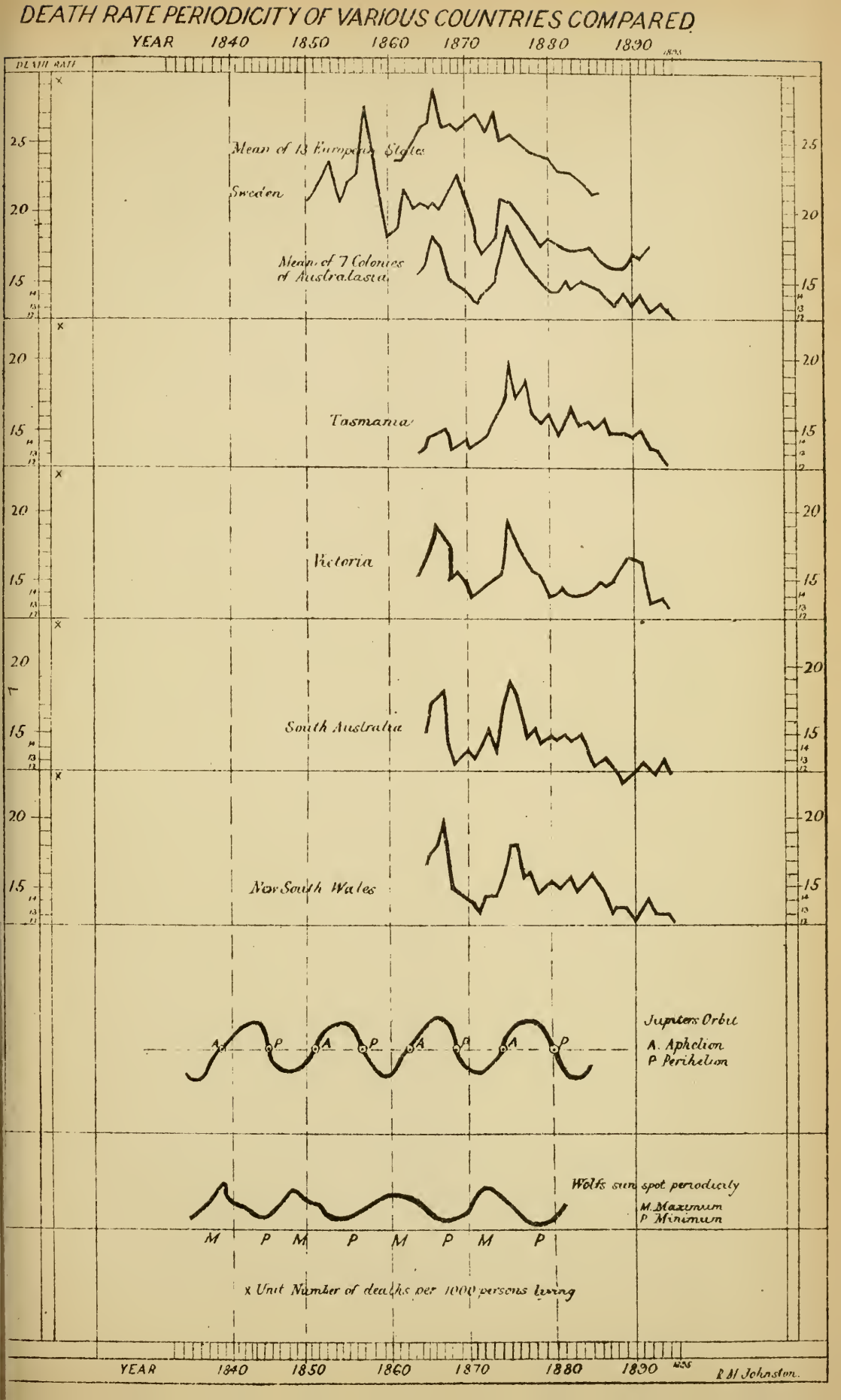
In conclusion, all experience shows that whatever cosmic influences may be at work, the healthiness or unhealthiness of a place depends greatly on human work. It may be still impossible to "bind the sweet influences of Pleiades, or loose the bands of Orion," but it is possible to safeguard the purity of our air and the healthiness of our city, and take away the reproach of our past negligence.

Major-General TOTTENHAM said it seemed to him that there was one other matter which required consideration as a factor in the judgment of healthiness of a place or district, whether as to natural or artificial conditions. He disclaimed any desire to decry or fix the stigma of unhealthiness on Hobart. He came to Hobart 11 years ago hardly able to walk half a mile at a snail's pace, and his tolerably known capacity in locomotion now needed no statistics to attribute to the healthful air of Tasmania. It was a deep debt of gratitude which had impelled him to advocate so strenuously and persistently improved sanitation in Hobart, in order that the health of the city—the healthiest he had ever seen in the world, and he had seen a good many—should be rendered still healthier. (Applause.) What he complained of was the existence in past years of preventible disease unwarranted by the exceptional advantages of the site, and due, in his opinion, and not in his alone, to municipal neglect of sanitary laws. (Warm applause.) Mr. Johnston had placed before them a series of tabular statements, the burden of each being a death rate. Those tables showed undoubted statistical acumen and patient research. The "mortality of disease" was well set forth, but he (Major-General Tottenham) had searched in vain for the "prevalence of disease," as indicated by the number of cases of preventible disease occurring in each city reviewed. The exclusion of only "old age and senile decay" from preventible causes classified all other deaths amongst the possible. That, unintentionally no doubt, gave a false view as regarded "sanitary state" for diseases were due to public as well as private responsibility or neglect of such. The ordinary acceptation of the term "preventible disease" was disease by governmental or municipal decree, so to speak. There should be no municipal or government neglect in this respect. (Applause.) The mere death-rate of a place could not be

regarded as a fully trustworthy test of its healthfulness. All the fever cases in Hobart were not notified, and the speaker gave statistics to support his contention. As Mr. Johnston had indicated, without accurate statistics they could not know, prove, or compare anything. As a soldier he could not afford to "enthuse" over statistics the bases of which were, to say the least, of uncertain origin. (Applause.)

Mr. W. F. Ward (Government Analyst) considered that Mr. Johnston's paper could not fail to convince anyone who would take the trouble to read it carefully, that excluding the deaths of old people, which formed such a large proportion of the deaths, and the old must die, Hobart death-rate was lower than that of other Australasian cities. But even this was not sufficient to attract the attention of visitors, and so he suggested that the monthly statements might either be so modified as to emphasise every time the high rate from old age alone occurred, or that the vital statistics be published at longer intervals, with full details. The question, however, was not, he thought, so much one of figures as of the general health reputation of the place, and in this we had suffered somewhat, owing, in the first place, to a few conspicuous cases of diphtheria last summer, and in the second, to perhaps a greater degree, to a statement repeated again and again that the town smelt to quite an unusual extent; that bad odours were, in fact, "frequent and painful and free," the cause being the want of rain to wash the town. Now, the ordinary passer-by did not stop to investigate, but classed everything which offended his or her nostrils comprehensively as "drains," declaimed accordingly, and anticipated germs, although it might be no more than the powerful but harmless water in which a cabbage had been boiled. (Laughter and applause.) Yet the good name of the city suffered. (Hear, hear.) There was no necessary connection between bad smells and infectious diseases. Human beings could often, for long periods, eat, drink, and breathe more or less filth, and be apparently not much the worse until the specific germs are somehow introduced which then increase, multiply, and spead in the congenial soil, so that typhoid and diphtheria were known as "filth diseases." It followed, therefore, that though offensive odours might in some cases be practically harmless, yet there was no reason why they should be tolerated if they could by any possibility be got rid of, and if enthusiasts had occasionally exaggerated their effects as well as the death-rate, yet enthusiasm carried most reforms, and had in this case great, if not full, justification. (Applause.)

Mr. JOHNSTON, in replying on the discussion, said he was glad that the main object of his paper had been accomplished. It was his endeavour to show the distinction between the sanitation of a place and its healthfulness; that it did not necessarily follow that while the sanitary conditions were not as complete as they might be, therefore its health was bad, for during a time being a city might be in a bad state of health, and yet have the best system of sanitation in the world. It seemed to be conceded on all sides that Hobart in the last two or three years had been in a most satisfactory condition as regards its health, but there were differences of opinion as to the causes. He had studied the subject for many years, and still believed that whilst sanitation was valuable in reducing certain diseases, such as typhoid, the great causes of such diseases were still beyond man's control. The percentages had fallen low in some years before any Health Acts were passed, although he admitted that in England typhoid fever cases had of late years been greatly reduced. Too little credit seemed to be given to the increased knowledge of medical men in the treatment of such diseases, and the improved habits of the people. He agreed with Mr. Mault that sanitary agencies were powerful influences in reducing the number of fever cases, but they were not the only ones, and they did not produce such good results as one should like to see. As to what Major-General Tottenham had said about the returns supplied to and used by statisticians not being reliable, the objection cut the ground from the objector's own feet, as he had quoted such statistics himself. (Laughter.) He would, however, be sorry if the effect of his paper would be that decreased attention would be given in Hobart or anywhere else to the importance of sanitation. (Applause.)

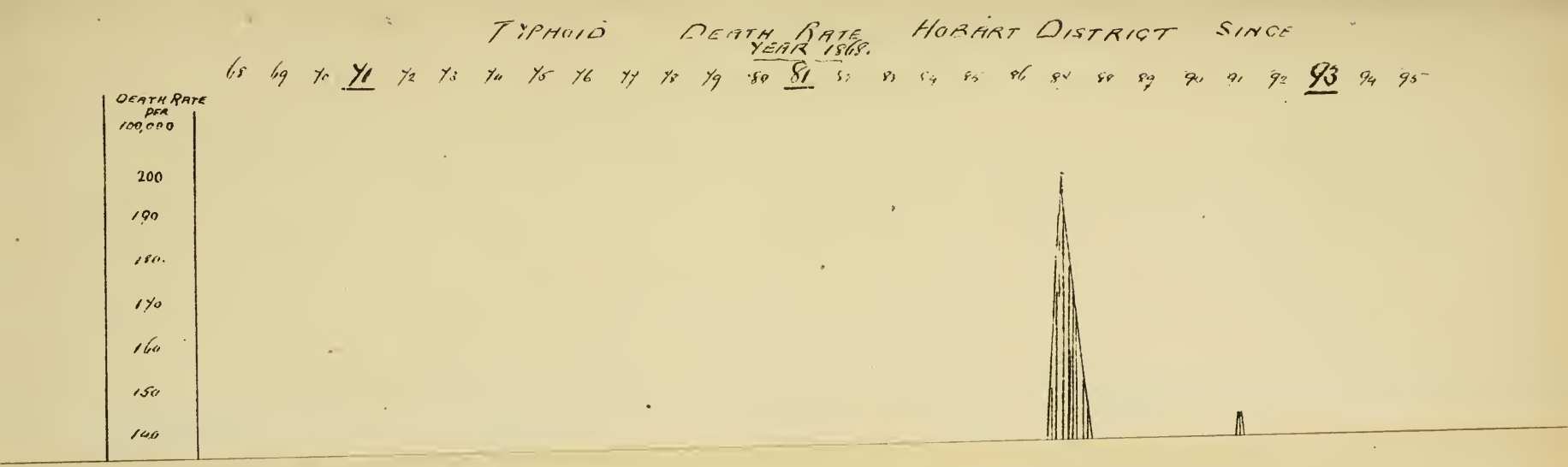

DEATH RATE PERIODICITY OF VARIOUS COUNTRIES COMPARED
YEAR 1840 1850 1860 1870 1880 1890
DEATH RATE
Mean of 13 European States
Sweden
Mean of 7 Colonies of Australasia
Tasmania
Victoria
South Australia
New South Wales
Jupiters Orbit
A. Aphelion
P. Perihelion
Wolfs sun spot periodicity
M. Maximum
P. Minimum
x Unit Number of deaths per 1000 persons living
YEAR 1840 1850 1860 1870 1880 1890
R.M. Johnston.

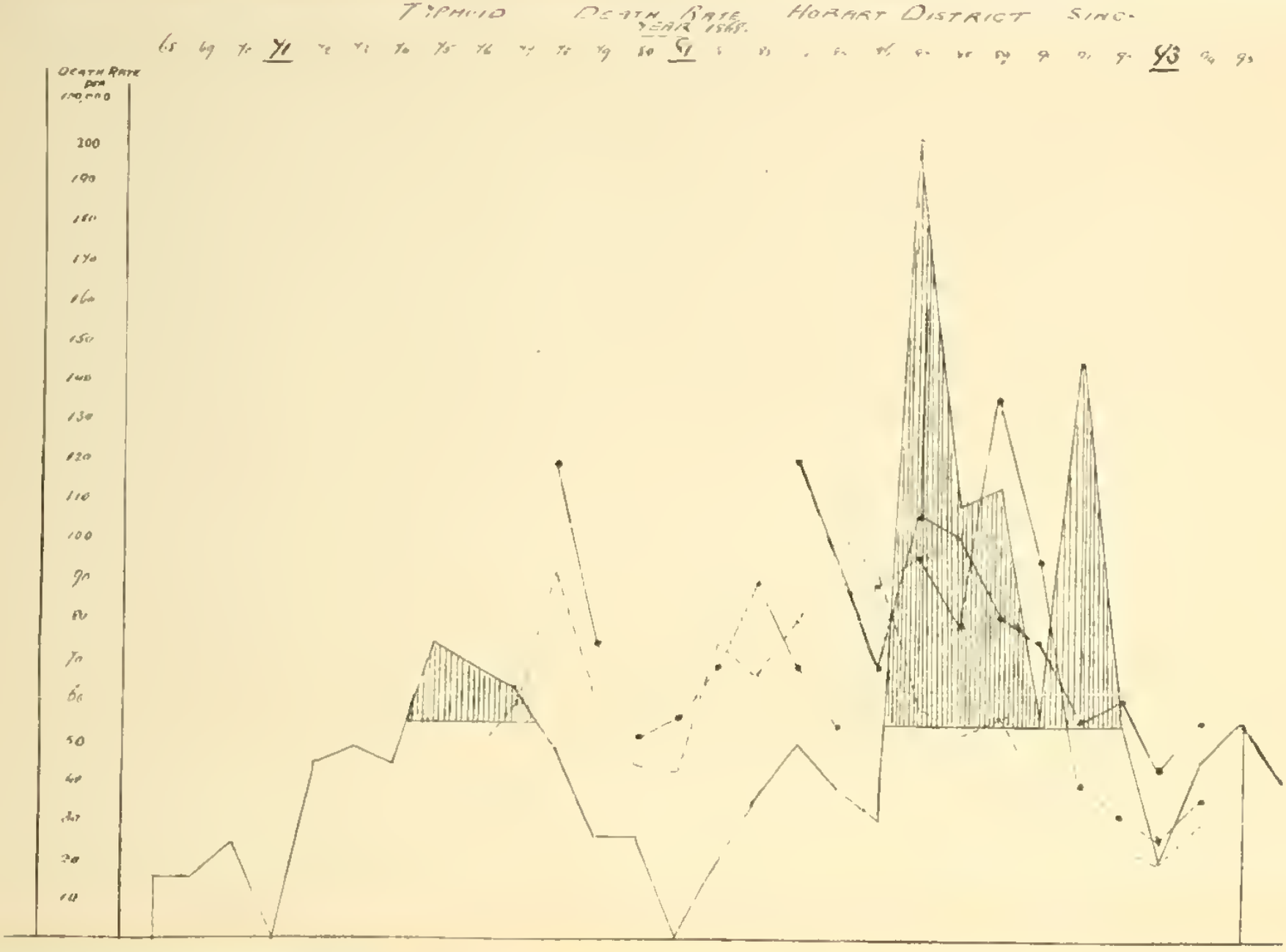
TYPHOID DEATH RATE HOBART DISTRICT SINCE YEAR 1868.

68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95

DEATH RATE PER 100,000

200
190
180
170
160
150
140




TYPHOID DEATH RATE HOBART DISTRICT SINCE YEAR 1865.
DEATH RATE PER 100,000
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10

Typhoid Curves for Five Colonies of Australasia

Since year 1870.