

[Report of the Medical Officer of Health for Westminster].

Contributors

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ANNUAL REPORT
UPON THE
PUBLIC HEALTH & SANITARY CONDITION
OF THE
UNITED PARISHES
OF
St. Margaret & St. John, Westminster,
FOR THE YEAR 1897,
BY
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Medical Officer of Health,
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To the Members of the United Vestry.

MY LORDS AND GENTLEMEN,

I have the honour to place before you my Annual Report on the health, sanitary condition, and vital statistics of the United Parishes, for the year 1897.

METEOROLOGICAL SUMMARY.

FIRST QUARTER.

The mean reading of the barometer was 29·718 inches; the mean temperature of the air 41·1. The amount of rain measured during the quarter was 7·35 inches, and the amount of bright sunshine recorded was 177·3 hours.

In January the weather was generally wet and dull, with very little sunshine; the weather continuing cold for the first few days of February; whilst in March it was cold with frequent rain.

SECOND QUARTER.

The mean reading of the barometer was 29·777 inches ; the mean temperature of the air was 53·1 ; the rainfall was 4·80 inches, and the amount of bright sunshine recorded during the quarter was 574·6 hours.

In April the weather was changeable, with frequent rain towards the middle and at the end of the month ; in May it was mostly dull, with very little sunshine ; in June the weather was generally warm, fine and bright.

THIRD QUARTER.

The mean reading of the barometer during this quarter was 29·779 inches ; the mean temperature of the air was 60·9 ; the rainfall measured 6·29 inches ; and the duration of bright sunshine recorded was 587·0 hours.

In the early part of the quarter the temperature was below the average, but from July 9th to August 11th the weather was fine and warm. From the latter date until September 22nd, the temperature was again below the average, the weather becoming dull and cool, with very little sunshine in September.

FOURTH QUARTER.

During this quarter the mean reading of the barometer was 29·93 inches ; the mean temperature of the air was 46·0 ; the rainfall measured 3·69 inches, and the duration of bright sunshine registered was 203·7 hours.

The weather in the first two months of the quarter was generally dry but dull ; the temperature was below the average until October 13th, but after that date it was in excess until the end of November. In December the temperature was below the average from the 1st to the 5th, and from the 21st to the 26th, but was above during the other parts of the month.

South westerly gales were experienced at the end of November, and at the beginning, middle and end of December.

THE HEALTH OF LONDON DURING 1897.

During the first quarter the death-rate in London was 18·0 per 1,000, excluding deaths of non-Londoners, which occurred in hospitals and other public institutions in London.

During the second quarter the death-rate was 15·1 per 1,000 ; during the third, 18·9 ; and during the fourth, 19·0.

HEALTH OF ENGLAND AND WALES DURING 1897.

During the first quarter of the year the death-rate in England and Wales among males was 19·9, and that among females 17·7, both showing a decrease compared with the averages in the ten preceding first quarters.

During the second quarter the death-rate among males was 17·6, and that among females 15·0 per 1,000. Both death-rates showed a marked decrease compared with the averages in the ten preceding second quarters.

During the third quarter the death-rate among males was 19·1, and among females 16·5. Both showed an increase compared with the averages in the ten preceding third quarters.

During the fourth quarter the death-rate among males was 17·9, and among females 16·0 per 1,000. Compared with the averages in the ten preceding fourth quarters the death-rate of each sex showed a decrease of 1·6 per 1,000 living.

921,104 births and 541,426 deaths were registered in England and Wales during the year 1897. The natural increase of population, by excess of births over deaths, was therefore 379,678, the average annual increase in the preceding five years having been 363,383.

The birth-rate in England and Wales in 1897 was 29·7 per 1,000 of the population, which is equal to the rate in 1896, and lower than that in any other year on record excepting 1894; compared with the average in the ten years 1887-96, the birth-rate in 1897 shows a decrease of 1·0 per 1,000.

The death-rate in 1897 was 17·4 per 1,000, which is lower than the rate in any previous year, excepting 1894 and 1896; compared with the average in the ten years 1887-96, the death-rate in 1897 shows a decrease of 1·2 per 1,000.

The returns issued by the Board of Trade show that 213,450 emigrants embarked during the year, from the various ports in the United Kingdom at which emigration officers are stationed, for places beyond Europe.

BIRTHS AND DEATHS.

The number of births registered during the year 1897, when all the corrections have been made, was 1,238, showing a birth-rate of 22·2 per 1,000 of the population. 317 births occurred in St. Margaret's parish, of which 159 were males and 158 females, giving a birth-rate of 14·4 per 1,000; and 921 births in St. John's parish; of which 486 were males and 435 females, giving a birth-rate of 26·8.

The number of deaths of parishioners duly corrected amounted to 1,005, showing a recorded death-rate of 18·0, and a corrected death-rate of 20·3 per 1,000 of the population. Of these deaths 334 occurred in St. Margaret's Parish, giving a recorded death-rate of 15·5, and 671 in St. John's parish, giving a recorded death-rate of 19·5.

The following comparative table shows the birth and death rates per 1,000 during the past seven years for the United Parishes, viz. :—

YEAR.	BIRTH-RATE.	DEATH-RATE.	
		Recorded.	Corrected for age and sex distribution.
1891	26·8	19·7	22·2
1892	24·7	23·0	26·0
1893	24·4	23·1	26·1
1894	21·9	18·0	20·3
1895	22·9	20·7	23·4
1896	21·9	17·7	21·1
1897	22·2	18·0	20·3

The following table gives the distribution of the deaths of parishioners dying in various institutions and elsewhere, all of which are included in the mortality statistics :—

<i>Institutions.</i>	<i>Deaths.</i>	<i>Institutions.</i>	<i>Deaths.</i>
Asylum—Bethnal House ...	1	Hospital—Royal Chest ...	2
„ Hoxton ...	1	„ for Incurables ...	1
„ Colney Hatch ...	1	„ Charing Cross ...	1
„ City of London... 1	1	„ Brompton ...	1
„ Hanwell... ... 1	1	„ Western Fever ...	8
„ Leavesden ...	1	„ South Western ...	3
„ Middlesex ..	1	„ North Western ...	4
„ Cane Hill ...	2	„ South Eastern ...	1
Hospital—Westminster ..	226	„ Fountain ...	1
„ Station ...	13	Infirmary—St. George's ...	216
„ Grosvenor ...	1	„ Chelsea ...	1
„ St. George's ...	19	„ Workhouse—	
„ Middlesex ...	8	„ St. George's ...	3
„ King's College ...	2	Home—St. Elizabeth's ...	1
„ St. Luke's ...	1	„ St. Joseph's ...	2
„ Victoria ...	2	Friedenheim ...	1
„ Belgrave ...	6	H. M. Prison, Wandsworth	1
„ St. Thomas's ...	5	Elsewhere ...	10
„ St. Bartholomew's	2		

TABLE I., giving the death-rates from certain classes of disease in the district :—

	Years.	Whole District.	St. Margaret's.	St. John's.
1. Chief Zymotic Diseases ...	1894	2·1	1·5	2·4
	1895	1·7	1·0	2·1
	1896	2·0	1·3	2·5
	1897	2·1	0·9	2·9
2. Phthisis... ..	1894	2·3	2·3	2·4
	1895	2·0	1·6	2·2
	1896	2·1	1·8	2·3
	1897	2·5	2·1	2·7
3. Pulmonary Diseases, including Bronchitis, Pneumonia and Pleurisy	1894	4·7	4·6	4·5
	1895	5·6	5·3	5·7
	1896	3·7	3·2	3·9
	1897	2·9	2·8	3·0

TABLE II.—Comparative Table of deaths from the principal zymotic diseases and deaths of infants under one year of age :—

YEARS.	1892.	1893.	1894.	1895.	1896.	1897.
Deaths (Total)	1297	1290	1006	1154	987	1005
Small Pox	—	—	—	—	—	—
Measles	77	5	37	23	17	23
Scarlet Fever	18	25	8	9	10	14
Diphtheria & Membranous Croup	44	14	22	15	22	20
Whooping Cough	20	15	19	13	28	13
Typhus	—	—	—	—	—	—
Enteric Fever	3	7	4	3	10	5
Simple & ill-defined Fever	—	1	—	—	—	—
Diarrhœa	22	43	11	27	28	40
Deaths of Infants under one year of age	233	255	180	246	209	200
Deaths under one year to every 1,000 Births re- gistered	169	188	147	192	171	161

(A₁) TABLE III.—DEATHS during the year 1897 in the Metropolitan Sanitary District of ST. MARGARET, Westminster, classified according to Diseases, Ages,

Sanitary District of ST. MARGARET, Westminster, classified according and Localities.

LOCALITIES. ST. MARGARET.	MORTALITY FROM ALL CAUSES, AT SUBJOINED AGES.							MORTALITY FROM SUBJOINED					CAUSES, DISTINGUISHING DEATHS OF CHILDREN UNDER FIVE.																					
	At all Ages.	Under 1.	1—5.	5—15.	15—25.	25—65.	65 & upwards.	AGES.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22				
FEVERS	Enteric (or Typhoid.)	Continued.	Relapsing.	Puerperal.	Cholera.	Erysipelas.	Measles.	Whooping Cough.	Diarrhoea and Dysentery.	Rheumatic Fever.	Ague.	Phthisis.	Bronchitis, Pneumonia, and Pleurisy.	Heart Disease.	Injuries.	All other Diseases.	TOTAL.																	
Westminster Hos- pital	226	38	33	24	16	104	11	Under 5 5 upwds.	...	...	4	...	...	...	...	...	...	...	...	...	...	8	...	...	1	22	1	5	30	71
									...	...	4	...	...	3	...	...	1	...	1	...	...	...	1	...	8	15	28	15	79	155
Convent	4	1	3	...	...	...	...	Under 5 5 upwds.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	4
												
Rest of Parish ...	188	34	15	2	7	84	46	Under 5 5 upwds.	...	...	2	...	...	...	...	...	...	...	...	3	...	2	...	...	...	3	1	4	34	49
									...	1	1	...	...	...	...	...	1	...	1	...	...	...	...	...	12	26	23	13	61	139
NET TOTAL ...	334	39	24	4	10	153	104	Under 5 5 upwds.	...	1	4	...	...	...	...	...	...	...	...	5	...	3	...	...	...	3	1	4	42	63
									...	1	1	...	...	1	...	...	1	...	2	...	...	...	...	...	45	58	30	18	114	271

The subjoined numbers have also to be taken into account in judging of the above records of Mortality.

Parishioners dying outside parish	141	4	5	2	3	69	58	Under 5 5 upwds.	...	1	2	2	...	1	3	9
									1	1	33	32	7	5	53	132		
Strangers dying in parish...	225	38	32	24	16	104	11	Under 5 5 upwds.	4	8	1	22	1	5	29	70			
									4	3	1	...	1	1	...	8	15	28	15	79	155	

CASES OF INFECTIOUS SICKNESS, coming to the knowledge of the Sanitary Districts of St. Margaret and St. John, Westminster
Ages and Localities.

"Notification of Infectious Disease" has been compulsory in the District since October 31st, 1889. The Isolation Hospitals are the Hospitals of the Metropolitan Asylums Board, and occasionally the London Fever Hospital and the London Small Pox Hospital.

A list of the streets with the number of cases of the principal infectious diseases occurring in such streets, is given below :—

ST. MARGARET'S PARISH.

STREET OR PLACE.	Scarlet Fever.	Diphtheria.	Typhoid Fever.
Albert-gate	—	1	—
Arthur-street	—	1	—
Artillery-row	1	—	—
Ashley-gardens	2	—	—
Broad Sanctuary.....	1	—	1
Broadway	—	1	—
Buckingham-cottages & chambers..	5	1	—
Carlisle-place	—	1	—
Carteret-street	—	2	—
Castle-lane	1	1	—
Catherine-street	—	1	—
Caxton-street	1	1	1
Charles-street	—	1	—
Cobourg-row.....	2	2	—
Dacre-street	—	1	—
Ennismore-gardens	2	—	1
Exhibition-road ..	—	—	1
Francis-street	3	4	—
Great Chapel-street.....	2	3	—
Great George-street.....	3	—	—
High-road.	1	3	—
Howick-place	2	—	—
James-street.....	16	1	2
Lewisham-street	1	—	—
Montpelier-place	1	1	—
Montpelier-row	1	—	—
Montpelier-square	1	—	—
Palace-street.....	1	3	—
Parker-street	3	1	—
Peabody-buildings, James-street ...	5	6	1
Prince's-gardens	—	1	—
Princes-street	—	1	—
Queen Anne's-gate	1	1	—
Raphael-street	1	—	—
St. Ermin's-hill	—	1	—
Stafford-place	1	—	—
Tachbrook-street.....	1	1	—
Trevor-place.....	1	—	—
Vandon-street	—	2	—
Vauxhall-bridge-road	2	4	—
Victoria-street	1	8	2
Willow-place	—	3	—

ST. JOHN'S PARISH.

STREET OR PLACE.	Scarlet Fever.	Diphtheria.	Typhoid Fever.
Alfred-street	—	1	—
Artillery-row	1	—	—
Arneway-street	—	—	1
Bell-street.....	1	—	—
Bennett's-yard.....	—	2	1
Bessborough-gardens	1	—	1
Bessborough-place	6	—	—
Bloomburg-street	1	—	—
Carpenter-street	1	1	—
Chapter-street	1	—	—
Charlwood-street.....	1	—	—
Cobourg-row.....	—	1	—
Dorset-street	2	1	1
Douglas-place	2	—	—
Douglas-street	2	—	—
Earl-street	2	—	—
Esher-street.....	—	1	—
Garden-street	3	2	—
Great Peter-street	6	1	—
Greycoat-place.....	—	3	—
Greycoat-street	—	1	2
Grosvenor-road	2	—	—
Grosvenor-street	1	2	—
Hide-place	1	—	—
Horseferry-road	5	—	2
Hugh-place	1	—	—
Johnson-street.....	1	—	—
Kensington-place	2	—	—
Laundry-yard	2	—	—
Lillington-street	6	1	1
Marsham-street	1	2	—
Medway-street.....	—	—	1
Millbank-street	2	1	—
Monck-street	2	—	—
Moreton-street.....	2	—	—
New-street	—	3	—
North-street.....	1	—	—
Page-street	1	—	—
Peabody-buildings, Old Pye-street.	6	8	1
Peabody-buildings, Orchard-street.	9	3	—
Ponsonby-place	3	—	—
Ponsonby-terrace	2	—	—
Purbeck-place	1	—	—
Regency-street.....	10	1	—
Rochester-row	3	2	—
Rochester-street	—	2	—
Romney-street.....	4	1	2
St. Ann's-lane	—	—	—
St. Matthew-street	1	—	—
Smith-square	2	1	1
Stanford-street.....	2	—	—
Strutton-ground	2	1	—
Tachbrook-street.....	1	3	—
Tufton-street	5	3	—
Vauxhall-bridge-road.....	7	1	1
Victoria-street.....	—	—	1
Vincent-row... ..	—	1	—
Vincent-square	1	3	1
Vincent-street	—	—	1
Winchester-terrace	3	—	1
Wood-street	4	—	—

REMARKS ON INFECTIOUS DISEASES.

Smallpox—(See Table II.)

Not a single case was notified in the United Parishes during the year 1897.

Scarlet Fever.

63 cases were notified in St. Margaret's parish and 126 in St. John's, making a total of 189 (compared with 221 notified in 1896). 14 deaths occurred altogether compared with 10 last year.

A noticeable feature in the Scarlet Fever returns of the Asylums Board Hospitals is the decreasing percentage of the mortality amongst scarlet fever patients.

Several cases occurred in close proximity in children attending St. Mary's Schools, Hide-place, in July, but by keeping a strict watch on and examining the children attending the school from the houses in which the cases occurred, the number of cases speedily decreased.

During the month of September several cases of Scarlet Fever occurred in the married soldiers' quarters, at Victoria House, Francis-street, and Wellington House, James-street. These premises being Government property are out of the jurisdiction of the local sanitary authority, but I communicated with the military doctor in attendance at these buildings and ascertained that he had caused the Wellington Barracks School to be closed, and prohibited the use of a common wash-house, with a view, if possible, to prevent contact of the occupants of these two institutions. The disinfection was carried out by the military authorities. It was partly owing to these cases that the Vestry passed the resolution which will be found in this report headed "Public Health Act and Government Property." The soldiers and their wives were in the habit of going to a neighbouring hostelry for refreshment where two cases subsequently occurred, and in one case, viz., that of a barman, the Vestry found it necessary to prosecute him for travelling by rail to Norfolk when the disease was upon him and when he knew that he was suffering from an infectious disease. He was subsequently fined for so doing.

Return Cases of Scarlet Fever.

Dr. Klein has commenced a series of investigations with regard to a bacteriological study of the desquamating skin of

CHART SHEWING WEEK BY WEEK THE NUMBER OF CASES OF SCARLET FEVER ——— DIPHThERIA ———
AND TYPHOID FEVER ———

Notified by Medical Practitioners as having occurred in the Sanitary District of St. Margaret,
Westminster, during the year 1897.

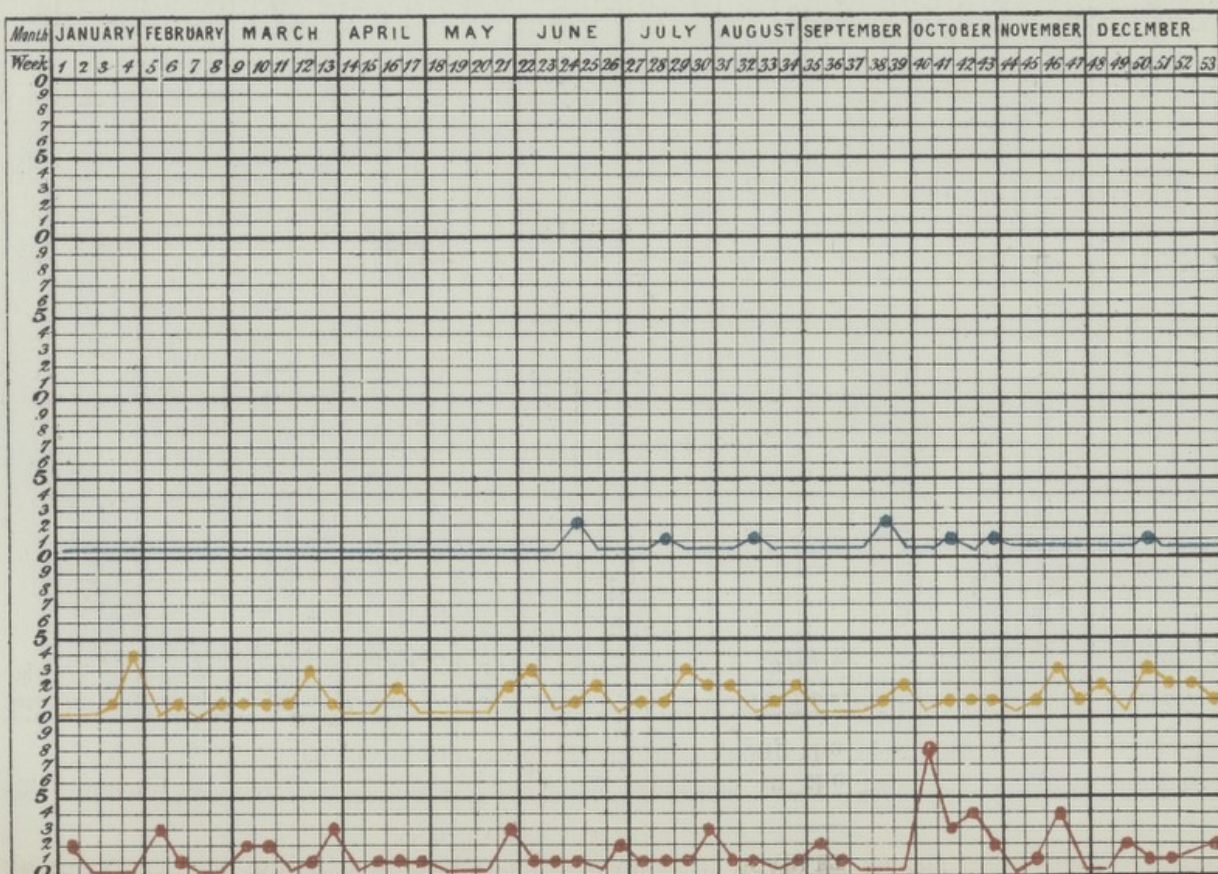
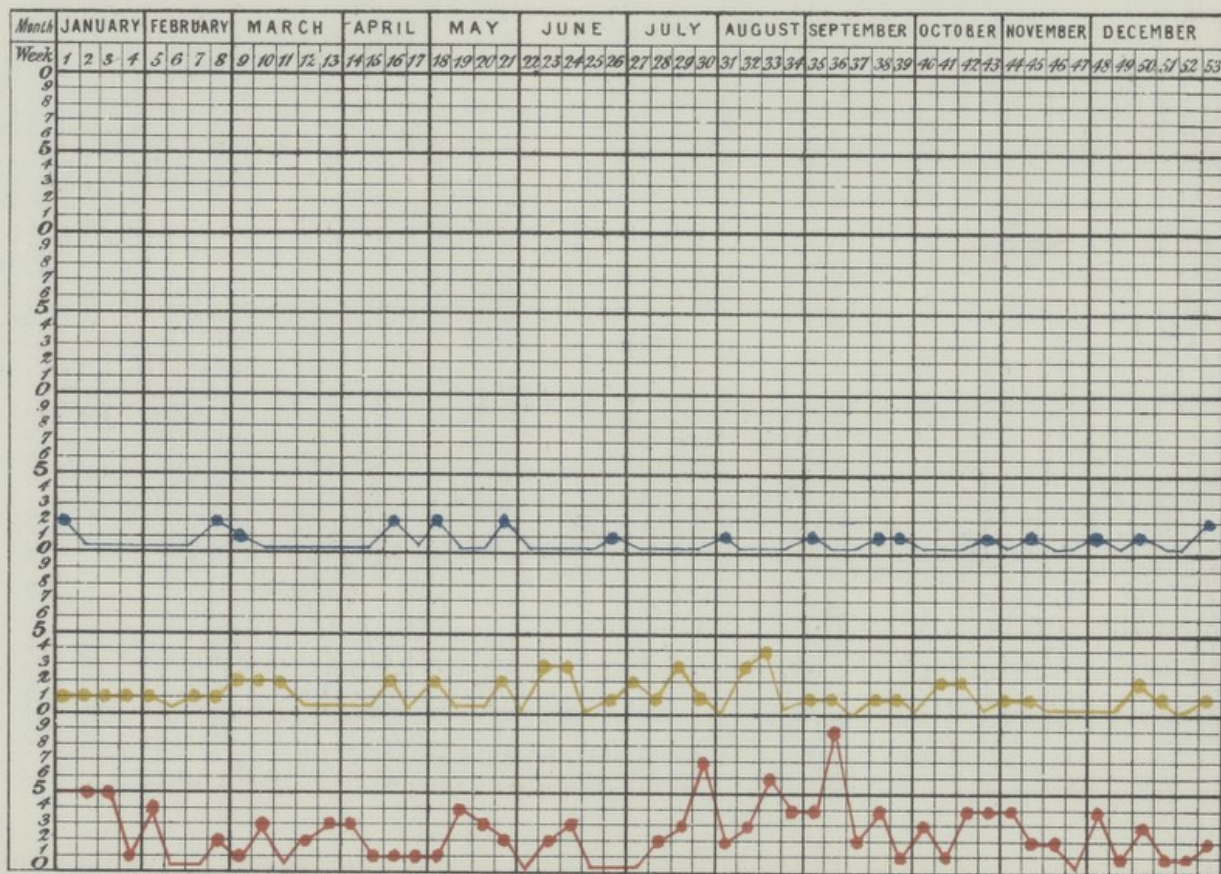
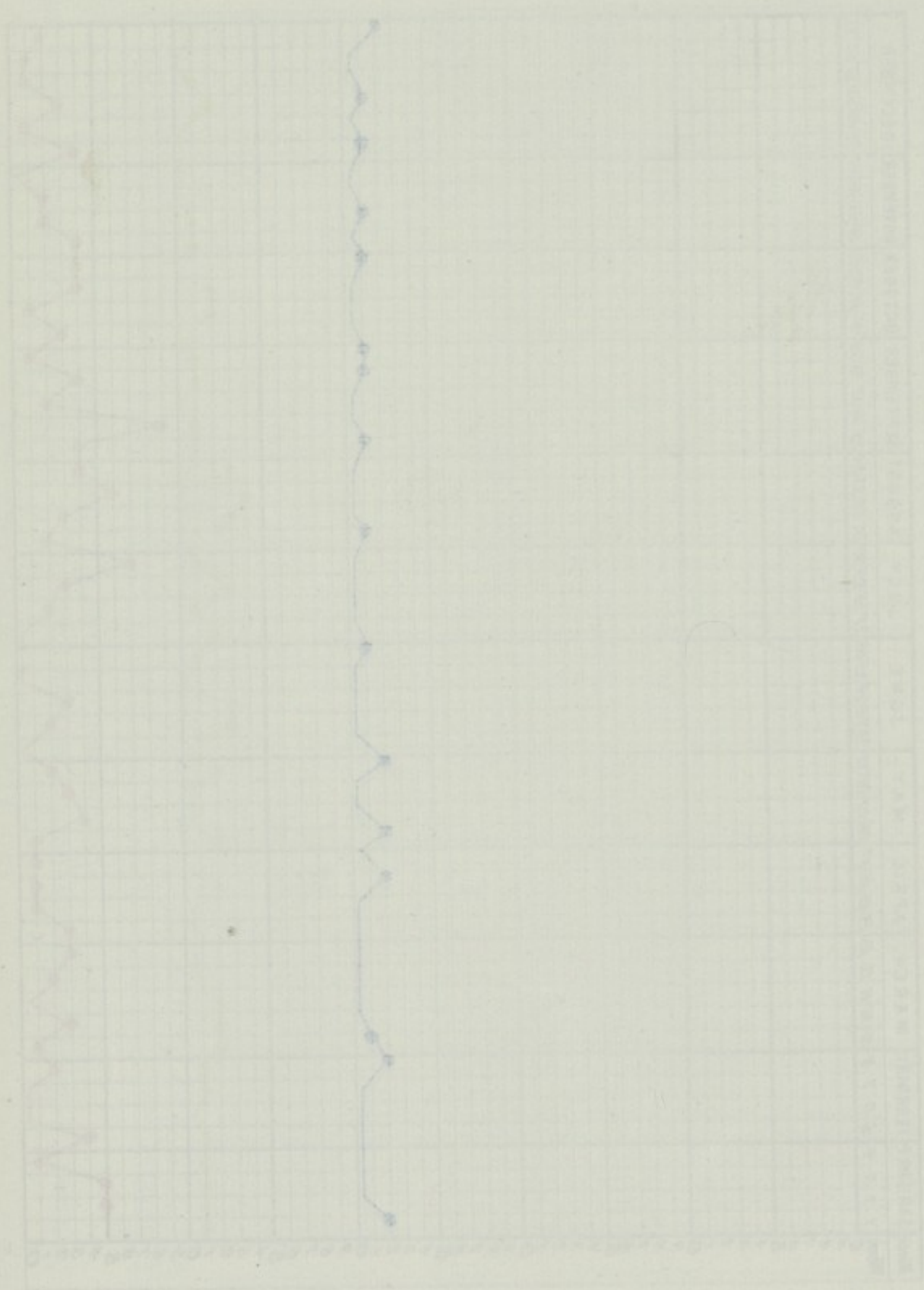


CHART SHEWING WEEK BY WEEK THE NUMBER OF CASES OF SCARLET FEVER _____ DIPHTHERIA
AND TYPHOID FEVER _____

Notified by Medical Practitioners as having occurred in the Sanitary District of St. John
the Evangelist, Westminster, during the year 1897.



Scale of Miles
0 10 20 30 40 50 60 70 80 90 100



persons at various stages of convalescence. He finds that at no stage of the peeling process after scarlet fever has he detected in the cuticle any microbe which could aid in spreading the disease. He is now engaged on an examination of the discharges from the ears and noses of patients suffering from scarlet fever.

Diphtheria.

57 cases of this disease were notified in St. Margaret's parish and 53 in St. John's, making a total of 110 (compared with 106 in 1896). 20 deaths occurred altogether from this disease, as against 22 (including membranous croup) last year.

The Metropolitan Asylums Board report that—

“The decline in the percentage mortality amongst diphtheria patients was from 40·74 in 1889 to 29·29 in 1894 and 22·85 in 1895 (when the anti-toxic serum treatment was first adopted) and 21·2 in 1896.

“Diphtheria, like scarlet fever, is most fatal to infant children. The maximum mortality occurs in the second year of life, when it reaches the high percentage of 56·2, subsequently falling with every additional year of life to the minimum of 3·2 per cent. amongst persons between 30 and 35 years of age.

“The mortality per cent. of females is less than that of males by 2·3.”

They also report, with regard to the reduction in the death rate of diphtheria after the use of anti-toxic serum—

“To a small extent, no doubt, this reduction in the death rate is attributable to the adoption of the bacteriological method of diagnosis, which has resulted in the inclusion of certain mild cases which would not have been regarded as diphtheria on clinical evidence alone. But, even after making allowance for these cases, the result of the use of the new remedy can only be regarded as most satisfactory.

“The ætiology of post-scarlatinal diphtheria is by no means yet fully understood, but, apart from any question of ward hygiene, the admission of unrecognised cases and the relative prevalence of diphtheria in the particular district must neither of them be disregarded as possible factors.”

With regard to the length of time which anti-toxic serum remains good, I wrote to the Clerk of the Asylums Board, and he very kindly informed me, through Dr. Sims Woodhead—

“That there is a slight falling off of anti-toxin going on as soon as it is placed in the small bottles. Although this is not very great it comes to be an appreciable factor by the end of two or

three months; so that it would be well that all anti-toxin should be returned after it has been in stock for a period of three months.

"If, however, the anti-toxin is kept from the light and in a moderately cool place, it should be within 10 per cent. of its original strength at the end of this time."

CONDITIONS UNDER WHICH ANTI-TOXIC SERUM CAN BE SUPPLIED GRATIS TO MEDICAL MEN.

The Clerk of the Metropolitan Asylums Board wrote stating—

"It having been found impossible to receive immediately into any of the Fever Hospitals under the control of this Board the case of diphtheria for whose removal application has been made, I forward herewith a Warrant for the delivery to the Medical Practitioner attending the case, upon application (*not by post*) to the Medical Superintendent of any of the Institutions named on the back thereof, of one bottle of anti-toxic serum for use in the treatment of the patient.

"Before the anti-toxic serum can be obtained, it will be necessary for the certificate at the foot of the Warrant to be signed.

"If a further supply of serum be required, application must be made for another Warrant."

ENTERIC OR TYPHOID FEVER.

During the year 29 cases of this disease were notified, compared with 33 last year. Of these nine occurred in St. Margaret's parish, and 20 in St. John's. Five deaths occurred, compared with ten last year.

I think every sanitary authority has taken to heart the lessons which have been taught during the year by the epidemics of this disease at Maidstone, Lynn, Clifton and Camborne.

Whether enteric fever is solely a water-borne disease or not it seems pretty certain that sewer air will act as a pre-disposing agent even if it is not proved to be in many cases the cause of the disease. In the Maidstone epidemic various opinions are given—one authority maintaining that the cause of the outbreak was a polluted water supply, another that it was caused by the bad drainage of the houses in the town.

Dr. Washbourn, who made a bacteriological examination of the Maidstone water supply, says in his report:—"The difficulties of discovering the typhoid bacillus in drinking water

are so great that it is still a debateable question whether they have ever been surmounted," and adds "on this account and for other reasons our failure to discover the typhoid bacillus in any of the examples examined affords no evidence against the view that the disease was conveyed by water.

In the Clifton outbreak it was found that a number of houses drained into a stream which ran through important dairy farms. The dairy utensils were washed in the water pumped from this stream, and so the milk became infected and hence the outbreak of the disease.

In the annual report of the medical officer of the Local Government Board for 1896-97 is an interesting account, of the action of the typhoid bacillus in soil, by Dr. Martin and Sir Richard Thorne, the latter reviewing the facts of an epidemic of typhoid fever which occurred in Chichester between April and August, 1896, and drawing attention to the steady diffusion of the disease which set in immediately after the appearance of a case in a notoriously insanitary area outside the city. "This prevalence of the fever," he says, "goes to show that enteric fever, though mainly distributed in epidemic form by means of water or of milk, is by no means always a water-borne disease, and it raises anew the question as to how far recurring prevalences of enteric fever in one town or spot can be due to the persistence in more or less active form in certain soils of the organism of the disease."

"Dr. Martin has ascertained that the behaviour of the microbe is very different when in the absence of competing micro-organisms it is implanted in organically polluted soil and in soil from an altogether uninhabited and uncultivated area. In soil of the former sort, as for instance in samples of earth from Chichester, the bacillus rapidly increases and spreads abroad, whereas in the virgin soil under like conditions of temperature and moisture it languishes and quickly dies out."

Many instances have also occurred during the year of cases of typhoid fever having resulted from eating oysters taken from sewage-polluted beds.

Over 20 cases of the disease occurred at Clacton from people eating such infected oysters.

Interesting cases have also been reported by medical men where typhoid fever and other diseases have been acquired by boys playing games, *e.g.*, marbles and peg-tops, on polluted soil, the germs finally finding their way into the interior of the

body by the boys licking their fingers and wetting the string with their saliva.

"Vaccination," against typhoid fever has been performed a great deal during the year, especially upon medical officers of the army and Indian medical services. Eighty-three persons were so vaccinated at the Barming asylum.

Owing to the outbreaks of typhoid fever during the year in various parts of England the Vestry ordered "that a systematic house-to-house visitation be made by the inspectors throughout their respective districts, with special reference to the provisions for storage and supply of water, and in connection therewith to the general condition of the houses inspected; and that periodical reports be made thereon to the Committee."

Erysipelas.

Fourteen cases occurred in St. Margaret's parish and 53 in St. John's, compared with 22 and 54 cases respectively last year. Two deaths occurred in St. Margaret's parish and one in St. John's.

Phthisis and Room-density.

"Dr. A. K. Chalmers, one of the medical officers of health for Glasgow, has recently published a report dealing with the distribution of tuberculous disease in that city, in which he shows that in each district where the phthisis death-rate exceeds the mean, there also the room-density of the district is in excess. By the term "room-density" Dr. Chalmers explains that he has regard not so much to the number of rooms per house, or to the varying cubic space per room, as to the care which is exercised in providing efficient ventilation. He is satisfied that as a general rule, though it is subject to explainable exceptions, the increase or decrease in the death-rate from phthisis varies with the increase or decrease respectively of room-density. The relation, however, between the two may be modified by the presence or absence of other conditions, and probably the room-density must attain a certain degree of intensity before its effect becomes appreciable. Dr. Chalmers considers that it acquires ætiological value only when it also becomes the numerical expression of certain other factors, all tending like itself to produce impurity in the air of dwellings."

The above remarks apply, in many cases, to some houses in Westminster, and the carrying out of the by-laws as to "houses let in lodgings" should go far to lessen cases of phthisis; but unless constant observation be kept on the premises, overcrowding is bound to occur.

No doubt overcrowding is the great cause of phthisis, and statistics show that heredity plays a comparatively small part in this disease—probably only in one tenth of the cases occurring—phthisis being a decidedly contagious disease.

Measles.

Twenty-three deaths occurred from this disease during 1897, compared with 17 last year. The most serious outbreak of measles occurred at St. Mary's schools, Hide-place. On Sept. 26th the epidemic began to show itself in the above schools, mainly in the infants' department.

Eighty - nine children were attacked and ten died, either from the measles or from pneumonia following the disease.

On October 22nd the sickness began to abate and then gradually declined.

The ages of the children attacked ranged from three to seven years.

At one time it was thought advisable to close the schools, but after due reflection and knowing the amount of intercourse which went on between the families of those attacked, and that measles is infectious before the rash appears, I deemed it inadvisable to do so. All due precautions were taken as to disinfecting and the daily examination of the children attending the schools.

Influenza.

Eight deaths occurred from this disease during 1897, viz., five in St. Margaret's parish and three in St. John's. During the last week in December this disease began to be very prevalent again.

PUBLIC HEALTH ACT AND GOVERNMENT PROPERTY.

The following is a copy of a communication addressed by the Vestry to the Government and other Local Authorities in London :—

The Vestry have recently had their attention called to cases in which property, in the occupation of certain of the Government Departments, has been found defective in its sanitary condition, or cases in which public inconvenience and danger have arisen through such property, and the occupants thereof, not being subject to the provisions of the Public Health Act, 1891.

In one instance, a local branch of the Post Office, where a number of clerks were in daily attendance, it was found that there was only one convenience for thirty persons, including both sexes; in another, a public building, attended by hundreds of persons daily, some of whom may have to wait several hours at a time, is not provided with retiring accommodation for females, so that the sanitary conveniences for men have to be resorted to by women; and in a third instance, it is known that cases of scarlet fever, which occur in a large institution, are not notified to the Sanitary Authority, and there is strong evidence that the disease has been conveyed beyond the infected building.

The Vestry are of opinion that the inconvenience and danger in such cases as these are not limited to the occupants of the property of the Government, but directly affect the health of the public at large. The Vestry are also of opinion that much might be done to minimise such inconvenience and danger, without impairing the exemption secured to Government property, by a co-operation between the Executive Departments and the Sanitary Authorities. They have, therefore, addressed a communication to the Local Government Board and Her Majesty's Office of Works, calling attention to the necessity, in the interests of the public health, for access being afforded to the sanitary officers of the Local Authorities to barracks, post offices, military hospitals, factories, and other Government Institutions, as well in reference to cases of dangerous infectious disease, as to water supply, drainage, w.c. accommodation and sanitary conditions generally, with the object of obtaining a systematic co-operation between the Departments having control of the Government buildings and the Sanitary Authorities.

Nearly the whole of the replies received from other Local Authorities in London concurred in the views of the Vestry.

Closing of Public Elementary Schools.

A Memorandum was issued during July, 1897, by the Medical Officer of the Local Government Board, "on the circumstances under which the closing of public elementary schools or the exclusion therefrom of particular children may be required in order to prevent the spread of disease."

Section 1 states the objects of the Memorandum as to which are the best means of preventing the spread of disease by school children among their fellows while avoiding any unnecessary interruption of the work of education.

Section 2 gives extracts from the "Regulations of the Education Department," amongst which are the following two Articles.

Article 88.—"The managers must at once comply with any notice of the sanitary authority of the district in which the school is situated, or any two members thereof, acting on the advice of the Medical Officer of Health, requiring them for a specified time, with a view to preventing the spread of disease, or any danger to health likely to arise from the condition of the school, either to close the school, or to exclude any scholars from attendance, but after complying they may appeal to the Department if they consider the notice to be unreasonable."

Article 83 (a) prescribes that "if a school has been closed during the year under medical authority, or for any unavoidable cause, a corresponding reduction is made from the number of meetings" (400 a year) required.

Article 101 provides that where the Education Department "is satisfied that by reason of a notice of the Sanitary Authority under Art. 88, or any provision of an Act of Parliament, requiring the exclusion of certain children, or by reason of the exclusion under medical advice of children from infected houses, the average attendance has been seriously diminished, and that consequently a loss of annual grant would, but for this Article, be incurred, the Department have power to make a special grant not exceeding the amount of such loss in addition to the ordinary grant."

Section 3 deals with diseases principally requiring action, viz., those which spread by infection directly from person to person, such as diphtheria, scarlet fever, measles, whooping cough, epidemic influenza, small pox and r6theln, and more rarely enteric fever and diarrhoeal diseases have to be dealt with in a like manner.

Sections 5 and 6 deal chiefly with regard to the exclusion of scholars from infected houses, or from particular localities, and as to when the closing of schools is required.

Section 7 deals with the duties of a Medical Officer of Health, when infectious disease occurs and draws attention to the aid which schoolmasters and others can give in such cases.

Section 8 comments on the duration of exclusion from school of particular children and states, "in this matter the Sanitary Authority will doubtless be guided by the advice of the Medical Officer of Health," and goes on to say: "Medical Officers of Health, having to specify a time during which any scholars are to be excluded from attendance at any school, should have regard as far as practicable to the circumstances of the particular scholars suffering from infectious disease or

living in infected households. Not only the nature of the infection and the length of illness, but the environments of the individual as affecting the retention of infection will deserve consideration. The period of exclusion, for example, will need to be different according to the conditions of a patient's lodgment, according to the sufficiency of the separation that can be effected between a patient and excluded scholars, and according to the opportunities of effectual disinfection that can be afforded to the household. Thus a hard and fast rule, such as has been laid down in some districts where scarlatina has been present, that no child shall go to school from an infected house for three months after the disease has begun in that house, is not to be commended. It is indeed possible that under the circumstances of a particular household, a child convalescent from scarlatina or living in the same house with convalescents should not in the interests of other children be permitted to return to school until after so long a period as this; but the same ought not to be assumed of all households in the district that may be invaded by scarlatina. The better plan would be for the sanitary authority to secure, during a shorter period, the exclusion of individual sick persons and their housemates from school; and when that period is about to expire to cause fresh inquiry to be made as to the expediency of further exclusion, and, if found requisite in particular cases, to cause fresh notice to be given to the school managers."

Section 9 says: "In deciding whether an outbreak of infectious disease among children of school age may be best combated by closing the school, or whether it will suffice to exclude the children of infected households, the two most important points to be considered are:—

(a) The completeness and promptness of the information received by the officers of the sanitary authority respecting the occurrence of infectious cases.

(b) The opportunities which exist for intercourse between the children of different households elsewhere than at school."

Section 10 says: "The more prompt and full the knowledge of cases of infectious disease that the sanitary authority are able to obtain, the better will be the prospect of checking such disease by keeping away from school the children of infected households, and the less will be the necessity for closing schools. If the cases be few in number, and their origin known, the exclusion from school of the children of infected households will probably suffice, but this measure will fail where there are many undiscovered or unrecognised cases, or where the known centres of infection are very numerous.

Commonly, the failure of carefully considered measures of exclusion to stay the spread of an epidemic which shows a special incidence upon school children, may be regarded as pointing to the continued attendance at school of children with the prevalent disease in a mild or unrecognised form, and a strong case will appear for the closing of schools.

If by reason of the absence or exclusion of a large number of children, the attendance at a school be greatly reduced, it may be found better to close it altogether. This is especially apt to occur in the case of epidemics of measles, a disease which is very infectious in the early stages, before the characteristic rash has appeared, and while the symptoms resemble those of a common cold."

Section 11 points out that, as a rule, closing a school in a sparsely populated rural district, where the children of different households, or of separate hamlets, rarely meet except at, or on their way to, the village school, the closing of the school is likely to be effectual in checking the spread of disease. It is less likely to be useful in a town, or compact village (particularly where houses are sub-let and yards are in common), where the children of different households when not at school spend their time in playing together, or running in and out of each other's houses.

Section 13 deals with the duty of the Medical Officer of Health in reporting such cases to the Local Government Board, and the grounds for the action he has taken in the matter.

Section 14 states: "All notices of the sanitary authority for the closing of Public Elementary Schools should be addressed in writing to the Managers, and should state the grounds on which the closing is deemed necessary.

All such notices shall specify a definite time during which the school is to remain closed; this should be as short a period as can be regarded as sufficing on sanitary grounds, since a second notice may be given before the expiration of the first, if it should be found necessary to postpone the re-opening of a school. The Managers of schools, after complying with the requirements of the sanitary authority, have the right of appeal to the Education Department, if they consider any notice to be unreasonable."

The Public Health Committee ordered that copies of the above Memorandum be procured and supplied to the Managers of each of the Elementary Schools in the district.

Copies were accordingly sent to the Managers of seventeen Elementary Schools in the United Parishes.

METROPOLITAN WATER SUPPLY.

In the Twenty-sixth Annual Report of the Local Government Board for 1896-97 will be found tabulated the following results from the Report of the Water Examiners appointed under the Metropolis Water Act, 1871, and which should be of interest in view of the Royal Commission appointed to inquire into the best means of dealing with the London water supply.

The United Parishes, of course, are chiefly interested in the Chelsea and West Middlesex Companies from which they derive their supply.

"The population supplied by each of the eight Metropolitan Water Companies on the 31st December, 1896, was approximately as follows"—

East London	...	...	...	...	1,249,363
New River	...	...	...	...	1,169,000
Southwark and Vauxhall	...	...	...	...	804,851
Lambeth	...	...	...	...	657,995
West Middlesex	...	...	...	...	597,157
*Kent	...	...	...	...	505,986
Grand Junction	...	...	...	...	394,696
Chelsea	...	...	...	...	275,290

"The following table represents the bacterial condition of the water issuing from the filter beds of the chief Metropolitan Companies during the year 1896."

Companies.	Chelsea	West Middlesex	Grand Junction	Lambeth	New River	East London
Amount of storage	12 days	5.3 days	3.3 days	6.0 days	2.2 days	15.0 dys
Average thickness of sand on filters	4 ft.	2.75 ft.	2.25 ft.	2.8 ft.	4.4 ft.	2.0 ft.
Average rate of filtration per square foot per hour	1.75 gls.	1.25 gls.	1.63 gls.	2.08 gls.	1.89 gls.	1.33 gls.
Maximum percentage of microbes removed	99.92	99.94	99.98	99.97	100.00	99.93
Minimum percentage of microbes removed	99.62	91.48	84.03	96.45	77.14	97.03
Average percentage of microbes removed	99.86	99.79	99.31	99.81	99.07	99.56

* "This Company supplies only deep-well water, which is delivered in a clear and bright condition to consumers as it is pumped from the wells. It requires neither storing nor filtration."

“The total length of pipes laid by the Metropolitan Water Companies up to the end of 1896 was 5,143 $\frac{3}{8}$ miles.”

During the year 1896 there has again been a considerable extension of the system of constant supply. The total number of houses within the area of the Metropolitan Water Companies having such a supply on the 31st December, 1896, was 719,882, being an increase of 47,074 over the figures for the corresponding day of 1895. Thus, at the end of 1896, about 86 per cent. of the whole number of houses supplied by the Companies were provided with a constant supply, and there were within the Metropolis 1,645 $\frac{1}{2}$ miles of streets in which the mains were charged on the constant system.

With regard to the employment of cisterns for domestic storage, the following are the facts as regards the different Water companies' districts:—

Chelsea Company.—Cisterns are used in the majority of cases.

East London Company.—Cisterns are used in some houses, but there appears to be a great want of proper means of domestic storage.

Grand Junction Company.—Cisterns are in use, and a draw-off tap on the rising main is recommended by the Company for drinking and cooking purposes.

Kent Company.—Cisterns are prescribed by the Company's Act, and are generally provided, but their retention is not now insisted on in the case of small cottage properties.

Lambeth Company.—Cisterns are generally maintained in the better and middle-class houses.

New River Company.—Cisterns for storage are always provided in houses of any size. In small property the abolition of cisterns is sanctioned by the Company by special arrangement.

Southwark and Vauxhall Company.—It is estimated by the Company that forty per cent. of the houses within their district are unprovided with cisterns.

West Middlesex Company.—Cisterns are maintained except in a few courts of very small houses, where standpipes have been erected with satisfactory results.

CLEANSING OF PERSONS ACT.

During the year an Act was passed by Parliament entitled “The Cleansing of Persons Act, 1897,” which permits Local Authorities to provide cleansing and disinfection for persons infested with vermin, without having to go to a workhouse or casual ward.

The chief clause in the Act is the following :—

“On and after the passing of this Act any local authority shall have the power, when in their discretion they shall see fit, to permit any person who shall apply to the said authority, on the ground that he is infested with vermin, to have the use, free of charge, of the apparatus (if any) which the authority possess for cleansing the person and his clothing from vermin. The use of such apparatus shall not be considered to be parochial relief or charitable allowance to the person using the same, or to the parent of such person, and no such person or parent shall by reason thereof be deprived of any right or privilege or be subject to any disqualification or disability.

“Local authorities may expend any reasonable sum on buildings, appliances, and attendants that may be required for the carrying out of this Act, and any expenses for these purposes may be defrayed out of any rate or fund applicable by the authority for general sanitary purposes or for the relief of the poor.”

The Bill, however, places no compulsion on local authorities to carry out this Act. It simply gives them the option of doing so.

The Public Health Committee had this Act placed before them by the Vestry for consideration, and passed the following resolution on it :—

“That the proper officers give effect to the provisions of the act, in the event of any application being made.”

ACT TO AMEND THE LAW RESPECTING METROPOLITAN WATER COMPANIES.

Another Act passed by Parliament and dated August 6th, 1897, is an Act to amend the Law respecting the Metropolitan Water Companies.

The following sections are of interest to local authorities—*Section I. states (Sub-sections 1 & 2) :—*

(1) Any water consumer or any local authority may complain to the Railway and Canal Commission that any of the metropolitan water companies has failed to perform some statutory duty of the company, and the Commission may hear and determine that complaint, and if satisfied of such failure order the company within the time limited by the order to fulfil the duty, and may, if they think fit, by any such order, impose any penalty for such failure which can be imposed under any Act, and enforce any such order in like manner as any other order of the Commission.

(2) If at any time complaint as to the quantity or quality of the water supplied by any of the metropolitan water companies for domestic use is made to the Railway and Canal Commission,

by any water consumer or local authority, the Commission may hear and determine such complaint, and if satisfied that the complaint is well founded, may order the Company, within such reasonable time as is specified in the order, to remove the ground of such complaint, and may enforce such order in like manner as any other order of the Commission, and may award damages to the complainant.

Section II. states :—

A local authority may aid any water consumer in obtaining the determination of any question which appears to the local authority to be of interest to water consumers within the district of such local authority with respect to the rights, duties, and liabilities of any of the metropolitan water companies in reference to the quantity or quality of water supplied or the charges made by them.

INFANT LIFE PROTECTION ACT.

This Act was passed in August, 1897, and supersedes the old Act of 1872.

In the new Act, which came into force on January 1st, 1898, the age of protection is raised from two years to five.

CORONER'S COURT AND MORTUARY.

Summary of work performed during the year 1897.

Number of articles disinfected from the Guards'	
Hospitals 	3,880
Number of articles disinfected from Guards' quarters	417
Number of articles disinfected from the United	
Parishes 	10,646
Number of rooms disinfected 	338
Number of families removed to the Vestry's Recep-	
tion rooms 	25
Number of bodies removed to the mortuary ...	140
Number of inquests held at the Coroner's Court ...	119
Number of bodies to await burial 	21

DISINFECTION BY STEAM.

A further improvement in disinfection by steam has been "adopted in the apparatus with which the disinfection steam-boat, *James Wadsworth*, engaged in the Port of New York, is provided, and which is described by Dr. Alvah Doty, the health officer of the Port, in the August issue of the *American Journal of the Medical Sciences*. It consists in the exhaustion of the air in the chamber so as to produce a partial vacuum before

the steam is admitted ; and it is found that all other circumstances being alike a temperature of 240° (that of the steam in the chamber), is reached in the interior of a mattress or like article in less than three minutes with the vacuum, though without it from ten to fifteen minutes are required.

Ten minutes at 240° destroys the bacilli of plague and anthrax, however protected, with absolute certainty, so that in fifteen minutes from the commencement of the process the steam may be turned off, when the steam exhaust is again set in action, though on the chamber only, until the former vacuum has been restored ; then the air inlet is opened, and the exhaust still acting draws such a powerful current through the chamber that in two or three minutes every trace of moisture has been removed, and wearing apparel may be used again within less than half an hour of its having been given up for the purpose of disinfection."

An interesting discussion on disinfection took place at the Leeds Conference of the Sanitary Institute, held during the year, Dr. Sims Woodhead coming to the conclusion that Hypochloride of Soda and Formic Aldehyde were the two compounds which gave the most satisfactory results.

TABLE VI.—VACCINATIONS DURING THE YEAR 1897.

Primary Vaccinations.			Re-Vaccinations by Public Vaccinator
Public Vaccination.	Private Practitioners.	Total.	
625	432	1,057	5

VACCINATION COMMISSION.

During the year 1897 Appendix VII. to the final report of the Royal Commission on Vaccination has been issued by Dr. Coupland on the outbreak of small-pox at Gloucester during the years 1895-1896. The following conclusions were arrived at as to the lessons taught by the recent epidemic :—

1. The epidemic of small-pox which, during 1895 had been comparatively slight and mild, assumed serious proportions in the months of February to April, 1896, not only in the numbers who were attacked, but in the high rate of fatality and the undue proportion of cases of confluent and malignant type.

2. The main reason for the rapid extension of the disease was the almost simultaneous invasion of many homes through children who were infected whilst attending certain of the public elementary schools.

3. Another reason for the spread is to be found in the inadequacy of the provision for hospital isolation and the enforced abandonment of systematic "quarantine" inspection, both conditions being due to the enormously rapid increase of the attacked, and of the houses invaded by small-pox.

4. The outbreak might probably have subsided earlier had it not been for the fact that reluctance to the hospital became so general.

5. A further reason for the spread and continuance of the epidemic may be found in the position of the hospital and the lack of control in its administration. On the other hand the conditions obtaining in the streets and dwellings most affected were of themselves such as to sufficiently account for the dissemination of the disease by direct contagion.

6. There is no sufficient evidence to support the contention that defective drainage or other insanitary condition was responsible for the development of the disease and for its disproportionate incidence in the South Hamlet. But the conditions which favour contagion were abundantly present, especially the retention of a large proportion of the cases within their homes, and in many instances, also, the impossibility of isolating the attacked within the house.

7. A feature which, as well as the exceptional fatality and severity, characterised this outbreak was the excessively disproportionate incidence of the disease upon young children. Of the whole number attacked (1,979) there were 706 under 10 years, or 35·7 per cent. Of the fatal cases (434) there were, in this age-period, 280 or 64·5 per cent.

8. Of these 706 children, only 26 were "vaccinated" (including one vaccinated three weeks before attack, and one who presented no marks of an alleged primary vaccination in infancy), whilst of the remainder 80 were "undergoing" vaccination when attacked, the vaccination having been performed within 14 days of the onset.

9. This proportion of vaccinated and unvaccinated amongst the *attacked*, 26 to 680, or, for every 100, vaccinated four (nearly), unvaccinated 96, may be compared with the proportions of the same ages and classes amongst those *exposed* to infection. According to the data collected from 899 households there were, under 10 years of age, 1,603, of whom 272 were vaccinated 1,331 unvaccinated, or, for every 100, 17 vaccinated to 83 unvaccinated.

10. There is no escape from the conclusion that the heightened mortality and severity of the epidemic were greatly due to so

large a proportion of *unvaccinated children* being attacked, for :—

- (a) The case-mortality under 10 years of age was 39·6 per cent., amongst the vaccinated 3·9 per cent., amongst the unvaccinated 41 per cent. Had the fatality remained in each class the same as obtained for the whole number at this age, there should have been 11 vaccinated deaths, and 269 unvaccinated. Or had the rate been that which actually obtained amongst the “vaccinated” there should have been only 26 unvaccinated deaths instead of 279, whilst *per contra*, had the unvaccinated rate been general, the vaccinated deaths should have been 11.
- (b) The disparity is quite as marked when the type of the attack is contrasted. For of 507 cases of *severe* attacks (malignant, confluent, indeterminate) there actually occurred only three amongst the vaccinated. Had the proportion obtaining in the whole number been here maintained (4 to 96) there should have been nearly 21 vaccinated attacks. Or if we take the *mild* attacks only, there were 48 at these ages, of which 17 were amongst the 26 vaccinated subjects. There ought to have been only two had the ratio between vaccinated and unvaccinated obtained here as it did for the whole number attacked.

Again, at the “vaccinated rate” (11·5 per cent.) the severe cases amongst the unvaccinated should not have exceeded 82, whilst at the “vaccinated rate” also (65·4 per cent.) the unvaccinated should have yielded 444 mild cases instead of 31.

Similarly, if the “unvaccinated rates” had obtained, there should have been 19 instead of 3 severe attacks amongst the 26 vaccinated subjects and only 1 mild case instead of 17.

Indeed in whatever way the question is regarded it is beyond dispute that small-pox in the vaccinated at this period of life is comparatively infrequent (in Gloucester the attack-rate was 8·8 as compared with 30·2 in the same class at ages 10 years and upwards), and that in those who are attacked the disease is mostly of the mildest form, whereas amongst the unvaccinated at this age the majority of attacks are severe.

11. From which considerations it follows that in the epidemic here under notice the severity of the disease, its high mortality, and its propagation were influenced and promoted by the unduly large proportion of unvaccinated children who were exposed to infection and who were infected.

12. As regards small-pox in the “re-vaccinated” it will be observed that in no fewer than 190 instances were individuals attacked who were said to have been vaccinated more than once. The evidence of re-vaccination, however, is seldom as definite as

is that afforded by a successful primary vaccination, whilst many persons acknowledge that their re-vaccination "did not take." This negative result of the operation was admitted in 62, yet it was not possible to say of the remainder that they had all been successfully re-vaccinated. Again in 86 individuals the re-vaccination had been done within so short a period of the onset of small-pox as hardly to be regarded as of any influence. In point of fact there were only seven persons, all of whom had discrete or mild attacks (including one "inoculated,") whose re-vaccination had been effected within from three months to 14 days of the attacks. In the remaining 35 the re-vaccination in several dated back for many years.

13. Lastly, it is not unlikely that, had Gloucester been better equipped for the emergency, had its sanitary organisation been more on a level with what should be the rule in cities of its importance, the epidemic might not have attained such proportions. Nevertheless, it must in fairness be remembered that the hospital accommodation for infectious diseases at the time of this outbreak was not actually inferior to that recognised as normally adequate for a place of its size (one bed per 1000 of the population), although I am far from thinking that in this matter sufficient provision is generally made. A permanent building, with a resident medical and nursing staff, ought to exist in every sanitary area. In this case the exceptionally sudden outburst of the disease, which spread with the violence of measles among the young, rendered nugatory all the efforts of the authorities to cope with it, and these very efforts to attempt general isolation, when the means for such a measure became inadequate, led, unfortunately to conditions that tended to neutralise the effect of the extended provision which eventually was made."

FACTORY AND WORKSHOPS ACTS.

The workshops generally in the six Wards have been inspected, and most of the sanitary arrangements were found to be satisfactory.

Notice was received from H.M. Inspector of Factories as to the occupation of a new workshop.—On inspection, the premises were found to be in a cleanly condition. The w.c. accommodation for females at the Steam Laundry in Vauxhall-bridge-road was found defective and has been remedied.

Underground Rooms.

Notices were served in eight cases of underground rooms being illegally used as sleeping rooms

WARDS 1 AND 3, ST. JOHN.

Bye-Laws as to Cleansing and Covering Cisterns used for Storage of Drinking Water.

It was found necessary to take legal proceedings in three cases under this Bye-Law, fines and costs amounting to £7 16s. 6d. being imposed.

Attorney-General v. Brownrigg.

A letter was received by the Vestry dated February 24th from Mr. Warrington Rogers, as follows :—

re Appeal against so much of Judgment of Mr. Justice Kekewich as related to Insanitary Nuisance.

I beg to inform you that this matter came before the Court on Thursday last, when the appeal was allowed, the Judges finding by way of declaration in favour of the Vestry, that Sir H. Brownrigg was legally bound to prevent the land in question from continuing to be a public nuisance, and that the Attorney-General was entitled to the injunction to enforce the performance by him of such duty, liberty to the Attorney-General to apply to the Judge for such injunction, if necessary, the Defendant to pay the cost of the action, so far as it was dismissed against the Defendant without costs, and also to pay the costs of the appeal.

Bye-laws with respect to house drainage.

The Works Committee received a letter from the London County Council, dated 18th December, 1896, forwarding draft of bye-laws with respect to house drainage, proposed to be made under section 202 of the Metropolis Management Act, 1855, and intimating that any observations which the Vestry, with whom the enforcement of the bye-laws within the parish would rest, may wish to make, should be forwarded by the 16th January, but adding that the draft had been the subject of very careful consideration and of long correspondence with the Local Government Board, and that the Council would probably not be able to make numerous and material alterations at that time.

In connection therewith, the Committee received a letter from the Islington Vestry, dated 12th January, transmitting copy of a letter addressed to the County Council, urging the necessity of further time for consideration; and a letter from the Kensington Vestry, dated 14th January, with copy of a letter addressed by them to the Local Government Board, requesting that confirmation of the proposed bye-laws should be withheld until the local authorities have had

reasonable opportunity of submitting any representations they may wish to make thereon.

The Committee expressed regret that the local authorities were not consulted during the time the Council were in correspondence with the Local Government Board, so that the then intimation that any material alterations would be deferred, might have been avoided. The Committee did not find, from the surveyor's report, that any important departure from the present practice was provided for by the bye-laws, and did not, therefore, offer any comment thereon.

Later on a letter, dated February 23rd, 1897, was received from the Vestry of St. Mary, Islington, enclosing a copy of their suggestions upon the drainage bye-laws proposed to be made by the London County Council under section 202 of the Metropolis Local Management Act of 1855, and expressing the hope that this Vestry would see their way to submit similar observations; also a letter from the Incorporated Association of Municipal and County Engineers, dated 25th February, forwarding a copy of suggested amendments, alterations and additions.

Understanding that the latter had been prepared by the surveyors to the several metropolitan sanitary authorities, and that the adoption of the same would secure uniformity of practice,

The Committee ordered that such amendments be sent to the County Council as the proposals of the Vestry.

NOXIOUS FUMES AND BLACK SMOKE.

43 observations were made in respect of black smoke issuing from various shafts in St. Margaret's Parish—but no summonses were required to abate the same—the effect of the service of notices being to keep the offenders careful for a time. A large number of the observations were upon the Army and Navy Stores premises, and eight other places, including the Queen Anne's Mansions.

VACANT PLOTS OF LAND.

These exist in the following places, owing to the houses having been voluntarily closed or pulled down:—

Corner of Moreton-street and Garden-street.
Chapter-street, corner of Frederick-street.
Regent-gardens.

Brunswick-place.
 Vincent-place.
 George's-place.
 Chapter-street, Douglas-street and Hide-place.
 Ship-court.
 Paradise-place.
 Douglas-gardens, Emery-cottages and Douglas-street.
 Gulston-cottages and Causton-street.
 Vauxhall-bridge-road and Bloomburg-street.
 Coburg-row.
 Old Rochester-row.

From 18 to 20 houses in Parliament-street will shortly be demolished, and already several have been razed to the ground. The remaining buildings will be dealt with as soon as the purchases have been completed.

HOUSING OF THE WORKING CLASSES ACT, 1890.

The owners of Nos. 1, 2, 3 and 5A, Chapel-place, were summoned under this Act. Nos. 1, 2 and 3 were closed, and after they had been thoroughly repaired the Vestry consented to the re-opening of the said premises. With respect to No. 5A, the owner, with the consent of the Vestry and upon payment of costs, obtained an adjournment, as he was actively engaged in large structural alterations to the premises, and upon the adjournment the summons was withdrawn, the house having, in the interval, been thoroughly renovated.

For the house known as 21, Francis-street, an order was obtained closing the premises, but the occupier refused to quit, and was, in consequence, summoned. She did not appear, and was therefore arrested and remanded. Upon the day of remand the case was withdrawn, since, in the interval, her children had been taken charge of by the Society for the Prevention of Cruelty to Children. The furniture was removed from the house, which was subsequently closed.

King's Head-court.

Under the above Act, Nos. 1, 3, 5, 7, 9, 11, 15, and 2, 4, 6, 8, 10, 12, King's Head-court, have been closed, and have since been demolished, being unfit for human habitation.

Three cottages in the rear of Nos. 15, 17 and 19, Chadwick-street, were also closed under the above Act.

No. 72, York-street, being unfit for human habitation, was closed, but *without* a summons being taken out, the lessee giving up his lease.

Bye-laws as to houses let in lodgings.

The Public Health Committee received a letter from the London County Council, dated 21st December, forwarding copy of a report by their Public Health Committee on the enforcement of bye-laws as to houses let in lodgings in the several sanitary districts of London, together with certain resolutions thereon passed by the Council, and also copies of a report on the question by the Council's medical officer of health.

The Council's report stated that "Westminster is illustrative of a district which has seriously addressed itself to the work within recent years. The results in Westminster are particularly striking, and should serve to encourage other authorities."

During the year the inspection of these houses has taken up a considerable amount of time, and much good work has been done. In many cases the drainage has been entirely re-constructed and additional w.c. accommodation provided for the lodgers in these houses.

In two cases, for failing to comply with the bye-laws, proceedings were taken, and fines amounting to £7 and 21s. costs were imposed.

Several other houses have been registered in the various wards of the parishes during the year.

Houses closed under the Public Health (London) Act, 1891.

No. 30, Johnson-street.

No. 52, Regency-street.

The former has been put into a proper state of repair, and the closing order has consequently been rescinded.

Unsound Food.

During the year the following articles of food have been condemned and destroyed:—

Mutton	...	...	...	2,717 lbs.
Beef	...	...	...	1,249 lbs.
Lamb	...	...	...	154 lbs.
Pigs' Kidneys	...	...	...	1 barrel.
Plaice	...	...	...	3 trunks.
Whelks	...	...	...	1 bag.
Skate	...	...	...	4 boxes.
Herrings	...	...	...	2 „
Haddock	...	...	...	1 box.
Soles	...	...	...	2 boxes.
Strawberries	...	...	...	10 boxes.
Apples	...	...	...	1 barrel.
Turkeys	...	...	...	2

Removal of fish offal

In consequence of complaints having been made to the Public Health Committee by tradesmen, of the difficulty experienced in obtaining the removal of fish offal produced on their premises, the Committee ordered, with a view to obviating the difficulty,

That subject to the observance of the bye-laws applicable thereto, and upon receipt of a written request in each case, facilities be afforded tradesmen for shooting fish offal into barges at the Vestry's wharf, Grosvenor-road, and that it be left to the surveyor to make and collect a charge at the rate of three pence per bushel, with a minimum of three pence, for the refuse so deposited at the wharf.

Bye-laws as to Paving and Drainage of Stables; Removal of Offensive Refuse, &c., under Sec. 16, P.H.L. Act, 1891.

In many instances, owners of stables have complained of their inability to get contractors to remove stable manure. The Public Health Committee directed that proceedings be taken in six cases for non-removal of manure, when the magistrate made a prohibition order in each case.

For failing after due notice to provide proper paving and drainage to stables, proceedings were taken in three cases. The stables in question, however, having been vacated previous to the hearing, the summonses were withdrawn on payment of the costs.

WATER SUPPLY TO NEWLY ERECTED HOUSES.

Wards 1 and 2, St. Margaret.

During the year only one certificate has been granted under Section 48 of the Public Health (London) Act. An application for a certificate was refused by the Public Health Committee on account of the house being already occupied. The applicant was eventually summoned and fined.

Wards 1 and 3, St. John.

Forty-three certificates have been granted in respect of premises newly erected in these districts.

Ward 3 St. Margaret, and Ward 2 St. John.

Three certificates have been granted under Section 48 of the Public Health (London) Act to premises newly erected, authorising the owners to occupy the premises, viz.:—

Broadway Sanctuary Chambers;

9, Dartmouth-street;

1, Little Dean's Yard;

all being supplied from the mains of the Chelsea Water Works Co.

BAKEHOUSES.

The bakehouses in the various Wards have been periodically inspected during the year, and various defects remedied. The bakehouses have been lime-whited and cleansed, and the cisterns in connection therewith cleansed; and many have had the covers repaired where it was found necessary. In many cases the owners' attention had to be drawn to accumulations of dirty flour and dust under the troughs, which were cleared away eventually.

DAIRIES, COWSHEDS, MILKSHOPS, SLAUGHTER-HOUSES, &c.

These premises have all been frequently inspected during the year, and the cleansing and lime-washing have been carried out in a satisfactory manner.

In several oil shops it was found necessary to call the attention of the owners to the way in which small quantities of milk for sale were exposed. Paraffin oil and coals were stored in close proximity to open vessels containing milk without any protection whatever.

In most of these cases the owners said they merely kept a few pennyworths of milk to oblige their general customers. A letter was sent to the London County Council, drawing attention to these oil shops.

SALE OF FOOD AND DRUGS AND MARGARINE ACTS.

During the year the following samples have been purchased for the purpose of analysis; and in addition one sample of musk drops (sweets) was submitted by a parishioner, and

analysed and certified as being free from any injurious ingredient :—

Articles Purchased.	No. of Samples.	Genuine.	Adulterated.	Fines.			Costs.		
				£	s.	d.	£	s.	d.
Arrowroot	6	6	—	—	—	—	—	—	—
Butter.....	21	16	5	13	0	0	3	2	6
Carbonate of Soda	3	3	—	—	—	—	—	—	—
Cocoa	3	3	—	—	—	—	—	—	—
Coffee	12	7	5	1	0	0	0	12	6
Cream of Tartar	6	6	—	—	—	—	—	—	—
Gregory's Powder	3	1	2	—	—	no	—	—	action.
Lime juice and Glycerine.....	3	—	3	—	—	no	—	—	action.
Milk	18	17	1	2	0	0	0	12	6
Milk of Sulphur	6	6	—	—	—	—	—	—	—
Mustard	3	2	1	—	—	no	—	—	action.
" Prescription ".....	3	3	—	—	—	—	—	—	—
Seidlitz Powders	3	3	—	—	—	—	—	—	—
Spanish Liquorice.....	3	3	—	—	—	—	—	—	—
Sugar, Demerara	6	4	2	1	10	0	1	1	0
Sweets (musk drops)	1	1	—	—	—	—	—	—	—
Sweet Spirit of Nitre	3	2	1	1	0	0	0	12	6
Tea	3	3	—	—	—	—	—	—	—
Vinegar	3	3	—	—	—	—	—	—	—
Total.....	109	89	20	18	10	0	6	1	0

Worthy of notice in the Twenty-sixth Annual Report of the Local Government Board is the working of the Sale of Food and Drugs Act, which shows that in 1877, 19·2 per cent. of the samples analysed were condemned, whilst during the official year ended just over 9 per cent. of the samples taken were condemned. Whilst in London 17·7 per cent. of the samples of milk taken were found to be adulterated, the figure was 9·1 for the rest of the country. Sunday is the great day when milk is adulterated, and no fewer than 47½ per cent. of the samples taken in London on that day were found to be adulterated.

As the Local Government Report says, "The only way to extinguish adulteration is by rendering it unprofitable."

Various interesting prosecutions have taken place in the metropolis and elsewhere during the year under the Sale of Food and Drugs Act. The Islington Vestry prosecuted a grocer for selling cotton seed oil when asked for olive oil. The defence was that it was marked "Sublime salad oil," and that salad oil included cotton seed, olive, and other oils; and that

it was not a drug, not a medicine for internal or external use, and they were summoned for selling it as a drug.

The magistrate decided against the Vestry, holding that it was a food and not a drug.

In another case at Woking, a druggist was summoned for putting carbonate of magnesia into "Gregory Powder" instead of the more expensive oxide. The bench dismissed the case, holding that the article sold was not to the detriment of the purchaser.

In another case, a tradesman was fined for selling butter containing 9 per cent. of boracic acid.

LEGAL PROCEEDINGS.

INSPECTOR DEE.

Fifteen summonses were taken out during the year—two under the Food and Drugs Act, one of which was dismissed without costs, and in the other case the defendant was fined twenty shillings, and had to pay 12/6 costs. Seven cases were taken out under the Public Health (London) Act and six under the Housing of the Working Classes Act. The sum of £7 3s. 6d. costs and fines was recovered, the Vestry being successful in every case.

INSPECTOR MACNAIR.

<i>Cases.</i>	<i>Fines and Costs.</i>		
	£	s.	d.
Failure to remove manure from mews	0	15	0
Dilapidated state of house (closing order made) ...	0	12	6
Ditto do. do. ...	0	12	6
Defective paving and drainage of mews (order made to pave and drain)... ..	0	2	6
Dirty condition of drinking water cistern ...	0	3	6
Failing to remove manure from yard (prohibition order made)	0	5	0
Obstructing thoroughfare	0	12	0
Two houses, defective condition of drains, w.c. and water supply apparatus (closing order made)	0	8	6
Occupying stables without proper paving or drainage. Summons withdrawn, stables having been vacated.	—		
House let in lodgings failing to keep house in proper condition, and defective cover to drinking water cistern	5	10	6

	£	s.	d.
Three cases defective paving and drainage to mews	1	6	6
Erecting w.c. contrary to bye-laws	0	11	0
Cistern in dirty condition and not properly covered	2	3	0
House let in lodgings, defective w.c. accommodation and drainage	2	10	6
Two cases selling yellow crystals as Demerara sugar	2	10	6
Adulteration of mustard (defendant died previous to hearing of summons).	—	—	—

Total ...£18 3 6

INSPECTOR KIRK.

26 summonses have been taken out by order of the Public Health Committee, the following tabulated statement showing the result of those proceedings :—

Number of Summons.	Act of Parliament or Bye-law under which proceedings were taken.	Offence.	Result.	Fine.	Costs.
16	Housing of the Working Classes Act	Premises unfit for human habitation	Vestry's action upheld	...	£2 2s.
1	Do. do. ... Public Health (London) Act	Do. do. ... Premises occupied without a water supply	Do. ... Summons dismissed	...	£1 1s.
2	Bye-laws of the London County Council	Premises without w.c. accommodation	Do.	—	—
2	Do. do. ... Metropolis Local Management Act	New w.c. fixed without notice to Vestry Clerk	Summons withdrawn	Cost of summons paid by defendant, 2s.	—
2	Sale of Food and Drugs Act	Obstruction of public footway	Vestry's action upheld	2s.	4s.
5	Do. do. ...	Adulteration of butter with 40 per cent. of foreign fat	Do. ...	£5	12s. 6d.
	Do. do. ...	Selling margarine for butter	Do. ...	£1	12s. 6d.
	Do. do. ...	Do. do. ...	Do. ...	£1	12s. 6d.
	Do. do. ...	Do. do. ...	Do. ...	£3	12s. 6d.
	Do. do. ...	Adulteration of butter, 70 per cent. margarine	Do. ...	£3	12s. 6d.
26			Total ..	£13 2s.	£6 11s. 6d.

The summonses taken out in respect of a want of proper water closet accommodation and proper water supply at No. 8, Bridge-street, was dismissed by the Magistrate after his visiting the premises, on the grounds that although from many points of view the premises in question were separate yet they were in the occupation of one tenant who was also tenant of the adjoining premises, these premises being accessible by a doorway cut through the party wall, and, inasmuch as efficient w.c. accommodation and water supply were provided in those adjoining premises, he considered that all the requirements of the Bye-laws had been complied with, and that he felt compelled to dismiss both summonses.

INSPECTOR DEE'S

Report for the Year ended January 1st, 1898.

Wards Nos. 1 and 2 St. Margaret.

Inspections made	...	...	...	...	...	982
Defects found	...	...	...	...	...	1,112
Notices served	...	...	...	...	...	712
Works completed	...	...	...	...	...	703
Notices outstanding, 1896	...	...	...	...	...	52
Notices uncompleted, January 1st, 1898	...	...	...	...	...	61
Re-inspections made	...	...	...	...	...	1,477
Intimations, &c., served in respect of the undermentioned matters :—						
Water closets	...	...	...	...	...	315
Drains, new or repaired	...	...	...	...	...	206
Water apparatus repaired	...	...	...	...	...	109
Dust receptacles provided or repaired	...	...	...	...	...	49
Premises cleansed	...	...	...	...	...	53
Overcrowding abated	...	...	...	...	...	9
Underground rooms found illegally occupied, and nuisance abated	...	...	...	...	...	3
Premises provided with proper means of ventilation	...	...	...	...	...	4
Yard paving repaired	...	...	...	...	...	30
Limewhiting carried out	...	...	...	...	...	14
Bakehouses ordered to be cleansed	...	...	...	...	...	4
Houses in which infectious disease occurred	...	...	...	...	...	106
Animals improperly kept (nuisance abated)	...	...	...	...	...	3
Accumulations of manure and refuse removed	...	...	...	...	...	74
New receptacles for manure provided	...	...	...	...	...	5
Black smoke	...	...	...	...	...	43
Miscellaneous nuisances abated	...	...	...	...	...	85
Total						<u>1,112</u>

INSPECTOR MCNAIR'S

Report for the Year ended 1st January, 1898, for Wards
1 and 3, St. John.

Number of new inspections made	...	...	...	1,033
„ re-inspections made	...	...	...	1,546
Total	...	...	...	2,579

Notices brought forward, 1896	...	...	...	55
Number of Notices served	...	...	...	743
„ Houses in which work is completed	...	...	...	714
Notices not complied with at end of year	...	...	...	78

Written Intimations, Notices, &c., served in relation to the
undermentioned matters, viz. :—

Water closets	...	...	...	...	...	165
Drains	...	...	...	...	...	256
Water apparatus	...	...	...	...	...	118
Dust receptacles...	...	...	...	...	...	145
Premises in an uncleanly condition	...	...	...	...	...	241
Overcrowding	...	...	...	...	...	11
Underground rooms illegally occupied	...	...	...	...	...	2
Premises improperly ventilated	...	...	...	...	...	30
Yard paving	...	...	...	...	...	67
Limewhiting	...	...	...	...	...	191
Stables, cowsheds, slaughter-houses and bakehouses	...	...	...	...	...	8
Houses in which infectious disease has occurred	...	...	...	...	...	107
Animals improperly kept	...	...	...	...	...	68
Accumulation of manure, refuse, &c.	...	...	...	...	...	54
Receptacles for manure...	...	...	...	...	...	16
Registration of houses let in lodgings...	...	...	...	...	...	4
Miscellaneous	...	...	...	...	...	236
Total	...	...	...	...	...	1,719

INSPECTOR KIRK'S

Report for the Year ended 1st January, 1898, for Wards
No. 3 St. Margaret, and 2 St. John.

Notices brought forward from 1896	...	...	...	49
Inspections made	...	...	...	1038
Re-inspections made	...	...	...	1494
Defects found	...	...	...	1293
Notices served	...	...	...	712
Works completed	...	...	...	679
Notices not complied with at end of year	...	...	...	82

The following nuisances have been abated, and defects remedied upon notices served :—

Water closets (new fixed and old repaired) ...	121
Drains (new laid, repairs, and stoppages cleared) ...	72
Water apparatus	27
Dust receptacles	54
Premises in an uncleanly condition	361
Overcrowding	18
Underground rooms illegally occupied	3
Premises improperly ventilated	15
Yard paving... ..	57
Limewhiting of yards	98
Houses in which infectious diseases occurred ...	130
Bakehouses	5
Animals improperly kept	3
Accumulations of manure, &c.	57
Receptacles for manure	1
Black smoke... ..	7
Registration of houses let in lodgings	2
Miscellaneous	180
Total ...	<u>1,211</u>

I remain,

My Lords and Gentlemen,

Your obedient Servant,

JOHN NORTON, M.D., D.P.H., M.R.C.S.,

Medical Officer of Health.

FEBRUARY, 1898



W. H. D. Edmunds' Comp

WES 86

YEAR 1897.

APPENDIX TO REPORT OF PUBLIC ANALYST.

REPORT

UPON

MILK SAMPLE "No. 53"

AND

The Prosecution thereon ordered by the VESTRY OF
ST. JAMES'S, WESTMINSTER, October, 1897.

BY

DR. EDMUNDS, *Public Analyst.*

[*Printed by Order of the Public Health Committee.*]

London:

WIGHTMAN & Co., The Westminster Press, Regency Street, S.W.

1898.



YEAR 1897.

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INTRODUCTORY NOTES.

This milk was taken on behalf of the Vestry of St. James's, Westminster. The sample was divided into three portions, which were analysed by three different Analysts, and their certified results are tabulated at pages 4-5. It will be seen that :—

1. All the certificates agreed as to the percentage of total milk-solids contained in the sample. All agreed that the sample had been adulterated with water.

2. In regard to the proportions of the fatty and non-fatty milk-solids, the certificates by myself and the Government Laboratory agreed. But the Vendor's Analyst allotted a larger proportion to the fatty, and a smaller proportion to the non-fatty solids.

3. In regard to the percentage of added water, the certificates all varied.

As between myself and the Government Laboratory, this variation arose from comparing the adulterated sample with different standards of milk. This being an unreal difference, it disappeared when the sample was compared with the same standard of milk.

The Vendor's Analyst certified for a larger percentage of added water. This arose from his having allotted a larger proportion of the milk-solids to fat, and a smaller percentage to the non-fatty solids upon which he judged the milk.

4. The standards of comparison used by the Vendor's Analyst and the Government Laboratory were the same,

i.e., a bottom limit milk, containing 8.5 % of non-fatty solids. But neither of these certificates set out the standard with which the adulterated milk had been compared.

My certificate stated that the sample contained "12 % of added water—good average milk being taken as containing 12½ % of milk-solids." The Government Analyst, taking as standard the poorest milk that escapes being condemned as adulterated, certified that the sample contained "not less than 3 % of added water." The Vendor's Analyst, taking the same poorest milk as standard, but estimating the non-fatty solids at a smaller percentage, certified that his client's "sample was adulterated with not less than 9 % of added water." Thereupon, the Defendant did not produce to the Magistrate the certificate from his own Analyst, but he sheltered himself behind the more favourable certificate given from the Government Laboratory. And he did not "tender himself or his wife to be examined on his behalf," as he is privileged to do under the Act. Thus the learned Magistrate had before him no evidence, except the two written certificates from myself and the Government Laboratory.

5. The certificate of the Government Laboratory having omitted to specify the standard of milk with which the adulterated samples had been compared, the Magistrate had no data for comparing the two certificates. The prestige of the Government Laboratory inclined him to think that the milk "contained 3 % of added water or thereabouts." He would probably have dismissed the summons had not the solicitor for the Vestry then tendered evidence proving a previous conviction of the defendant for adulterating milk with 20 % of water. Thereupon the learned magistrate congratulated the defendant upon having reduced his adulteration from 20 % to 3 %, and inflicted a fine of ten shillings—leaving the Vestry to pay its own costs.

6. It will be seen from the table at page 4, that I had analysed the first portion of the sample upon the day after it had been taken, and, therefore, that no question as to loss of non-fatty solids by decomposition during storage had arisen as to my portion of the sample.

The Vendor's Analyst analysed the second portion of the sample after four weeks' storage. His certificate does not show what, nor whether any, addition had been made to the non-fatty solids on account of estimated loss by decomposition during storage.

The Government Laboratory analysed the third portion of the sample after five weeks' storage. It certified that it had made addition on account of loss by decomposition during storage, but it did not state the amount of such

addition. Subsequently, in reply to interrogatories from myself, it stated, that "practically no addition" had been made; ultimately it admitted that "no addition" had been made. These written statements are irreconcilable.

7. Whereas I had certified that the sample contained 12 % of added water—in comparison with "good average milk"; only by laborious interrogation was it subsequently elicited that the "not less than 3 % of added water"—as calculated at the Government Laboratory—depended upon a comparison with milk at that point of poverty at which it only just escapes condemnation as adulterated. Which of these standards should be used for comparison with a condemned milk—the object being to secure fair play as between vendor and purchaser—is a common-sense question of great importance. For the consideration of this question no better jury could be formed than the Public Health Committee of St. James's Vestry. Another question is, Whether a milk should be judged by its percentage of milk-solids in the aggregate? Or, by a deficiency in one kind of milk-solids—an excess in the milk-solids of another kind not being credited to the vendor as a set-off against the deficiency.

8. In this particular prosecution, the accuracy of my own analytical findings, the fairness of my deductions, and the completeness of my certificate were all admitted, yet, owing to the Government Laboratory setting up the poorest passable milk as a standard, and owing to its non-compliance with the law as to making clear the standard taken for the calculation of the percentage of added water, a serious divergency in conclusion was suggested to the mind of the learned Magistrate. To appeal on the ground that the certificate from the Government Laboratory was incomplete and misleading would amount to a public scandal. It would, in any event, be a severe infliction upon the defendant, and it would certainly involve heavy law-costs. The question raised by the events of this prosecution are therefore of large importance to the working of the Adulteration Acts.

The great body of Public Analysts throughout the country contain among their number many eminent chemists—men who have done much to advance those processes by which adulterants in food and drugs are now detected. Yet a proper appeal court is necessary for the revision or endorsement of the analytical findings which become the basis for prosecutions in our courts of justice. It is obvious, however, that chaotic, incomplete, and contradictory statements—such as, in the annexed correspondence, appear to have emanated from the Government Laboratory—must be severely dealt with; otherwise, the entire administration of the Adulteration Acts will be thrown into confusion and uncertainty.

MILK, "No. 53." Analytical Findings from the same

Portion of Sample sent to:—	Date of Analysis. 1897.	PERCENTAGES BY WEIGHT.					Standard of Comparison as stated in Certificate for the calculation of Added Water.	Standard of Comparison actually used.
		Total Milk Solids.	Milk Fat.	Milk Solids not Fat.	Additions made for estimated loss of Non-fatty Solids by decomposition during storage.	Added Water as certified.		
Dr. Edmunds on Sept. 24th	Sept. 25th	10·94 (Fractions rounded off in favour of Vendor and taken at 11·00)	2·69 (Coil Process)	8·25	None	12·00	A good average Milk—containing 12·5 % of Milk Solids	A good average Milk—containing 12·5 % of Milk Solids
Vendor's Analyst on Oct. 17th	Oct. 22nd	10·86	3·14 (Schmid Process)	7·72	None	"Not less than 9·00"	Standard not stated	The poorest Milk that escapes condemnation—containing 8·5 % of Solids-not-Fat
Government Laboratory on Oct. 28th	Nov. 5th	10·87	2·67 (Maceration Process)	8·20	None*	"Not less than 3·00"	Standard not stated	The same Standard as above—8·5 % of Solids-not-Fat

* Mr. Bannister certified at first that addition had been made (Nov. 6), *vide* page 13.

Mr. Bannister subsequently wrote:—"Practically no addition" (Nov. 16 and Dec. 24), *vide* pages 16 and 24.

In further reply to Dr. Edmunds, Mr. Bannister wrote:—"No addition" (Jan. 5), *vide* page 26.

These discrepancies seem irreconcilable.—[J.E.]

Sample of Milk, as certified by three different Analysts.

PERCENTAGES OF ADDED WATER, AS CALCULATED FROM THE ANALYTICAL FINDINGS
WHEN COMPARED WITH THE FOLLOWING STANDARDS OF MILK :—

Fair Average Milk, containing 12.5 % of Milk Solids.	Bottom limit Milk, containing 11.25 % of Milk Solids.	Bottom limit Milk, regarding its 8.5 % of Non-fatty Solids; disre- garding excess or deficiency in its 2.75 % Fat.
$\frac{10.94}{12.50} = .8752$ <p>Average Milk ... 87.52 % Added Water ... 12.48 %</p> $\frac{11.00}{12.50} = .88$ <p>Average Milk ... 88.00 % Added Water ... 12.00 %</p> $\frac{10.86}{12.50} = .8688$ <p>Average Milk ... 86.88 % Added Water ... 13.12 %</p> $\frac{10.87}{12.50} = .8697$ <p>Average Milk ... 86.97 % Added Water ... 13.03 %</p>	$\frac{10.94}{11.25} = .9724$ <p>Bottom limit Milk, 97.24 % Added Water ... 2.76 %</p> $\frac{10.86}{11.25} = .9653$ <p>Bottom limit Milk, 96.53 % Added Water ... 3.47 %</p> $\frac{10.87}{11.25} = .9662$ <p>Bottom limit Milk, 96.62 % Added Water ... 3.38 %</p>	$\frac{8.25}{8.50} = .9706$ <p>Bottom limit Milk, 97.06 % Added Water ... 2.94 %</p> $\frac{7.72}{8.50} = .9082$ <p>Bottom limit Milk, 90.82 % Added Water ... 9.18 %</p> $\frac{8.20}{8.50} = .9647$ <p>Bottom limit Milk, 96.47 % Added Water ... 3.53 %</p>

The narrative of the case, and the text of the certificates and correspondence are appended.

The Law governing Analysts as to the form of their certificates is clearly laid down by the High Court of Justice in the appeal case *Fortune v. Hanson*. A report of this case will be found in *The Times* of January 28th, 1896. After hearing argument by counsel, the judges are reported as follows :—

“ Mr. Justice Hawkins thought the certificate here did not conform to the requirements of the Act. It was admitted that milk naturally had water in it, and therefore it was necessary, in his opinion, that *the magistrate should know what standard the Analyst took*. Standards differed greatly, the magistrate might take one, the Analyst another. To say there was 5 % of added water was merely an opinion of the Analyst. *The justices ought to know upon what percentage he based his calculation*. It was not as if water was a substance totally unknown to milk in its pure state.

“ Mr. Justice Kennedy concurred. *The certificate was to give substantially the data on which the justices could act for themselves*. It would be wrong to convict upon a mere statement that there was 5 % of added water. *The analysis should be clear, and afford materials on which the justices and the accused also might know how the result had been arrived at.*”

It will be seen from this ruling that, apart from the common-sense duty of so framing a certificate as to enable the magistrate to apply his personal judgment to the case, the Law makes it incumbent upon the Analyst to specify in his certificate the standard which he takes for the calculation of added water. Such cases, moreover, have first to be adjudicated upon by the Local Authority—so far as to determine whether a prosecution shall be ordered. The reasoning applied by the Judges as to what the Analyst's certificate should make clear to the magistrate, applies equally to what the certificate should make clear to the members of the Local Authority, and, moreover, also to the person accused of the adulteration.

The Standard with which a condemned milk is compared in order to calculate its percentage of added water, is often confused with *the limit* at which a deficiency of milk-solids is no longer excused. Yet *the standard* and *the limit* are altogether different things. For different countries, and even for different seasons or pastoral conditions, the standard may need to be

varied. Dr. Bell, the well-known principal of the Government Laboratory, obtained milks from 235 individual cows—each milked in the presence of a responsible person for the purpose of a test analysis. These 235 milks gave an average of total milk-solids, 12.83% —consisting of fat 3.83% , non-fatty solids 9.00% . Then 24 dairy-milks (each the mixed milk of a herd of dairy cows) gave an average of total milk-solids, 13.22% —consisting of fat 4.12% , non-fatty-solids 9.1% . Dr. Bell sums up these two tables by saying:—“Average milk ranges in non-fatty solids from 9.0 to 9.1% , in fat from 3.83 to 4.12% .” This gives, for average milk, a range of total milk-solids from 12.83 to 13.22% . Dr. Bell then wrote:—

“It is to be hoped that the results of this inquiry will serve to settle the vexed question as to the alleged constancy in the composition of cow’s milk, especially in the non-fatty-solids. The samples were obtained from different parts of the country, and comprise milk yielded both by house and grass fed cows, and every effort was made to obtain fair representative specimens of milk yielded by different cows, and under the ordinary conditions of changes of food and season.”

The figures thus set out by Dr. Bell may be accepted as fairly representing an average milk “of the nature, substance and quality demanded” when milk is purchased.

It need only be added that, owing to recent improvements in the extraction of the butter-fat, a larger proportion of the milk-solids are now described as fat, while the non-fatty-solids are to the same extent lessened.

It is material to note that in St. James’s there are now no cowhouses, and therefore that the milk sold in St. James’s is practically all dairy milk, *i.e.*, the mixed milk of herds of dairy cows. Therefore when we take as the standard a milk containing 12.50% of milk solids, we give the turn of the balance in favour of any one who may be accused of adulteration.

Among Dr. Bell’s 235 individual milks, the fat varied from 1.92 to 6.87% , while the non-fatty-solids varied from 8.00 to 11.27% . And even these extremes would not cover every case which may occasionally be discovered in the milk of an individual cow. But if such abnormal milks were admitted as “of the nature, substance and quality demanded” when milk is purchased, it would always be safe to add 30% of water to an average milk. If adulteration is to be controlled, we cannot allow the adulterator to ride off upon the phantom of a sick or half-starved cow. Morbid secretions of that sort must not be sent to market as milk.

On perusing the correspondence,* it will be seen that Mr. Bannister, describing his practice at the Government Laboratory, writes :—

“We have no power to fix standards of quality, and the limits that we impose, of 8·5 % non-fatty solids and 2·75 % of fat, are only intended to guide the magistrates in demanding strict proof that poor samples of milk brought before them are as obtained from the cow, and not made so by the addition of water or the removal of fat.”

For the Analyst “to fix standards of quality” is manifestly no part of the duty imposed upon him by the Adulteration Acts ; but it is obvious that the Analyst, unless he have regard to the quality of fair samples, could never affirm that any sample was adulterated. How could the Analyst certify that an article was not “of the nature, substance and quality demanded,” unless by comparison with some standard of that “nature, substance and quality”? In the Eleventh Annual Report of the Local Government Board this fundamental question is dealt with as follows :—

“The Analyst, in judging of milk, must necessarily adopt a minimum standard of constituents based on a large number of analyses of genuine milk. But there would be a great difficulty in prescribing a standard by Act of Parliament, as has occasionally been suggested, for if it were fixed as low as to class as genuine the milk of the oldest and worst-fed cows to be found in the country, it would admit the addition of an enormous amount of water to milk of fair quality ; if, on the other hand, the standard of a fair average milk were adopted, there would be a loud outcry against the prohibition to sell genuine milk falling below that average.”

Obviously, the question of a standard being set up by the Analyst for his own guidance is a different thing from that of the erection of standards in a general sense. But Mr. Bannister also appears to introduce, with a light heart, an alteration in the English Constitution. He lays down that a tradesman is to be hauled up before a magistrate on mere suspicion, in order to be made to prove that he has not watered his milk. If I read Mr. Bannister’s proposition correctly, he issues from the Government Laboratory a solemn certificate as to certain scientific conclusions, the truth of which conclusions depends upon whether the said milk afterwards proves to have been extracted from a cow or not. (*Vide* letters, Nov. 15 and Dec. 14, pages 15 and 23.)

* *Vide* letter of Dec. 14, page 23

The Limit is that point of poverty in milk-solids below which we condemn the milk as adulterated. If we allow a downward variation such as to give the purchaser 90 % of the milk-solids to which, on the standard of 12.50 % milk-solids, he is entitled; we deduct 1.25 from 12.50 %, which gives a milk containing 11.25 % of milk-solids. This allows the vendor to add 10 quarts of water to 90 quarts of 12.50 % milk. Below this limit we condemn the milk as adulterated. Then a milk having been condemned as adulterated, What standard are we to compare it with for the purpose of calculating the percentage of added water? Are we to compare it with an average milk of 12.50 % milk-solids? Or, shall we take up with the theory that the adulterator buys a milk just above that point of poverty at which it will be condemned, and then proceeds to secure his own conviction by adding a paltry 3 % more of water to a milk of 11.25 % milk-solids? This theory is ridiculous. What the adulterator does is to buy of a respectable firm of milk merchants a milk such as that which contained 13.08 % of milk-solids. He then waters this down until its milk-solids are diluted to a point between 11.25 and 11.50 %, which is just the limit at which an adulterator, if cleverly defended, can defeat a prosecution and leave the local authority to pay all the costs. Sometimes, especially on Sundays, the adulterator is tempted to add a little more water, and, should a sample of this blend be taken, he gets caught. That is the real history of milk adulteration. If 11.25 % be adopted, not only as *the limit* but also as *the standard*, which by some confusion of thought is often done, the Magistrate gets a certificate that the sample contains "not less than 3 % of added water." Should the said standard be properly set out in the certificate the true significance of the facts may still be pointed out to the Magistrate. But, *if the standard be not set out*, the prosecution is defeated or is stultified. In that case the Local Authority is not only left to pay all the costs, but it is paralysed by the aspersion of an officious severity.

Upon the question whether a milk should be judged by the percentage of its milk-solids in the aggregate—or in one part only, and without setting off to the vendor's credit any excess that may be found in other of the milk-solids, some further facts have to be considered.

In a milk deficient in fat but otherwise excellent, we debit the deficiency in fat to the milk-seller. Thereupon, the law charges him with a criminal offence—that of abstracting the cream. Yet that deficiency in fat may arise from mere carelessness in a milk-server who gives to one customer an excess of cream and to another a deficiency. *Such deficiency in fat may*

occur without fraudulent intent, or even knowledge of the fact on the part of the milk-seller, and without his gaining any sort of advantage. Deficiency of fat occurs in two cases. In one case the non-fatty solids also are deficient and the case is clearly one of fraudulent watering. In the other case the non-fatty solids are full or in excess, while the fat is deficient. How are we to judge these latter milks?

If we pay fourpence per quart for milk containing 12·50 % of milk-solids, we buy a pound of milk-solids at about the price that we now pay for a pound of butter. There is therefore no serious commercial disadvantage to the buyer if either the fatty or the non-fatty solids do exceed their usual proportions. As a matter of all-round food value, the non-fatty solids of milk are—weight for weight—about equal in value to the fat. It may be said that corpulent adults would do better upon the non-fatty solids; that emaciated infants would do better upon the fat. What I submit is that, when there is a deficiency in one particular, while there is an excess in another, the vendor does not get fair play unless the excess is allowed as a set off against the deficiency. It has therefore been my practice to judge a milk upon its aggregate milk-solids, and not upon a deficiency in one particular. The certificate framed upon this basis becomes simpler and more intelligible to the members of the Local Authority and to the magistrates. In my own judgment it is also fairer to the vendor, while equally fair to the purchaser.

In this particular prosecution (Milk No. 53), the certificate issued from the Government Laboratory was not in accordance with the ruling of the judges of the High Court of Justice (*vide* page 6). It does not give the standard taken for the calculation of added water. Further, it makes an addition for assumed loss during storage, and it does not state the amount of that addition. The certificate therefore contains two unknown quantities, and it does not “afford materials on which the justices, or the accused, might know how the results had been arrived at.”

NARRATIVE AND CORRESPONDENCE.

I.—On September 24th, 1897, a sample of milk, "No. 53," was submitted to me for analysis. I completed the analysis on September 25th, and found that the sample contained:—

	In 100 parts.
Fat	2·69
Non-fatty Solids	8·25
Total Milk Solids	<u>10·94</u>

In these determinations, the turn of the balance was always given in favour of the Vendor; and, in estimating the added water, I went upon the basis that there was certainly not more than 11 parts of milk-solids in each 100 parts of the milk. Then, as "a good average milk" contains not less than 12·50 per cent. by weight of milk solids, each 100 parts of this sample contained 88 of "good average milk," and 12 of added water.

I thereupon certified as follows:—

"I am of opinion that the above sample of milk contains 12 parts per centum of added water—good average milk being taken to contain $12\frac{1}{2}$ parts per centum of milk-solids."

On October 7 a prosecution was ordered by the Vestry.

The sample of milk taken on September 24th had been divided into three portions—each into a six-ounce glass bottle furnished with a glass screw-stopper and red rubber washer. One of these three portions was handed to the vendor, one was brought to me, and one was retained in the custody of the Vestry in order to be available for a control analysis.

The summons was returnable on October 27th, at the Police Court, Great Marlborough Street.

II.—Upon receiving the summons, the defendant ascribed the adulteration to the Farmer or to the wholesale milk dealers. Next day (October the 15th), without warning to the wholesale dealers, a sample of their milk—then in course of delivery to the defendant, was taken and submitted to me for analysis. I found that this sample contained:—

	In 100 parts.
Fat	3·98
Non-fatty Solids	9·10
Total Milk Solids	<u>13·08</u>

I reported this sample as "excellent milk."

III.—The wholesale milk merchants proved to be Messrs. Pryce and Harris, of Craven Court, Drury Lane. On December 10th, Messrs. Pryce and Harris informed me that the milk delivered to the Defendant on September 24th was from the same source as that delivered on October 15th. That this milk came from a gentleman-farmer of high character at Peterborough; and that the milk churns, as sent up per Great Northern Railway, had been taken on each occasion direct from King's Cross terminus to the Defendant's shop.

Some days after the sample had been taken from their delivery of milk on October 15th, Messrs. Pryce and Harris sent the Defendant's portion of the first sample to Messrs. Redwood and de Hailes, the well-known analysts, in order that they might analyse it on his behalf. The following is a copy of the certificate issued by these gentlemen as the result of their analysis:—

[Copy.]

15, RED LION SQUARE, W.C.,
23rd October, 1897.

REDWOOD & de HAILES,

Having analysed a sample of milk received on 20th October, from Messrs. Pryce and Harris, of Drury Lane, and marked "Parish of St. James, Westminster—53—24th September, 1897," we are of opinion that it is adulterated with not less than 9 % added water.

Sp. Gr.	...	...	...	Sour.
Total Solids	...	...	...	10·86 per cent.
Fat	...	...	...	3·14 „ „
Solids not Fat				7·72 „ „

(Signed) REDWOOD & de HAILES.

The fat was estimated by the Schmid process.

IV.—On October 27th, the case came before Mr. Plowden, one of the learned Magistrates at the Police Court, Great Marlborough Street. The Defendant then did not produce his own Analyst's certificate, but asked that that portion of the sample which was still in the custody of the Vestry should be sent on to the Government Laboratory for a control analysis. Thereupon the learned Magistrate ordered the sample to be sent to the Government Laboratory with a request for its analysis and a report thereon. And the case was adjourned till November 10th.

The following certificate was received by J. Ronaldson Lyell, Esq., Chief Clerk, Police Court Marlborough Street.

[Copy.]

“ GOVERNMENT LABORATORY,
CLEMENT'S INN PASSAGE,
STRAND, LONDON, W.C.

The sample of milk, marked “ No. 53,” and referred to in your letter of the 27th ultimo, was received here on the following day, securely sealed.

We hereby certify that we have analysed the milk and declare the results of our analysis to be as follows :—

Non-fatty Solids	=	8.20	per cent.
Fat	...	2.67	” ”

From a consideration of these results, and after making addition to the non-fatty solids on account of natural loss arising from the change which has occurred in the milk through keeping, we are of opinion that the sample in question contains not less than three per cent. of added water.

As witness our hands this Sixth day of November, 1897.

(Signed) R. BANNISTER.

G. LEWIN.

The Clerk to the Magistrates,

Police Court, Marlborough Street, W.”

At the adjourned hearing, on November 10th, upon this certificate being read, the Solicitor in charge of the prosecution asked for an adjournment in order that I might be subpoenaed to attend and give evidence in person. Therefore the case was again adjourned till November 17th.

V.—On my comparing the two certificates, it appeared that :—

1. The analyses agreed closely in their results, but the conclusions diverged widely.

2. My certificate was complete in itself, as showing the standard of comparison to be a “good average milk containing $12\frac{1}{2}$ parts per centum of milk-solids.” The certificate from the Government Laboratory did not disclose its standard of comparison, and it also added to the non-fatty solids obtained by analysis an undisclosed amount “on account of natural loss arising from the change which has occurred in the milk through keeping.” In the absence of these two data, there were no common terms in which the certificates could be compared. I therefore wrote as follows to the Government Laboratory :—

[Copy.]

" Re Milk Sample, No. 53.

VESTRY HALL, PICCADILLY,
November 13th, 1897.

DEAR SIR,

In your certificate to the Magistrate of the Marlboro' Police Court, upon the above sample, you certified that the milk contained 10·87 per cent. of milk-solids, and you gave the conclusion that the milk contained "not less than three per cent. of added water."

In my analysis, made on September 25th, the result was milk-solids 10·94 per cent., and, having judged the milk to be watered, I gave the odd fraction in favour of the vendor, and based my certificate upon the milk-solids certainly not exceeding 11 per cent.

Taking good average milk as containing 12·5 per cent. of milk-solids, it follows that $11/12\cdot5 = \cdot88$, and this gives 88 per cent. of average milk, *plus* 12 per cent. of added water.

I shall be much obliged if you will favour me with

A description of the methods used in your analysis,

The standards of reference used,

And the methods of calculation,

as the case has been adjourned for the purpose of further consideration.

Faithfully yours,

(Signed) JAMES EDMUNDS.

R. BANNISTER, Esq., F.C.S., &c., &c., &c.
Government Laboratory."

The following reply was received:—

" GOVERNMENT LABORATORY,
CLEMENT'S INN PASSAGE,
STRAND, LONDON, W.C.,

[Copy.]

15th November, 1897.

DEAR SIR,

Milk Reference No 53.

Our method of analysis was the ordinary "maceration process" which is so well known to milk analysts.

The results you obtained agreed with ours, so there is no necessity to go further into methods of analysis, but we may confine ourselves to the conclusions drawn from these results.

We consider that when milk is sold containing less than 8.5 % non fatty solids or 2.75 % fat, it is the duty of the Vendor to satisfy the Court that the milk sold is as milked from the cow and not diluted with water or deprived of its fat. You assume that for giving the extent of dilution the comparison should be made with milk containing 12.5 % milk-solids which per centage includes fats as well as the non-fatty solids. By such a comparison you make the fat short as well as the non-fatty solids, and to be logical the milk should have been shown deficient in fat as well as diluted with water.

The Act of 1875 is silent about the average composition of milk, but it has been decided in the superior Courts that the milk mentioned in the Act is that given by the cow whether rich or poor.

Yours very faithfully,

(Signed) R. BANNISTER.

DR. EDMUNDS,

Vestry Hall, Piccadilly, W."

The following letter was then sent to Mr. Bannister :—

[Copy.]

"VESTRY HALL, PICCADILLY,

November 16th, 1897.

Re Milk Reference, No. 53.

DEAR SIR,

I am much obliged for your letter of yesterday's date, and am glad to know that the results of our analyses agree. But I do not see how you arrive at your conclusion.

Will you favour me with the following additional data :—

1. The addition which you made to the non-fatty solids on account of such decomposition as may have occurred subsequent to my analysis of the sample on September 25th ?

2. The standard of reference which you adopted in order to calculate the percentage of added water ?

Upon judging a milk diluted, do you compare it with a fair average milk, containing, say, 12.5 per cent. of milk solids ? Or, do you compare it with a milk at some other standard ; and, if so, what standard ?

3. The methods of standardising under different kinds of deficiency, with a view to determine the percentage of added water in the sample:—

A. The fats being deficient and:—

1. The non-fatty solids being also deficient ?
2. The non-fatty solids being full ?
3. The non-fatty solids being in excess ?

B. The non-fatty solids being deficient and:—

1. The fats being also deficient ?
2. The fats being full ?
3. The fats being in excess ?

I remain, dear Sir,

Yours faithfully,

(Signed) JAMES EDMUNDS.

RICHARD BANNISTER, ESQ., F.C.S., &c., &c., &c.,
Government Laboratory."

Mr. Bannister replied as follows:—

[Copy.]

"GOVERNMENT LABORATORY,
CLEMENT'S INN PASSAGE,
STRAND, LONDON, W.C.,
November 16th, 1897.

Re Milk Reference No. 53.

DEAR SIR,

The sample of milk in question was in such good condition when received that practically no addition to the non-fatty solids had to be made to cover the loss by keeping.

The percentage of added water was worked on an 8.5 % "solids not fat."

The questions put under head 3 in your letter are I think not exactly what you mean. It is evident that the assumption of watering in A 2 and A 3 could not apply, because the non-fatty solids are in 2 "full" and therefore satisfactory, and in 3 they are in excess. Such milk would be wrong because of *deficiency of fat*, and not for dilution with water.

In A 1 and B 1 the offence would be the same, viz.:—addition of water and deficiency in fat.

Usually we should make 8.5 as the basis for estimating dilution with water, and 2.75 for fat deficiency; but if the

milk were of abnormal composition we should take these facts into consideration when drawing our conclusions from the results obtained.

In the cases of B 2 and B 3, great care would have to be exercised in deciding whether the non-fatty solids had been depressed by getting a sample containing more than the normal proportion of fat. If this were so the non-fatty solids would be naturally lowered at the expense of the fat. Each of such cases would have to be decided on its own merits, and it is consequently not practicable to give a general answer which could be made to apply to individual cases.

Believe me,

Yours faithfully,

(Signed) R. BANNISTER.

DR. JAMES EDMUNDS,

Vestry Hall, Piccadilly, W."

VI.—At the second adjournment, on November 17th, the learned Magistrate made strong remarks upon the divergence between the conclusions of the two certificates. Nevertheless, he saw that both certificates concurred in proving that there was *some* adulteration. Thereupon evidence was admitted as to a previous conviction for adulterating milk with 20 per cent. of water, and a fine of twenty shillings and costs. Upon this, the learned Magistrate inflicted upon the defendant a fine of ten shillings, and left the Vestry to pay its own costs.

VII.—In order to arrive, if possible, at an understanding of the procedure adopted at the Government Laboratory, I wrote again to Mr. Bannister, as follows :—

[Copy.]

December 6th, 1897.

"Re Milk Reference, No. 53.

DEAR SIR,

1. I thank you for your letter of November 16th, and I now forward copy of my own certificate, and the result of the prosecution.

2. The great general importance of this matter is my excuse for asking you for some further data. I think we ought to seek the good offices of the Government Laboratory with a view to agree upon some uniform procedure for the determination of milk solids, and also to agree upon uniform standards of comparison for adulterated milks. Such agree-

ment would enable added water to be calculated without those divergencies which now arise to hinder the administration of the Adulteration Acts, and to cast ridicule upon our scientific reports.

3. (a) On considering the data given by your analysis, and your conclusions as to the percentage of added water, I gather that you added $\cdot 05\%$ to the percentage of non-fatty solids, so as to raise their percentage from $8\cdot 20\%$ to $8\cdot 25\%$?

(b) You have not favoured me with the reference to any published description of "the ordinary maceration process," which was used for the examination of this milk. May I ask whether it was the process described in the second part of Dr. Bell's book—at pages 9 and 10; or at pages 16, 17 and 18; or was it some other process?

(c) By what data do you determine the additions to be made for loss during storage in stale samples of milk?

4. As you have pointed out, the results of our analyses agree in this case. You will probably also agree that:—

(a) I might have signed your certificate as well as my own?

(b) You might have signed my certificate as well as yours?

(c) The difference in our conclusions was due simply to our using different standards of milk in order to calculate the percentage of added water?

5. It is obvious that, at the Government Laboratory, you wish to do what is fair and right according to law. You cannot intend your certificate to be incomplete as a scientific document, and thereby to put the Public Analyst into the position of having to assail the certificate of a professional brother, or else to submit himself to disparagement. Yet such was the position in which I was placed by the certificate sent to the magistrate on the 6th of November last.

Now, I venture to submit that your certificate, though correct as a scientific document, is worded in such a manner as to confuse the mind of a magistrate. For when you certify, as in this case, that "the sample in question contains not less than 3 per cent. of added water," the magistrate naturally assumes that this is probably the full extent of the adulteration. How is he to know that you are comparing this adulterated milk with the lowest passable standard of milk? If a milk is so poor that it can safely be certified as adulterated, surely it is the most equitable course to compare it

with "a fair average milk." In any case the standard of comparison ought to appear in the certificate. When you take such a low standard, this is the more important in order that the Magistrate may realise the true significance of your certificate. Again, when the amount added to the non-fatty solids, for estimated decomposition during storage, is not shown upon the certificate, it reduces your conclusion to the position of a mere arbitrary opinion.

6. It is obvious that, in general, the Magistrates do not understand the precise significance of the two decimal fractions which express the percentages of the fatty and of the non-fatty solids respectively. They do not understand the inferences to be drawn from the variations of these two fractions—each varying either above or below an arbitrary standard of level. They have no means of judging standards of milk, except by comparison with "a fair average milk." In this very prosecution, it was impracticable to show the magistrate that, while I had specified my standard as being "a good average milk containing 12.5 % of milk solids;" your standard, which you had not specified, contained only 11.25 % of milk solids—the poorest milk that, upon analysis, would escape condemnation. The learned Magistrate very properly declined to enter into a technical discussion. All he could see was that both certificates concurred in proving that *some* adulteration had occurred—that adulteration being as he surmised, "three per cent. or thereabouts," and he seemed inclined to decide the case against the Vestry. It was only upon evidence as to a previous conviction for adulterating milk with 20 % of water being rendered, that the magistrate saw his way, and inflicted a fine of ten shillings—leaving the Vestry to pay its own costs.

I venture to point out that, if the standard of comparison you used—and the amount of your addition on account of loss had been stated, your certificate would have been comparable with mine. In that case the learned Magistrate would have perceived that the divergent conclusions arose from using different standards of comparison, and he would have been enabled to apply his own judgment as to which was the fairest point from which to calculate the percentage of added water. For the Vestry to prosecute a milkman for an inferential addition of three per cent. of water to "a fair average milk," would have been severe, or even officious. But to prosecute a milkman who adds 12 to 16 % of water to "a fair average milk" is necessary alike for the security of the public and for the protection of milk-

men who sell good milk. Other samples of milk, taken by the same officers—at about the same time—from other tradesmen in the parish, yielded on analysis 13.19 %, 13.54 %, and 14.84 % respectively, of milk-solids. How can such tradesmen keep their doors open if others in the parish be allowed to sell as milk a liquid containing only 10.94 % of milk-solids. This defendant, when summoned, attributed the adulteration to the farmer who supplied him with milk. On the next day (October 15th), in order to test that allegation, a sample of the milk, then in course of delivery by this farmer, was taken and analysed. It was found to be an excellent milk, containing 13.08 % of milk-solids (fat 3.98 %, non-fatty solids 9.1 %). Now, if we assume that the milk delivered by this farmer, on September 24th, was equal to that which we know that he delivered on October 15th, then $\frac{10.94}{13.08} = 83.6$ % of milk and 16.4 % of added water. If we take as the standard that average of 235 authentic milks which was published by Dr. Bell, then $\frac{10.94}{12.83} = 85.3$ % of milk, and 14.7 % of added water.

7. In your letter of November 15th (par. 3), you speak of a deficiency of non-fatty solids *or* of fat. And again, referring to my certificate, you say:—"You assume that for giving the extent of dilution the comparison should be made with milk containing 12.50 % of milk-solids which percentage includes fats as well as the non-fatty solids. By such a comparison you make the fat short as well as the non-fatty solids, and to be logical the milk should have been shown deficient in fat as well as diluted with water." Yet in this very milk the non-fatty solids *and* the fat were *both* deficient. It is obvious also, in general, that the addition of water must always, by mechanical displacement, lower the proportion of fat in the same degree as it dilutes the non-fatty solids. I do not see how your comment applies either in this case or in general.

8. With regard to the particular cases on which you comment in yours of November 16th:—

(a) It is true that A 1 and B 1 are similar. But the two cases may have to be regarded from different standpoints, according as the principal deficiency is found in the fatty or in the non-fatty solids, and the recognition of the two cases makes the scheme symmetrical.

(b) It will be observed that the terms "full" and "in excess" are variables, subject to an up-and-down movement, according to the levels at which standards of reference are fixed. Whether particular "fulnesses" or "excesses" will be "satisfactory" must, therefore, depend

upon the levels to which those terms relate. At the Government Laboratory 2.75 % of fat, and 8.5 % of non-fatty solids will both be "full." But neither of these can be regarded as satisfactory. In St. James's 3.5 % of fat and 9.00 % of non-fatty solids are regarded as "full," and also as legally "satisfactory." Then, milks which reach the level of Dr. Bell's average, *i.e.*: Fat 3.83 % and non-fatty solids 9.00 % are regarded as really full measure, and as morally satisfactory. Milks containing more than 12.83 % of milk-solids are marked "excellent."

(c) In your penultimate sentence you say :—"The non-fatty solids would be naturally lowered at the expense of the fat." You will agree with me that, in general, one thing cannot lose at the expense of another. What I submit here is that the addition of fat mechanically displaces part of the non-fatty solution. In that way, the addition of fat lowers the percentage of non-fatty solids in a given volume of milk, and lowers it in precisely the same proportion as the addition of the same volume of water would lower it by dilution. This, if you agree, makes it that the fat gains at the expense of the non-fatty solids.

9. Touching the advantages and disadvantages of judging a milk analysis by the measure of its milk-solids in the aggregate, or by the measure of its milk-solids—fatty or non-fatty, disjunctively; we have four cases, *i.e.*: A 2, A 3, B 2, and B 3. To illustrate a frequent case, we take A 3, in which two pints of good milk have been blended with one pint of separated milk. We get such a result as:—Fat = 2.00 %, non-fatty solids 9.5 %. Here we have a milk whose fat is distinctly deficient, but whose milk solids in the aggregate are above the 11.25 %. In a milk equal to the average of Bell's 235 milks, we get:—Fat 3.83 %, non-fatty solids 9.00 %. Two pints of this mixed with one pint of separated milk containing fat .26 %, non-fatty solids 9.00 %, yield a blend which is slightly below the level for fat, but well above the level for non-fatty solids. This yields fat 2.64 %, non-fatty solids 9.00 %, = aggregate milk-solids 11.64 %. How are we to certify these cases? *As Analysts, we have no evidence that these milks have been blended.* We know that mere stupidity or carelessness in distribution may give an excess of cream to one customer, and a deficiency of cream to another; and that, in this way, such case may occur without fraudulent intent on the part of the milk-seller. Now, the sale of adulterated milk is a criminal offence. It is a fundamental principle of English law, that an accused person is to be deemed innocent until *proved* to be guilty. The Vendor

of such a milk is liable for a civil wrong to the purchaser. But is the vendor fairly open to prosecution for a criminal offence when the analyst, if skilfully cross-examined, would have to say that this milk might have been misdistributed by accident or stupidity, and altogether without fraudulent intent. Moreover, the sole profit accrues to the purchaser who happens to receive the undue share of cream. I submit that, in such cases :—

(a) The Vendor has an equal right to be credited with any excess, as to be debited with any deficiency, in his milk-solids.

(b) By judging the milk upon its aggregated milk-solids we get a simpler and fairer, and more easily understood standard.

(c) A milk, when below the limit for its aggregated milk-solids—say below 11·5 %—should be condemned as an adulterated milk.

(d) An adulterated milk should have its added water measured, not by a milk at the bottom-limit of variation, but by comparison with “a fair average milk.”

(e) And it has been abundantly shown that “a fair average milk” contains fully 12·50 % of genuine milk-solids.

I remain, dear Sir,

Very faithfully yours,

JAMES EDMUNDS.

RICHARD BANNISTER, Esq., F.C.S., &c., &c., &c.,
Government Laboratory.”

And the following reply was received :—

[Copy.] “ GOVERNMENT LABORATORY,
CLEMENT’S INN PASSAGE,
STRAND, LONDON, W.C.,
December 14th, 1897.

DEAR SIR,

I appreciate the kind words used in the second and fifth paragraphs of your letter of the 6th inst. respecting this department, and can truly say that our aim is to administer the Foods’ Acts in a just and impartial manner.

The maceration process, as applied to a sour milk is given in the second part of Bell’s book p.p. 16 to 18, but the additions made for loss by keeping are made in a different manner to what is there described.

We now directly estimate the amount of alcohol, ammonia, and acids, and convert our results into solids-not-fat—from which source they have been derived—the fat itself remaining uniform throughout.

As pointed out in my first letter to you the Act of 1875 is silent about the milk referred to in the Act itself being of average composition, and in the case of *Hewitt v. Taylor* heard by Lords Justices Lindley and Kay, in the Court of Queen's Bench in 1895, it was decided that a milk having the composition 7.98 per cent. of non-fatty solids, and 2.94 per cent. of fat, and proved to have been sold as it came from the cow was genuine milk.

It follows therefore that we have no power to fix standards of quality, and the limits that we impose of 8.5 per cent. non-fatty solids and 2.75 per cent of fat are only intended to guide the magistrate in demanding strict proof that poor samples of milk brought before them, are as obtained from the cow, and not made so by the addition of water or the removal of fat.

Your letter raises so many novel points in connection with milk analysis that it would be more satisfactory to see you than to attempt to write in full reply. So if you can call here I shall be glad to go over with you the points you have raised.

Yours faithfully,

(Signed) R. BANNISTER.

DR. JAMES EDMUNDS, M.D."

[Copy.]

" December 16th, 1897.

Re *Milk Reference* " No. 53."

DEAR SIR,

I thank you for your letter of the 14th inst. I gladly accept your kind invitation to call upon you and talk over the various important questions which have arisen out of our correspondence upon this case.

This particular prosecution has to be reported upon fully to our Public Health Committee; and, therefore, I shall be glad if we may first finish in our correspondence the residual data of this particular case. The general questions in my letter of the 6th inst. can then stand over for our conference, and it is to be hoped that we may arrive at such procedure, and such form of certificate, as will, in future, prevent trouble other than such as may arise from "the personal equation" of various Analysts.

Perhaps, therefore, I may trespass upon your good nature so far as to ask you again for those residual data of my letter of the 6th, as far as to complete this case.

I gather that in "No. 53" it was not found necessary to determine the alcohol, the ammonia, the acids, and the carbon dioxide, with a view to calculate them back into the non-fatty solids. But if any amount was added to your findings on account of loss in storage I shall be glad to know what that amount was.

Since my last letter I find that the Defendant's portion of sample "No. 53" was sent to Messrs. Redwood & de Hailes for analysis on his behalf on October 20th, and that they certified that "the milk was adulterated with not less than nine per cent. of added water." But your certificate being so much better, the Defendant did not produce his certificate from Messrs. Redwood & de Hailes.

Faithfully yours,

(Signed) JAMES EDMUNDS.

RICHARD BANNISTER, Esq.,
F.C.S., &c., &c."

GOVERNMENT LABORATORY,
[Copy.] CLEMENT'S INN PASSAGE,
STRAND, W.C.,
24th December, 1897.

DEAR SIR,

In reply to the enquiry contained in your letter of the 16th instant whether the Alcohol, Ammonia, &c., were determined in the sample of Reference Milk 53, I have to state that in accordance with our usual practice they were estimated.*

The result of our examination was stated in my letter of November 16th, viz., that no allowance had, practically, to be made to cover the loss of non-fatty solids by keeping.

I may state in conclusion that if the law had permitted us to use as a standard for comparison 12 5% milk-solids, as you have done in making your calculation of water addition, our conclusions and yours would have agreed.

With the season's compliments.

Believe me,

Yours faithfully,

(Signed) R. BANNISTER.

DR. JAMES EDMUNDS.

* The term "estimated" is not an answer. To *estimate* an ingredient means to make an approximate judgment as to quantity. To *determine* it is to measure it or to weigh it. To "test" for a thing is merely to determine the fact of its presence, but without determining or even estimating its quantity.—[J.E.]

VESTRY HALL,
PICCADILLY, W.,
January 4th, 1898.

[Copy.]

Re *Milk Reference "No. 53."*

DEAR SIR,

I thank you for answering one more of the questions. This answer shews that the divergency in our conclusions was due entirely to our using different standards of milk for comparison with the adulterated sample, and it closes that point.

I think that you under-estimate the intelligence of the Members of the Public Health Committee of St. James's, when you assume that they will regard as intelligible your replies upon the remaining questions.

With a view to save us all the trouble which would be caused by their appealing to the Home Secretary for these data, I therefore trouble you with one more letter, and I ask you to favour me with answers to the following questions :—

1. What ground have you for suggesting that the law does not "permit us to use as a standard of comparison 12·5% milk-solids"? As I read the Acts, my standard of 12·5% milk-solids is just as permissible as your standard of 8·5% solids-not-fat.
2. Were the Alcohol, Ammonia and acids in this sample *determined*? If yes, will you favour me with the figures of those determinations? If nothing was added for loss, will you kindly say so? If something was added, will you favour me with the figures of the amount added, and the method by which that amount was deduced from the aforesaid determinations.

With the compliments of the season.

Yours faithfully,

(Signed) JAMES EDMUNDS.

RICHARD BANNISTER, ESQ., F.C.S.,
&c., &c., &c.

GOVERNMENT LABORATORY,
[Copy.] CLEMENT'S INN PASSAGE,
STRAND, W.C.,
January 5th, 1898.

DEAR SIR,

In your letter of yesterday's date you ask me two questions, to the second of which I have already replied in my letters of November 16th and December 24th, viz., that the sample of milk was tested* for Alcohol, Ammonia, and acids, and that no addition† was made for loss.

In reply to your first question may I refer you to the fourth paragraph of my letter of December 14th? You will there see that I have not used the term "standard," and the reason is also given for not doing so.

The interpretation of the law is the special function of Magistrates and Judges who try such cases, and you cannot therefore expect me to say more on the points raised in your first question.

Yours faithfully,

(Signed) R. BANNISTER.

DR. EDMUNDS, M.D.

VESTRY HALL,
[Copy.] PICCADILLY, W.,
January 7th, 1898.

Re *Milk Reference* "No. 53."

DEAR SIR,

I thank you for yours of the 5th instant, and for your answer. That answer closes the questions as to the significance of your certificate.

But I cannot understand your reply to my question as to the new point which you introduced in the last paragraph of your letter of December 24th, and your reference to your previous letter does not help me.

In yours of December 24th it is obvious that you did use the word *standard*. You also suggested that "the use of 12.5 % milk-solids as a standard for comparison is not

* This is no answer. *Vide* foot-note, page 24.

† Reference to the letter will show that Mr. Bannister's then statement was "practically no addition."

permitted to us by law." I ask whether you really mean to suggest that my certificate used a standard not permitted to us by law ? and, if yes, on what ground you make that suggestion ?

The choice of a standard for comparison with an adulterated milk is, I think, left wholly to the discretion of the Analyst. If you agree, then 12·5 % milk-solids is just as much "permitted to us by law" as is 8·5 % of non-fatty solids. If the Analyst uses an improper standard for the purpose of drawing his conclusions, the remedy is provided. That remedy is to put the Analyst into the box and cross-examine him, so that the Magistrate may judge of the accuracy of his findings and of the propriety of his deductions.

To have put you into the box in this case would have been to ask the Magistrate for a fourth adjournment, and this would have been harsh to the Defendant. It would also have thrown further costs upon the Vestry or upon the Defendant.

To appeal in these cases involves enormous law costs.

Yours faithfully,

(Signed) JAMES EDMUNDS

RICHARD BANNISTER, Esq., F.C.S.,
&c., &c., &c.
