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Surrey County Council.

Medical Officers of Health.

ANNUAL REPORT,

1897.

WITH A REPORT OF

A CONFERENCE

ON

WATER SUPPLY,

ON MARCH 21st, 1898,

AND AN ACCOUNT OF THE

BIOLOGICAL METHODS OF SEWAGE DISPOSAL,

BY THE MEDICAL OFFICER FOR THE

County of Surrey.

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ANNUAL REPORT

OF THE

MEDICAL OFFICER OF HEALTH

FOR THE

Administrative County of Surrey.

1897.

My Lords and Gentlemen,

The following Report relates to the Public Health and progress of sanitary administration and improvements in the County during the year 1897.

Once more the County Medical Officer has been able to present this Report to the April meeting of the Sanitary Committee. But the difficulty in achieving this result has been even greater than that experienced last year. One of the chief causes of delay in presenting reports to the District Councils—to be forwarded by them to the County Council—arose on this occasion out of the Influenza epidemic at the beginning of the present year (1898). This gave the majority of Medical Officers so much occupation in private practice, as to have prevented attention in some cases to this matter. There are other obstacles in the way of early presentation which need not now be discussed. Suffice it to say that no effort has been spared to surmount them, and that the last of the district reports was received on March 31st. It is a matter of congratulation that in the County of Surrey it has been found possible for two years in succession to give an account of its administrative affairs in relation to public health, while the interest in them is comparatively fresh.

As regards Statistical Returns and Tables, in the preparation of which a great deal of time is occupied every year, these comprise now only two sets—viz., A and B. The first named, A, is a summary of corrected and adjusted statistical returns which the Local Government Board requires every Medical Officer of Health (a moiety of whose salary is repaid from the County Fund) to make to them, and copies of which, under the provisions of the Local Government Act, 1888, must be sent to County Councils. The second Table, B, which is abridged in this as in the previous Annual Report, is drawn up in as convenient form as possible for ready reference at public inquiries. As proof of the value of these returns it may be mentioned that at Guildford they have been the means of drawing public attention to a mortality among infants which has already brought about a notable reduction in the same; that they also furnish an indispensable record of the varying rates of mortality from Typhoid and other diseases, with regard to the prevention of which all Sanitary Authorities have such heavy responsibility; and that at public inquiries they have been referred to as a careful and impartial record of the death-rates. These Tables will be further referred to under the heading of "County Death-rate and Statistics."

In the Report for 1896 the subject of Water Supply in relation especially to Typhoid prevalence, was separately and specially discussed. The year now under notice, 1897, has witnessed one of the most remarkable and clearly demonstrated water epidemics of this disease which has ever occurred since the time when exact inquiries into the causes of epidemics were instituted in England. The occurrence of these "explosions" should teach us all a great lesson. It is one which has already been insisted on in Council and Committee by A. H.

Smee, Esq., J.P., F.S.S., &c. But there is an even larger lesson to be learnt: it is that the main cause of the persistent prevalence of Typhoid in many districts is due to continued neglect of sanitation, apart from water supply. It should always be remembered that, although the sudden occurrence of 1500 cases of Typhoid in the little town of Maidstone attracted universal attention, and powerfully affected the public mind, there must have occurred during 1897, sporadically or in groups, at least ten to twenty times that number of cases throughout the country and that in the vast majority the origin of the mischief is the nasty, unwholesome condition of dwellings and their drains and surroundings, which allows of the poisonous or infectious matter of this preventable disease being kept alive from one year to another, some day, perhaps, to get access to a public water supply through an "open door." The early recognition of the disease; its notification to Sanitary Authorities; the destruction of the poison; the improvement of dwellings and methods of sewage disposal, especially in rural districts, should rank as preventive measures of the first importance. This was the main argument of the Report for 1896.* In the Report for the year now under notice (1897) the subject of Water Supply need only be discussed from the administrative point of view. Opportunity will also be taken on this occasion to describe generally methods of sewage disposal, which have been under consideration during 1897.

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* Vide *The Times* Leading Article, June 7th, 1897, entitled "Water Supply and Typhoid"; also *The Times* Leading Article, December 27th, 1897, entitled "The Typhoid Bacillus," with a note on the same subject the following day, December 28th, 1897, by the County Medical Officer.

I.—COUNTY SANITARY ADMINISTRATION.

The above heading denotes the various branches of administrative work which come within the province of the County Council, and which relate to the safeguarding and improvement of the public health at present and in the future. The object being to "promote the efficiency" of the various departments of our complex system of local government, it is plain that conferences, formal and informal, with representatives of the Council, colleagues and officials, must constitute an essential part of the duties of a County Medical Officer of Health. The subjects on which he has been called upon for advice and assistance is indicated by a list taken from his diary. It includes the following, viz.:—

Statistical Subjects with the Medical Officers of the County, and with officials at Somerset House.

Water Supplies and Conservancy of Streams, &c.—With the Chairmen of the Council and Committee on numerous occasions; with General Scott, of the Local Government Board, and with several well-known Authorities on questions involving special knowledge, chemical, biological, hydrogeological and engineering; with the Chairman of the Thames Conservancy, Charles Burt, Esq., J.P., the representative of Surrey, and the officials of that Board, as well as with the Medical Officers of Health and, of course, the officials of Water Companies. The principal subjects calling for attention during the year have been the condition of the River Wey below Godalming and below Guildford; the Blackwater; the schemes for intercepting water at Waddon and in the Hindhead District. The County Medical

Officer has also had many communications and calls from Medical Officers of other Counties, on subjects in which the Surrey County Council has taken the initiative.

The Working of the Notification System and Sanitary Organisation forms a continuous subject for conference and discussion. The work has gone on very smoothly, and during the indisposition of the Medical Officer of the united districts every desired assistance was given to the Deputy whom he appointed.

Hospital Questions have engaged less attention lately, owing, perhaps, to the opposition raised in many cases, such as that at Whitemoor, to isolation hospitals, and to the lack of assistance from Crown Authorities, as at Egham. The County Medical Officer has always been ready to assist local authorities who are doing their utmost in this direction, as is the case at Farnham The Dorking Inquiry comes into a different category.

Vaccination is so closely allied to the two foregoing subjects, that it is bound to be mentioned here, although it is not even directed or controlled by Medical Officers of Health, and does not therefore usually form part of the Annual Report forwarded to the County Council. Still, whenever an alarm of Small Pox is given, and the County Medical Officer is consulted, Vaccination is, of course, the sheet anchor relied on for safety. During the year under notice the subject has been discussed by experts and responsible Medical Officers of Health on special occasions, as at the Incorporated Society of Medical Officers of Health, the Epidemiological Society, the Statistical Society, and the Sanitary Institute. The County Medical Officer has been required to take a prominent part in these meetings. The one important fact to record here is that whenever and wherever the meetings have been held,

and an expression of opinion has been given, there have been no two opinions among responsible Medical Officers of Health as to the indispensability of proper systematic primary Vaccination if the infant and juvenile population is to remain protected as heretofore.

The list of subjects which have also been referred to the County Medical Officer by various Authorities includes the following, viz.: the disposal of sewage and refuse generally—paper mill refuse—tannery refuse; the provision for scavenging at Albury; the complaints of Farnham sewage farm; Mr. Chart's Report on the Blackwater; the closure of schools, and the Memorandum thereon of the Medical Officer of the Local Government Board; the condition of the Beverley Brook below Worcester Park; the condition of the Sandpits at Egham; the much-needed provision of a Hospital for Egham; the proposed Small Pox Hospital for Croydon and Wimbledon; the Sanitary Conditions of the County Asylum, and the proposed Provision for Pauper Lunatics; the alleged Pollution of sources of the Medway; Gipsy Encampments dangerously near sources of water supply; suggested Regulations for Cowsheds and Dairies; the Cuddington Hospital and Small Pox Isolation; the Disposal of the Typhoid Poison at Hospitals generally; the Sanitary Condition of one of the County Police Stations; the Notification of Measles; the Disinfection of Verminous Persons; the Cleanliness of School Children; the Addlestone and Chertsey Drainage Question; Water Supply at Coulsdon; Communications from other counties and large towns relating to Typhoid Prevalence; the connection of houses with New Drainage Systems, the separation of rain Water Drains from Sewer Drains, and a number of kindred questions.

In connection with the subject of Disinfection, respecting

which householders desire information, the County Medical Officer begs to refer to the lectures given by himself at the Sanitary Institute, on the Principles of Disinfection and to a very good pamphlet on the Practical use of Disinfectants, by Dr. Gay, published by the National Health Association. He would also draw attention to the description of the disinfection or destruction of the Typhoid discharges or poison given in the Report of the Medical Officer for the Croydon Rural District.*

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* "During attacks of Typhoid, strong pails with tight lids are delivered every alternate day at infected houses for the reception of all excreta and other waste products of the sick room, and these contents are burnt. The method adopted here is to remove the pails to the sewage works, where their contents are mixed in a special receptacle with small cinders and ashes, and burnt in one of the boiler furnaces. It is not a finished method, compared with the special destructors used in some towns, but it answers well in a district such as this, where, fortunately, it is unusual to have many cases at a time. The total destruction of Typhoid dejecta is very important, and has been carried out by this Council for some years now. The most common alternative plan is to use the public sewer by means of the domestic slop-sink or closet, but, as ordinarily carried out, this cannot be regarded as free from danger. Another common method is that of burial, generally in the back garden; but this also would appear to be not altogether safe, in view of the recent investigations (of great importance in other directions as well) of Dr. Martin and others, which show that the Typhoid bacillus can exist for long periods and even multiply in soil contaminated with organic matter, such as is usual, more or less, in the neighbourhood of dwellings. The importance of these bacteriological investigations, both generally, and especially in relation to matters connected with hygiene and public health, is growing daily. It is easy to foresee that any future increase of knowledge respecting the causation and prevention of disease, the natural destiny, so to speak, of filth, and the extent and limits of its power for evil, will be very largely derived from bacteriology, and that upon its teachings, after full confirmation, will depend more and more the daily practice and administrative action of those engaged in public health work. The necessary facilities for carrying out bacteriological work is, in many places, now an integral part of the sanitary organisation, and this Council are providing such means for this district in the hospital now in course of erection."—*Annual Report*, 1897, *Croydon Rural District.*

The only communication received on the subject of the administration of the Food and Drugs Act has been from the neighbouring County of Hants.

The following is a list of Local Government Inquiries, notice of which was sent to the County Council or which the County Medical Officer was specially requested to attend:—

Leatherhead Drainage Scheme (Provisional Order).

Woking, Extension of Drainage Scheme.

Stoke-next-Guildford, Constitution of Special Drainage District.

Croydon County Borough Water Supply Pumping Station at Waddon.

Croydon Sewage Disposal Area at Beddington—Proposed Extension thereof. (After much preliminary enquiry and negotiation a compromise was arrived at between the Corporation and the objectors to this scheme. The formal open inquiry did not therefore take place.)

Croydon Rural, Extension of Sewerage Work and Prevention of River Pollution.

Molesey. (Small extension of sewerage work.)

County Borough of Croydon, Urban District of Wimbledon, and Rural District of Croydon, under Sec. 279, Public Health Act, 1895, as to Application for an issue of a Provisional Order, forming the above into a United District for the purpose of providing Hospital Accommodation for the reception of cases of Small-Pox.

Limpsfield and Oxted Drainage Scheme. (The Septic Tank System with land in addition according to the requirements of the Local Government Board).

Cheam and Cuddington Extension of Sewerage, &c., (including much-needed improvement at the outfall).

Of the above Inquiries, those at Leatherhead, Croydon, Limpsfield and Oxted had to do with important questions of principle. They naturally extended over a considerable period of time, and required very close attention. In accordance with precedent and instructions, the County Medical Officer was present at the Inquiries, primarily for the purpose of affording to the Inspector holding the same any information he had in his power to give upon the general subject, and of reporting to the Sanitary Committee. In some cases, as at Leatherhead, Croydon, and Oxted, Drainage and Water Inquiries, he has in addition, by the desire of the Inspector, and with the consent of all parties, made an independent statement towards the conclusion of the Inquiries.

The Inquiry at Dorking under the Isolation Hospitals Act, 1893, was held on Friday, March 26th, by the following Members of the Council:—

Wm. Welch, Esq. (Chairman).
W. G. de F. Garland, Esq.
Sir Benjamin Brodie, Bart.
Charles Burt, Esq., J.P.
Col. E. A. Fitzroy.

The Report and Conclusion of the Committee appears in the May Volume of the County Council Reports, pp. 303-310.

In connection with his General Report on Water Supply, which, together with the Annual Report for 1896, was before the Council in May last, the County Medical Officer continued his inquiries respecting the Sources of Water Supply in various parts of the County, and in conjunction especially with the

Medical Officer of Health for the Croydon Rural District, he has extended them to the underground disposal of refuse and animal organic matter which have been thought of by some in connection with souces of water supply.

As usual, a number of cases of river or stream pollution have called for investigation by the County Medical Officer. Some of these have been serious and important; others, comparatively speaking, of a trifling nature.

All the principal Sewage Outfall Works in the County were visited at a time of the year when the effects of mismanagement or neglect were most likely to be apparent. After making these visits, the County Medical Officer communicated with the Medical Officer of the district, so that any necessary representation to the District Council might be made without delay.

The County Medical Officer visited the Cuddington Isolation Hospital soon after it was opened, and by special request he has visited two other hospitals in the County during the year under notice, for the purpose of conferring with the Medical Officers who desired his advice on questions of doubt or difficulty.

Fortunately, the year has not been marked by any notable prevalence of epidemic disease. The County Medical Officer has only once been referred to, on the occasion of an outbreak of Small Pox at Bandon Hill. A remarkable little outbreak of Typhoid is referred to in a footnote to this paragraph * Any notable

* "At Thursley the large number of Enteric Fever cases was due to a serious outbreak of that disease which occurred in a sequestered valley in the hollow of Hindhead, named the 'Devil's Punch Bowl'; the particular part of the valley affected is called Highcombe. Here there were twelve cases, about one-fourth of the inhabitants; the cause of the outbreak was contamination of the drinking water. The initial case occurred on January 19th, and was not recognised until about three weeks after; it was thought to

prevalence of Typhoid and Diphtheria cases in any locality of the County usually necessitates conferences or consultations of the District and County Medical Officers, and every month correspondence takes place between the Medical Officers on the subject of preventive measures as applied specially to these two diseases.

The above work entails, of course, a great number of journeys of inspection, &c., the record of which is regularly submitted to the Sanitary Committee, and a very large amount of personal correspondence, which has been conducted as usual.

Except for a change in the office of Sanitary Inspector or Inspector

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be a case of influenza. It was notified to me on the 11th February. This case occurred in a small cottage of three rooms—all on the same floor—which was very much overcrowded at the time of the outbreak, seven persons sleeping in one of the rooms, which was the only bed room, the other room being used as a scullery or pantry. Thirteen people must at one time have occupied these three small rooms The stools of this first patient were thrown over a wooden paling close to the house, as their dangerous character was not recognised at first. This small cottage had its water supply from a spring on a raised piece of ground above the house. The spring emptied itself by means of a small underground channel which ran in front of the house, and afterwards supplied another cottage about a hundred yards lower down by means of a spout. Finally the stream flows through the Punch Bowl. After leaving the front of the first cottage, this small underground stream flows past the piece of ground (about three feet distant, and about one foot from the surface) upon which the stools of the initial patient were thrown ; some of these stools were also thrown into the cottage privy, which lay higher but in the same line as the underground stream. If it may be remembered, at this time the weather was damp and rainy, when the ground would be in a favourable condition for percolation, the underground stream would soon be contaminated, and in this condition was drunk by the inmates of the cottage lower down, five of these people being ill with Enteric Fever. Recognising the seriousness of this outbreak, I called in the help of the County Medical Officer of Health, who visited the spot with me on three occasions. The milk supplies of the valley were carefully inquired into, as also the other water supplies. Stringent instructions as to the disinfection, &c., of the stools were given to the nurses in charge, and the serious consequences pointed out if these were neglected ; the stools were disinfected with a 1 in 500 solution of corrosive sublimate and buried some distance from the cottage. On visiting the spot on the second occasion, the cases were

of Nuisances at Reigate, the *personnel* of the County Medical and Sanitary Staff remains the same as when last reported upon. The previous Reports have dealt thoroughly with the subject of Medical and Sanitary Organisation in the County. It will probably be considered unnecessary, therefore, to say more under this head at present, especially as it will have to be reverted to under the heading of Water Supplies.

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found not to be doing well, and this will be easily understood from the overcrowded state of the cottage—seven cases were lying ill in this small cottage. After a consultation with the medical man in charge of the cases, the County Medical Officer of Health and myself, it was pointed out to the parents and friends that if these valuable lives were to be saved, prompt measures must be taken at once ; and it was finally decided to remove those cases which the medical man in charge thought would not have their lives endangered by the journey. They were then removed to the Hambledon Union Infirmary. After this, a great improvement took place in those left at home as well as those who were removed, and ultimately not a case was lost. We then took steps to trace the cause for the initial case. About a month before he took ill, he was at work as a mason in a new building at Haslemere called High Rough, in company with a number of other workmen ; here he had drunk from a bucket ; the supposition was, that one of these other workmen might have been suffering from a slight form of Enteric Fever, and have infected the bucket afterwards used to hold drinking water ; on a careful examination of these men, and inquiry of their medical advisers, all that could be ascertained was that one of the men was subject to attacks of 'Dysenteric Diarrhœa.' The first lad attacked was also known to have helped to empty a small cesspool which had become choked at a dwelling-house at Haslemere ; but as he did this six weeks before he became ill, the time was thought to be too long, although there was the evidence that a case of 'Diarrhœa' occurred at the house, but this was proved on eminent authority to be simple Enteritis. Of course there was the chance that this lad might have eaten some infected article of food." The limitation of this outbreak, which might under other circumstances have proved the source of widespread mischief, must be ascribed to the measures of precaution taken.—*Annual Report*, 1897, *of the Medical Officer of the Hambledon Rural District.*

TABLE B (Rural), 1897.—Density, Birth-rate, Death-rates from all Causes, from the principal Zymotic Diseases, and from Diseases of the Respiratory Organs, and Infant Mortality.

RURAL DISTRICT.	Birth-rate to 1000 persons living.	DEATH-RATES TO 1000 PERSONS LIVING.				Deaths of Infants under one year to 1000 Births.
		All Causes.	Principal Zymotic Diseases.	Phthisis.	Respiratory Diseases.	
Chertsey	26·4	10·2	0·92	0·83	1·94	115
Egham	26·4	15·2	1·35	1·17	2·06	150
Farnham	29·9	15·3	1·90	0·75	2·04	95
Hambledon	23·6	12·2	0·60	0·70	1·66	94
Guildford	23·7	11·2	0·88	0·74	0·88	82
Dorking	17·5	11·3	0·28	1·12	1·31	59
Epsom	22·0	11·2	0·64	0·99	1·40	101
Croydon	26·8	11·3	1·76	1·08	1·47	97
Reigate	24·9	10·4	0·20	0·65	1·76	81
Godstone	21·7	13·2	1·56	1·04	2·32	127
Total of above Districts	24·4	12·1	1·09	0·91	1·65	100

TABLE B (Urban), 1897.—Density, Birth-rate, Death-rates from all Causes, from the principal Zymotic Diseases, and from Diseases of the Respiratory Organs, and Infant Mortality.

URBAN DISTRICT.	Birth-rate to 1000 persons living.	DEATH-RATES TO 1000 PERSONS LIVING.				Deaths of Infants under one year to 1000 Births.
		All Causes.	Principal Zymotic Diseases.	Phthisis.	Respiratory Diseases.	
Barnes	21·8	11·0	1·48	0·94	1·36	143
Richmond	23·7	12·4	0·81	0·98	1·75	139
Wimbledon	25·9	12·5	1·91	0·53	1·38	120
Ham	23·7	5·3	...	...	...	83
Kingston	30·3	16·0	2·67	1·16	2·25	151
Esher and Dittons	23·5	11·1	1·68	0·45	1·12	148
The Maldens & Coombe	21·8	10·3	1·55	0·86	1·03	31
Surbiton	25·4	11·0	1·32	0·47	1·32	113
East & West Molesey	21·7	11·6	0·32	0·95	1·27	146
Chertsey	25·7	14·1	0·95	2·22	1·50	108
Weybridge	19·2	8·2	...	1·10	0·88	69
Walton	24·2	9·4	0·79	1·01	1·46	98
Farnham	29·4	12·6	1·26	1·26	1·44	68
Frimley	24·2	11·0	1·31	0·98	2·13	108
Godalming	22·9	12·3	0·89	0·89	1·44	87
Guildford	21·2	11·2	0·37	1·54	1·29	93
Woking	40·8	14·1	1·52	0·65	1·74	104
Dorking	23·4	15·7	1·31	1·57	2·61	73
Leatherhead	21·1	10·6	1·67	1·04	1·25	89
Epsom	22·7	11·3	1·17	0·75	1·92	146
Sutton	21·9	12·7	2·42	1·24	1·80	139
Carshalton	27·7	15·0	2·93	1·21	2·76	186
Reigate	21.8	10·8	1·03	0·99	1·55	96
Total of above Districts	24·8	12·3	1·42	1·01	1·62	119

II.—COUNTY DEATH-RATE AND STATISTICS.

The population of the Administrative County, estimated, in the usual way, to the middle of 1897, was, in round numbers, 458,000. The deaths during 1897 being 5599, the death-rate per 1000 persons living was **12·2**. The average death-rate of the County during the seven years 1889-95 was 13·6. The death-rates of 1896 and 1897 were both of them 1·4 below that average.

The death-rate of the Urban Districts was 12·3, and that of the Rural Districts 12·1.

The County birth-rate for 1897, calculated in a similar way, was **24·7** per 1000 persons living. This is below the average birth-rate of the past seven years.

In referring to rates of mortality, &c., it must be borne in mind that we are now at a considerable distance of time from the last census, and that in consequence these estimates can only be regarded as approximate and provisional, seeing that they are based on populations which in some instances may be found, at the 1901 census, to have diverged considerably.

In this connection it is desirable to briefly review the system for the correction or adjustment of the death-rates which is followed by the District and County Medical Officers.

In the first place, it is plain that the existence of huge asylums, &c., in Surrey districts, such as those at Caterham and Banstead, occupied as they are by populations strictly belonging to the Metropolis, and amongst whom, owing to

illness, an abnormally high death-rate prevails, would seriously affect the calculations of the death-rates, and would, generally speaking, give a very erroneous impression of the respective healthiness of the districts. The only course is to eliminate these populations and deaths altogether from Surrey, and to refer them to the County Medical Officer of Health for London.

In like manner, the existence of the County Asylum at Brookwood, of the Royal County Hospitals at Guildford and Richmond, necessitates the elimination of the deaths which do not belong to the districts in which they occur, viz., Woking, Guildford and Richmond, and their relegation to the district from which they came. The floating populations of the Hospitals are small in proportion to those of the areas in which they are situated, and so far as they are concerned the correction is not complicated by the question of how to allocate the populations. All will agree then that these corrections are necessary, and that without them a false representation of the death-rates may be made.

To go a step further. The suggestion has been made and partially carried out in some districts, that the deaths occurring at workhouses should be distributed in like manner. But in some instances the inmates of the workhouse must be regarded as residents of the districts, and it would seem more fair to accredit their deaths to the districts where they die and are buried, than to those from which they came. If the deaths should have to be referred to the districts which the persons may have left many years before, then the proportions to which the districts contribute to the population of the establishment would have to be taken into account, so that an infinity of trouble may be taken to make corrections which are, after all, only apparent

in the decimal fraction column. Moreover, if, as a general rule, workhouse corrections are to be made, there would, in some districts (health resorts), arise the further question, whether in the case of visitors dying in a locality allowance should not be made, and so on till the stage of affectation in the way of correction is reached.

There may, however, be exceptional cases, in which the distribution of workhouse deaths becomes necessary for the purposes of a fairly correct estimate of the death-rate. Farnham is a case in point. The Union Workhouse is a sort of Hospital for Aldershot, and, as it was said in a former County Report, the accrediting these Aldershot deaths to Farnham would be very fallacious. The death-rate of Farnham for 1897, *with* the workhouse deaths included, was 20·2; *without* the workhouse deaths it was only 12·6. In like manner, it is contended that the Kingston Workhouse, situate close to Norbiton Station, is virtually a hospital for this very large and populous Union, and that consequently it may be necessary, every year, to distribute the population and deaths belonging to the component parts of the Union, viz.: Kingston, Wimbledon, Malden, Ham, Surbiton, Esher, The Dittons, and Molesey. There are difficulties in the way of doing this, but if the absence of the correction in this case appears to falsify the death-rate estimate to an extent worth consideration, it must be done, whatever the trouble and cost may be. In that case the Kingston Workhouse like that at Farnham, would be treated as a hospital. It is understood that the Registrar of Deaths has instructions from the Authorities at Somerset House to record the previous place of residence of every person dying at the workhouse; if this is done, and a copy of the register is sent to the Medical Officer of

Health for Surbiton and the other districts, it should be possible for him to make his corrections. If this is not done, it is suggested that an arrangement should be made between the Sanitary Authorities and Guardians of the districts concerned that a list of deaths, with ages, causes of death and previous residences, be prepared by the workhouse master as soon as possible after the 1st January each year, just as is done at the present time by the steward at Brookwood Asylum. If the workhouse master could at the same time furnish an estimate of the average proportion of inmates belonging to the component districts, the correction would then be feasible.

The Report of the Medical Officer for Surbiton contains reference to this subject. The Report of the Medical Officer of Health for Kingston Borough, which was made and courteously forwarded to the County Council with remarkable promptitude, also takes account of this particular difficulty.

Turning to the lessons to be derived from the statistical returns so carefully prepared. There is, first of all, "infant mortality" to be considered. It is very gratifying to learn from the Report of the Medical Officer for Guildford that the death-rate was reduced from 83 in 1896 to 49 in 1897. This very remarkable reduction was, in the opinion of the Medical Officer of Health, "due in great measure to improved sanitary arrangements consequent on the carrying out of the new sewerage operations." As the reduction of the infant mortality in Guildford, following directly upon the representation of the County Council, has been so marked that it amounts to almost 30 per cent., (calculated on the average of the last ten years), it is suggested that it may be desirable to extend these representations.

The infant mortality in the whole County in 1896 (*i.e.*, the number of deaths per 1000 births) was 110, and in 1897 a little higher. What is even more significant, it rose, in the Urban Districts, from 112 in 1896 to 119 in 1897. The County Medical Officer has had considerable official experience. His Reports as Medical Officer for Nottingham, 1872-83, dealt with the subject from the sanitary, social, and medico-legal aspects. In his opinion the fact of excessive infant mortality existing in two Rural Districts, viz.: Egham and Godstone (which includes Caterham), and in a number of Urban Districts, viz.: Barnes, 143; Richmond, 139; Kingston, 151; Esher and Dittons, 148; Molesey, 146; Epsom, 146; Sutton, 139; and Carshalton, 180, is important and should be specially noted for local inquiry by the District Councils concerned.

The Zymotic mortality is low, taken altogether (1·29 per 1000 population); but the death-rate from Typhoid continues to be a substantial item, which is unsatisfactory, seeing that this is a distinctly preventable disease.

The most satisfactory feature in the returns for the whole County is the low death-rate from Phthisis, *i.e.*, pulmonary consumption (under 1 per 1000 population). The connection of the prevalence of this disease with conditions of the soil is matter of great medical interest. The Phthisis death-rate in Surrey is low as compared with Kent, Sussex, and Hampshire, slightly under 1 per 1000 population. It is only by taking a number of years in succession for comparison that it is possible to draw any conclusion with regard to immunity of particular districts in the County.

In connection with the prevalence of Phthisis and tuberculous diseases generally, the supervision of cowsheds is of the first importance.

Respiratory diseases caused 1·63 deaths per 1000 of the population. Many of these deaths were primarily due to Measles or Influenza, and were to some extent preventable.

III.—PREVENTIVE MEASURES.

The discussions which have taken place on the subject of Vaccination at meetings of responsible Medical Officers have been briefly referred to above. Nowhere in these discussions has there ever been any difference of opinion as to the great danger of abandoning our first line of defence against epidemic Small Pox—namely, the compulsory Vaccination of infants. The system, inaugurated forty years ago under the Privy Council, has stood the country in such good stead for so many years, that, as the Royal Commission express it, it is impossible to contemplate its abandonment at the present day "without dismay."

There were three cases of Small Pox in the Croydon Rural District, and one case in the Epsom Rural District, in 1897.

As regards provision for the isolation of initial cases of Small Pox, no substantial progress has been made. It is stated in one of the reports that cases of Small Pox are removed from one of the districts in Surrey into another County north of London!

The districts of Croydon and Wimbledon are about to provide accommodation in conjunction with Croydon County Borough. It was remarked by the County Medical Officer at the Preliminary Inquiry that it is of course expected that the site will be well chosen as regards isolation and convenience for neighbouring districts in the Administrative County.

As regards Diphtheria, in addition to the remedy of those insanitary conditions which may possibly influence the spread

of the disease, further progress has been made in the early discovery and mitigation of the disease, by extension of the bacteriological aids to diagnosis, and in facilitating the Anti-toxin treatment in the early stages of illness. Most of the reports contain an account of what is being done by local Sanitary Authorities in these directions.

The Medical Officer of Health for Surbiton refers to the letter which was sent by the District Council on his recommendation, on January 7th, 1895, to every medical practitioner in that district. Three years ago he pointed out the great advantages in the modern means of diagnosis, and in the early treatment of cases with subcutaneous injections of reliable serum. The circular letter now referred to states that "the District Council, through their Medical Officer of Health, have made special arrangements with the British Institute of Preventive Medicine, to make the requisite bacteriological examination of suspected cases of Diphtheria, and to supply sufficient reliable Anti-toxin for the treatment of one average case." He adds that these facilities are still available.

The Medical Officers for Kingston, Malden and Esher all refer specially in their Reports, for 1897, to the great importance of the early treatment of cases of Diphtheria with Anti-toxin.

The Medical Officer of Health for Kingston gives a description of the mode of preparing Anti-toxin. The Report then continues as follows:—

"The point of greatest importance in this mode of treatment is that it should be commenced at the very earliest moment.

"The injection of the Anti-toxin has no effect on persons not suffering from Diphtheria, so that there is no reason for delay.

"The percentage mortality of cases treated on different days of the illness, before the introduction of Anti-toxin and since, is shown in the table :—

	1st day.	2nd day.	3rd day.	4th day.	5th and later.
Without Anti-toxin	22·5	27·0	29·4	31·6	30·8
With Anti-toxin	4·7	12·8	17·7	22·5	24·6

"It will therefore be clearly seen that although the results with Anti-toxin are always more favourable, still it is the results of its use on the first day of the disease that show the most marked difference.

"The effect of the treatment is also most marked in the case of young children, amongst whom the disease is most fatal."

In the same Report much stress is laid upon the need for an isolation hospital for this important district. This necessity is felt more in the case of Diphtheria than in any other disease, except perhaps, Small Pox. If it is desired to state the diseases in which the benefits of hospital isolation appear to be greatest, the order would be as follows :—

Small Pox, in the absence of compulsory proper re-vaccination.

Diphtheria, for isolation and the anti-toxin treatment.

Typhoid, for the nursing advantages and the destruction of infectious material (the poison of the disease).

Measles and Scarlatina, for isolation and treatment.

The last-named disease, Scarlatina, is of a milder character than formerly. In fact, although so much more attention is given to it at the present day by Sanitary and Hospital Authorities, to whom cases have to be notified, it really appears to be sometimes less serious than Measles. On this point the

Medical Officer of Health for the Croydon Rural Sanitary Districts gives some interesting and valuable experiences in his Report. Writing on the subject of Measles, the notification of which is compulsory in that part of the County, he says :—

"Although Measles began to prevail almost simultaneously with Scarlet Fever, it spread much more rapidly, for whereas the former reached its height in April and the beginning of May, the latter did not do so until May and June, the reason being the greater infectivity of Measles. With the exception of the 7 cases at the end of the year, 117 cases of Measles occurred in Mitcham in 70 houses, and there were 5 deaths, or a fatality of 4¼ per cent. of the ascertained cases. The disease was, therefore, more dangerous than Scarlet Fever, the fatality from which was 2½ per cent., in 190 cases. But the type of Measles was, comparatively speaking, severe, and a large proportion of the sufferers were children under 3 years of age. The fatality in 1896 in the much larger epidemic of 626 cases was considerably less, namely, 1½ per cent."

The medical and sanitary inspection of Schools continues. The Reports of the Medical Officers of Health for Woking, Guildford Rural, Kingston, and Croydon Rural contain, as usual, a great deal of valuable information on this important subject. The extent to which supervision of this kind is practicable, and likely to prove of public benefit, has yet to be decided. In the meanwhile, it may be noted here that special account is taken of the experiences recorded in the Reports of Medical Officers of Health.

There need not, on this occasion, be any separate reference to the establishment, extension, or routine working of Isolation Hospitals, inasmuch as the subject was fully discussed in the

Reports for 1896. Elsewhere in this Report, mention is made of the opening of the Hospital at Cuddington, and of the efforts that are being made in the Croydon and Farnham districts to provide efficient accommodation.

The Council's Inquiry at Dorking is specially reported elsewhere.

The position of things at Egham is indicated by the accompanying extract from the Report ofthe Medical Officer of Health.

"The Notification Act is in force in the district and every notified case of infectious disease is inquired into and watched, but up to the present time it has not been found practicable to obtain a suitable site for an Isolation Hospital. During the year, a Committee was appointed to confer with the Crown Authorities, to whom so large a proportion of the land belongs, in the hope of being able to arrange for such a site, and the Crown Surveyors gave their consent to the sale of a plot of land, of between two and three acres in extent, between Cooper's Hill and Runnymede, on condition that a public meeting of the inhabitants should be specially held to consider the proposal, and that their approval of the same would be held to be *sine qua non* as regarded further negotiations. This meeting had not been held up to the end of 1897, but it has been held since, and it was pointed out by inhabitants having an intrinsic knowledge of the locality that it closely adjoined a part of Runnymede which is specially liable to floods, and that in consequence of its low level, and the character of the marshy land, such flooding persists after it has disappeared elsewhere, and gives rise to offensive emanations of such character and amount as to render the proposed site unsuitable for hospital purposes. A resolution was, however,

passed, affirming the necessity for such provision, and during the coming year I trust that the efforts of the Authority to obtain a fitting site may be more successful than they have been hitherto."—*Annual Report*, 1897, *Egham District.*

One other fact deserves to be recorded under this heading of Preventive Measures. It is that in the Croydon Rural District steps have been taken to prosecute persons for spreading infection, in accordance with the provisions of the Public Health Act, which, as yet, have been seldom resorted to by Authorities.

IV.—PUBLIC WATER SUPPLIES.

In the Annual Report for 1896, issued by the direction of the Committee early in 1897, the County Medical Officer summarized for its convenience certain general information derived chiefly from Government reports, works of reference, and reliable text books on hygiene and water supplies, together with his own observations, commenced in 1873, and continued ever since, on the conditions which control the spread of Typhoid.

For reasons then submitted, (the cogency of which seem generally admitted) it is essential that, in systematic measures for the safeguarding of water supplies, medical knowledge respecting the natural history, development and methods of spread of waterborne infectious diseases should be taken into account. Long ago it was fully recognized that Typhoid may be suddenly spread to an alarming extent by means of infected water. Such epidemics naturally attract an immense amount of public attention and emphasize the importance of the subject. But it must also be admitted that a very large proportion of the cases reported on, carefully and in detail, year by year, by Medical Officers of Health, are in no way traceable to infected water supplies; and that, on the other hand, certain inhabited areas and localities, not only in towns but in country districts, give distinct evidence of a special liability to Typhoid prevalence, although, as regards water supply, they are on the same footing as other neighbouring Typhoid-free districts. The control of filth nuisances generally

referred to at p. 56 of the last Annual Report for the County, is specially mentioned as one of the most essential measures of prevention.*

This aspect of the question, which immediately concerns the Council, will be referred to presently; in the meanwhile, for the purposes of this Report, and in order to preserve the order of things, it is necessary to briefly review other aspects which have in various ways been under the consideration of the Sanitary Committee of the Council.

In the summer of 1897, an important Inquiry took place at Croydon Town Hall, before a representative of the Local Government Board, as to a proposed pumping station at Waddon. It is referred to on p. 695 of the County Council Volumes of 1897, under the heading "The River Wandle." This Inquiry gave occasion for the discussion of two questions relating to Public Water Supply which are certain to require further attention.

The first of these relates to the interception or abstraction of underground water, (whether in motion or comparatively still), and the legal points involved. This is a subject which, belonging as it does specially to the province of water engineers and hydrogeologists, is not one on which Medical Officers can be expected to give responsible advice, although it is of great interest to them, and its importance is dwelt on in the Report for 1896. Here it may be recorded that the Council, without committing itself too generally to "promotion of research" in this direction, has, following the motion of Mr. Smee, sanctioned the preparation of a special "Report upon the water resources of

*Vide "*The Lancet*" Leading Article, June 12th, 1897, entitled "Water Supplies from the Chalk in relation to the Public Health."

the River Wey watershed to begin with" (p. 48, C.C. Vol., 1898). In this connection, the valuable Address to the Sanitary Institute in the autumn, by Mr. Whitaker, F.R.S., may be referred to He there makes use of a term, "protective area," as signifying an area acquired by one company and from which no other company or authority shall be permitted to abstract water. Now, it will be obvious to the Council, having regard to questions which have been under consideration at Sutton and elsewhere, and which are rather of sanitary and medical significance, that this term "protective area" would be more appropriately employed if used to denote the extent of ground (included in what is termed the "cone of exhaustion") which should be acquired in order to protect from *pollution* the water taken therefrom. The expression "protection" in the one case refers to quantity, and in the other to quality, which latter meaning is more important from the point of view now under discussion.

This brings us to the second aspect of the subject, on which the Local Government Board was asked to decide by the Croydon Corporation last July. It is that of the probability and possibility of our water supplies becoming contaminated by sources of pollution near and remote. By the wish of the Council the County Medical Officer was present at the Local Government Board Inquiry, and gave evidence in accordance with conclusions arrived at and expressed in his Report. He most emphatically gave it as his opinion that the system of allowing sewage to drain into, and soak away in the chalk or other water-bearing strata, was to be strongly condemned. This will be referred to presently in connection with the Conference of Medical Officers, and to their practical sugestions for checking this baneful system.

In the meanwhile, the Maidstone Epidemic occurred, which following the other Typhoid Waterborne Epidemics of Newport and Worthing, caused a general feeling of uneasiness among those who have duties and responsibilites in connection with the public health, especially the Medical Officers of Health, upon whose shoulders the responsibility was certain to fall in the event of "explosions," as sudden epidemics of this kind are aptly termed. This feeling, which was general throughout the country, manifested itself first of all at the Meeting of the Sanitary Committee of the Surrey County Council, held on October 12th, 1897, and presided over by Mr. Welch. Instructions were then given to the County Medical Officer, that he should report on the best means to be adopted with regard to:—

(*a*) Watching the various sources of water supply within the County utilised by Local Authorities and Companies other than the Metropolitan Water Companies.

(*b*) Obtaining analyses of the water, if and when, and as frequently as the County Medical Officer of Health may think advisable.

(*c*) Reporting to the Committee from time to time.

Agreeably with these instructions he considered the questions, administrative, official, and other, involved in the above, and in due course reported as follows:—

"In the first place I desire to draw special attention to a point of great practical importance, and which very directly bears upon the subject matter of the present Report. It is the public danger which may arise from carelessness about the poison of Typhoid, whereby air, earth, water, or food may become infected. The system, which requires the compulsory

notification of Typhoid and other infectious diseases, with regard to which sanitary authorities and water companies have heavy responsibility, was inaugurated at Huddersfield, Bolton and Nottingham almost simultaneously about twenty years ago. Much discussion took place at the time as to the necessity for including each of the diseases mentioned in the Schedule. With regard to Typhoid, it was strongly urged that where the poison was intercepted and soil infection prevented, and where the material known to contain the poison could be subjected to sufficiently destructive processes, that there diffusion of the disease could be stopped. The history of Typhoid prevalence, where notification and skilled disinfection has been carried out, has fully justified the anticipations of the promoters of the system. It is obvious that where hospitals are provided for the isolation of Typhoid cases that cannot be properly attended to at home, all this work will be much more efficiently carried out than is otherwise possible, and that corresponding advantages will accrue to the public health. It may be further mentioned that, besides approved methods of disinfection, new apparatuses for the sterilization and destruction of infectious or poisonous materials have been tried at Cholera hospitals, and that from accounts quite recently received they are likely to prove very useful if attached to the wards used for Enteric or Typhoid Fever patients.

"The reason for referring specially to this aspect of the subject is obvious. It is that, from the medical point of view, preventive action, which deals with the actual sources of danger, is even more effectual than that which aims at dealing with circumstances, the potentiality of which for harm is more or less hypothetical.

"Proceeding now to consider 'the watching' of the sources of water supply. This has always, of course, been within the province of Medical Officers of Health generally. By inspections and investigations the discovery of new channels of infection has come about. The promotion of sewerage works for towns large and small, for the purposes of preventing danger to water supplies derived from rivers, has long been an important and useful work. So, also, has that of dealing with sources of pollution to shallow wells. With adequate assistance, skilled, informed and instructed, this work of safeguarding and examining water supplies, coupled with action taken under the Public Health Act for remedy of nuisances, has been very successfully carried on for many years, with resulting diminution of zymotic waterborne diseases. Typhoid in England, as was pointed out in the Annual Report, has been reduced by more than 60 per cent.*

"The desirability of promoting and extending these local inspections to subterranean sources is the subject immediately under consideration at present. The necessity for Medical Officers of Health being in this, as in other matters, connected with the public health, the chief examiners of the conditions affecting, or threatening to affect, water supplies, is apparent, not only from orders relating to our duties, but also from the provisions of the Public Health Acts under which remedial action would have to be taken.

"For example, if within the 'protective area' of a particular water supply there was a wasting cesspool, action for its removal

* For full information respecting the decline of Typhoid mortality in England, and the varying rates of mortality in the different counties, *vide* Twenty-Sixth Annual Report of the Local Government Board, 1896-97—Supplement containing the Report of the Medical Officer for 1896-97. Together with excellent illustrative Maps, prepared by H. Timbrell Bulstrode, M.D. The whole Volume to be purchased through any Bookseller. Price 4/8.

as a nuisance, within the meaning of the Acts, rests on the opinion and certificate of the Medical Officer of Health. In the case of certain 'protective areas' which are considered to be more especially exposed to risk, and where the Company is supplying the water to inhabitants in several sanitary districts, the work of investigation needs to be continuous. In such a case also, the Medical Officers for different districts being concerned, the co-operation of the County Medical Officer of Health is desirable, and even necessary, with a view to a joint report. Further than this, in the case of all sources of County public supplies, a periodical annual visit might be made by the County Medical Officer of Health in conjunction with the Medical Officer of Health of the District. Any report made would then be a joint report of the District and County Medical Officers of Health. The County Medical Officer of Health would report, as previously, on the results of these inquiries, &c.

"In our own County the harmonious manner in which District and County Authorities and the Officers generally have hitherto worked together, lead me to anticipate that the above scheme would work out satisfactorily. It needs, however, to be specially remarked *that adequate assistance must be afforded.* The occasional specialist expert advice or assistance is not referred to at present; but the Committee may be reminded of what has been said in the Annual Report about the statutory duties of the Sanitary Inspectors or Inspectors of Nuisances under the Public Health Act. It is quite essential that the Inspectors, whether they are acting separately or whether the duties are attached to those of District Surveyors, should be guided by the Medical Officers in this important part of their work. In this way, and with the help of officials of the Water Company in collecting samples, &c., the public health requirements of the County might, I think, be very well met, so far as 'field observation' is concerned.

"(*b*) As regards analyses, already the Companies have responded to the Council's invitation, and have furnished copies of analyses by well-known analysts.* With regard to chemical or biological analyses—their purpose and the lessons to be derived therefrom—I would repeat what has already been said in the last Annual Report. In many cases in which it is resorted to, it is unnecessary, for the reason either that the water is not liable to contamination, or in others that it is evidently polluted. On the other hand, there are many cases of important and extensive public water supplies, from subterranean as well as river sources, where analysis, chemical and bacteriological, systematically conducted, is an indispensable part of a complete sanitary investigation. I would express my entire agreement with those who, in such cases, deprecate the habit which some water authorities have of shielding themselves behind a single analysis. I believe that the chief use of chemical analysis in the future will be in affording, in certain particular cases, of noting variations from the *standard or normal conditions* of the supply, and that in regard to bacteriological examination one of the chief uses is to determine the significance of micro-organisms, and their relation to each other. Much progress is being made in this new department of laboratory research, but I would repeat that it is a great mistake to suppose that the data are sufficient to enable the bacteriologist alone to form definite conclusions.

"As to the number and occasion of analyses, I would venture again to offer my opinion that, although the resolution of several companies to have quarterly analyses is distinctly a step in advance, and quite in accordance with the views summarized in the Annual Report, still, in some cases, companies might

* Copies of Analyses relating to twenty-three sources have been received. April 19th, 1898.

find it better to arrange their analyses so as to ascertain the effects of excessive or deficient rainfall, and other conditions. Seeing that the companies have always been ready to grant me facilities for local inquiry, and have shown readiness to give information, there is, I think, every prospect that very valuable information as to the character of the waters will be obtainable in this way. In certain cases this information may have to be checked by analyses made at your own instance. Under what circumstances, and by what arrangement, these last should be carried out, must to some extent depend on the result of antecedent inquiries such as those already alluded to, which are now in progress, respecting the 'protective areas.' These inquiries must be conducted by the Medical Officers of Health, whose responsibility in such matters must be fully recognised.

"In conclusion, I would beg to offer a remark on this question of the responsibility of Medical Officers of Health. In the case of eminently preventable diseases, which may assume epidemic form, it is very heavy. In fact, there are few public servants who are called upon to bear a heavier burden of responsibility. Having been for several years a local Medical Officer of Health, and having had in that capacity to initiate measures of prevention in the case of preventable epidemic disease, I feel that I have earned the right to urge on the public the consideration which I strongly hold is due to my colleagues. In their responsibility I have shown myself, as County Medical Officer of Health, always ready to take my share. At the same time, I feel sure that my remarks will be appreciated when I say that, in questions of joint official responsibilities, it is only prudent and proper that a clear understanding should be arrived at in the first instance by those chiefly concerned, not only as to the lines of investigation, but also as to those of report, as well as

the action which is likely to follow thereon. From the general public desire, and from the harmonious relations with my colleagues, which have happily existed during the few years that my work has been in Surrey, I augur favourably, and fully anticipate that we shall be in a position to make a very useful joint report. But I could hardly deal with the subject of your instructions without referring to the necessity for that cordial co-operation which it has at all times been my desire to promote, and which, in matters of joint responsibility, is absolutely essential."—Signed and dated January 14th, 1898.*

After the above Report had been considered by the Committee and referred to at the Council, Mr. Welch, the Chairman, took the initiative and convened a meeting at a central spot where all the officials concerned were enabled to discuss the points of practice, and administrative or systematic action is evidently desirable. The meeting was fully attended. Dr. Jacob, who has for many years represented several of the most important sanitary districts in the country, took part and moved resolutions. While recognising the responsibility that must fall on the Medical Officer of Health in securing the proper examination of the water supply of this district, he also affirmed the principle that in such examinations combined action on the part of district and county officials is not only desirable, but necessary. Here it may be observed that the term "examination" is intended to be very comprehensive, and includes the inspection of the "protective area," or the

* NOTE.—The term "protective area" has been substituted in the above for "gathering ground," which is the expression used in the Local Government Board circular, headed "Water Supplies," addressed to Town Councils, Urban District Councils, and Rural District Councils under date December 17th, 1897.

methods of collection, storage, filtration, and distribution of water supplies, the procuring of samples for analysis, the scope of analysis—physical, chemical or biological, and the arrangements for the same. On all these points of practice discussion took place, and as the resolutions were spoken to by gentlemen of eminence in their profession and of wide experience in this special branch, the conclusions arrived at will necessarily carry weight.

Conference—March 21st, 1898.

Present: Mr. Welch, Chairman; Dr. Jacob (Chertsey, Weybridge, Walton, Dorking, Leatherhead, Epsom, Sutton, Carshalton, Reigate), Dr. Rowland (Richmond), Dr. Beale Collins (Kingston-on-Thames), Dr. Senior (Esher and Dittons), Dr. Davison (Coombe and Malden), Dr. Owen Coleman (Surbiton), Dr. Knox (East and West Molesey), Dr. Woodforde (Egham), Dr. Sloman (Farnham), Dr. Lorimer (Farnham), Dr. Walcot (Frimley), Dr. Hall (Hambledon), Dr. Parson (Godalming), Dr. Morton (Guildford), Dr. Wellington Lake (Guildford and Woking), Dr. Darra Mair (Croydon), Dr. Oldman (Godstone), Dr. Williamson (Deputy Medical Officer), the County Analyst, (Dr. Thomas Stevenson), the County Medical Officer of Health (Dr. Edward Seaton).

Dr. Adams (Barnes), was prevented coming by a summons to a Coroner's inquest. Dr. Philpot (Croydon) mistook the day, and Dr. Leonard Wilde (Croydon) was, to his great regret, prevented coming by temporary illness. Dr. Pocklington (Wimbledon) had previously written to say that he should much like to have been present, but had already arranged for his vacation in March.

The subject first discussed was that of the necessity for periodical examinations of sources of public water supply. Dr. Jacob referred to the responsibilities of Medical Officers of Health in the first place, and Dr. Morton recalled the circumstances of the Typhoid Epidemic at Guildford thirty years ago, as an illustration of the dangers to which public water supply sources were sometimes exposed. Dr. Jacob then moved, and Dr. Morton seconded the following resolution, which was put to the Meeting and carried unanimously—

I.

"That in the opinion of this Meeting, periodical examinations of public water supplies are necessary, their frequency depending on the special circumstances of the district concerned; and that, inasmuch as the Medical Officer of Health for the district has the responsibility of inquiring into and reporting on causes which affect, or threaten to affect, the public health of the district, it is desirable that, with proper assistance, the examinations should be conducted or directed by him for the authority."

The necessity for joint examinations and reports was then discussed. It was pointed out that, as in the case of streams passing through different sanitary districts, the co-operation of district and county authorities and officials had worked well, and that the same principles of harmonious action might with advantage be applied to the case of public water supplies common to the whole or parts of several sanitary districts. The case of the Sutton Water Company, from which part of the supply of the Croydon Rural District is derived, and that of the East Surrey Company, which supplies water (from sources at Kenley in the Croydon R. S. D., and from Caterham in the Godstone R. S. D.), throughout a wide area including Red Hill, were mentioned in illustration of the

necessity for joint examinations and reports. Dr. Jacob then proposed, and Dr. Oldman seconded, and it was unanimously carried—

II.

"That, inasmuch as the District and County Councils are together charged with certain definite responsibilities with regard to the prevention of the pollution of streams which flow through several sanitary districts; and furthermore, inasmuch as the areas of public water supply frequently embrace parts of several different sanitary districts, it is desirable that examinations by the district and county officials be made in combination for the purposes of *report* once a year."

The river sources of supply were then considered. The population in the Administrative County of Surrey, which is supplied by two Metropolitan Companies (viz., the Lambeth, and Southwark and Vauxhall), is estimated at about 170,000. With regard to these it was proposed by Dr. Beale Collins, seconded by Dr. Rashell Davison, and carried unanimously—

III.

"That, inasmuch as the sources of supply of the Lambeth Water Company and the Southwark and Vauxhall Water Company are already under the direct supervision of the Local Government Board and other public authorities, further examination, except so far as it relates to reservoirs and distributing mains, would be superfluous."

With regard to other river sources in use at present in the County, those, viz., of the West Surrey and South-West Suburban Companies, the areas supplied—or to be supplied—viz. (that part of the Thames Valley from Sunbury Lock to Cooper's Hill, and as far south as Byfleet, Chobham, and Windlesham) are larger than that supplied by the Metropolitan

Companies, though much less populous. It was proposed by Dr. Woodforde, seconded by Dr. Jacob, and carried, unanimously,—

IV.

"That, in the case of the South-West Suburban and West Surrey Water Companies, systematic examination of the storage and filtration arrangements, as well as those for distributing the supply, is desirable, and that the results of such examinations form the subject of an annual joint report of the district and county officials concerned."

Other Surrey Water Companies derive their supplies from—

(*a*) *The Chalk Formation.*

Sutton Company.
Leatherhead Company.
East Surrey Company (Kenley).
Woking Company.
Epsom District Council.
Guildford Corporation.

(*b*) *The Lower Greensand Formation.*

Farnham Company.
Godalming Company.
Dorking Company.
Reigate Company.
East Surrey Company (Caterham).
Limpsfield and Oxted Company.
Cranleigh Company.

(*c*) *Bagshot Sand Formation.*

Frimley and Farnborough Company.

Some of the Companies derive their supplies from more than one source; for example, the Dorking Company possesses four sources, all from the *same* formation, and the Richmond Corporation has four different supplies, each of which is from a *different* formation.

There are a few other minor sources which may be classed as public supplies. Altogether, there are 23 chief sources of public water supply in Surrey drawn from subterranean or below-surface springs. In the case of some of these, the situation is ideally perfect, and examination is a formal matter; in others it will be decidedly not so.

With regard to the above, it was proposed by Dr. Lorimer, seconded by Dr. Darra Mair, and carried unanimously,—

V.

"That in the case of public water supplies derived from surface or underground springs, the purity of which may be threatened by contamination from the drainage of cesspools, &c., it is desirable that thorough examination be made from time to time by the district and county officials concerned, and that the result of these examinations be reported on annually."

Having regard to the thoroughness and reliability of the inspections which are included in the examinations above referred to, it was thought that, in cases which could be agreed upon by the responsible officials, frequent analyses might be safely dispensed with. After some discussion, the following resolution, proposed by Dr. Williamson, and seconded by Dr. Hall, was carried:—

VII.

"That where a water supply is derived from a presumably perfectly safe source, and where it is, in the opinion of the District and County Medical Officers after joint inspection, considered above suspicion, the procuring of samples for frequent analyses is unnecessary."

The arrangements or provision for the taking of samples for analysis were then discussed, and it was proposed by Dr. Parson, seconded by Dr. Walcot, and carried unanimously,—

VIII.

"That where analyses are necessary, the provision for the very responsible work of taking samples of water for analysis should be such as are satisfactory to the Medical Officer of Health, and approved of by the Authority."

Further discussion then took place respecting the conditions under which it is necessary to take and submit samples for analysis. The need for explanation to District Councils as to the scope, meaning, and objects of analyses, as well as the fallacy in certain cases of depending upon a single analysis, were agreed upon. It was then proposed by Dr. Woodforde, seconded by Dr. Darra Mair, and carried unanimously,—

IX.

"That, having regard to the complexity of the subject of water examination—

A. In respect of the presence or absence of certain notifiable diseases ;
B. In its relations to Hydrogeology ;
C. „ „ Physics ;
D. „ „ Biology :
E. „ „ Analytical Chemistry,

it is desirable that the conditions under which it is necessary to take and submit samples for analysis should be determined on by the authorities concerned in consultation with the medical officers. And that, in considering the question of defraying expenses for the same, the authorities be furnished with full information as to the scope and object of analysis."

A subject of some little difficulty was then broached—namely, the position of the Sanitary Inspectors appointed by the Authorities. These officers have statutory powers, including right of entry on premises, and service of notices under the Public Health Acts, which should render their aid to the Medical Officers of the Authorities most valuable. Now in several districts of the Administrative County of Surrey the posts of Surveyor and Sanitary Inspector are combined. There may be some advantages in this arrangement; but, on the other hand, it is felt there are certain disadvantages. The Surveyor's work is apt to become too absorbing to allow of

attention being directed to what are usually termed "Sanitary Matters." In effect, the office of "Sanitary Inspector," as apart from the preparation and execution of sanitary plans and works, is likely in some instances to be forgotten. Such being the case, the Medical Officers owe it to their Authorities to inform them as to the position of affairs.

The following resolution therefore is of immediate practical importance as will be at once recognized by those who have taken prominent part in the subject of the London and Home Counties' Water Supply, which is now engaging so much attention. At the same time, it will be seen to bear reference to all the subjects of the foregoing resolutions.

The subjoined resolution was proposed by Dr. Wellington Lake, seconded by Dr. Hall, and carried unanimously :—

X.

"That it is desirable that every District Council should be possessed of accurate and reliable information with regard to the source of water supply of every house in the district, and that the Sanitary Inspector, under the directions of the Medical Officer of Health, is the proper official to carry out such a survey, with the approval of the Authority."

Leaving the subject of medical and other sanitary surveys of the sources of water supply, the Meeting considered another question of broad general interest, viz., the desirability of generally adopting processes of softening such as that which has been so successfully carried out by the East Surrey Water Company at Kenley. The effect of this process, in reducing the number of microbes present in drinking water, has no doubt influenced some Authorities in favouring its adoption.

It is assuredly a highly significant fact that in the case of certain very important towns (supplied with water derived from the chalk formation) the adoption of softening processes at the works has been decided on. This is doubly significant in regard of the fact that in these cases the Corporations, who are the Sanitary Authorities, are themselves the owners and directors of the water supplies.

It was proposed by Dr. Jacob, seconded by Dr. Senior, and carried unanimously,—

XI.

"That, in the case of water supplies derived from the chalk formation, especially those which are of extraordinary hardness, it is advisable that softening processes be adopted, and that representation be made to that effect by members of this Meeting to the Sanitary Authorities concerned."

Finally, the Meeting took into account many points in connection with the above considerations that give rise to questions concerning the powers of the Public Health Acts, and the applicability of the various clauses of the same to the conditions which have to be dealt with under the authority of the District Council. The District and County Medical Officers may, as occasions arise, be in a position to offer practical suggestions, which will be very useful to the responsible legal advisers of the Councils concerned. In anticipation of such consultations it may be said at once that, if much good is to be done in the way of additional safeguards to our Public Water Supplies, District Councils must be prepared to take up cases in which the decision of Courts of Summary Jurisdiction and Appeal is an uncertain factor. Some authorities are less inclined to venture on new departures than others. They may, however, be reminded that in doing this they are only

repeating what was done when the Acts first came into operation by authorities who litigated, on public grounds, about conditions which are now dealt with everywhere as recognized health nuisances.

The following resolution, proposed by Dr. Knox, seconded by Dr. Lorimer, was carried unanimously :—

XII.

"That, in considering the applicability of the various clauses of the Public Health Acts to conditions which it is necessary to deal with in order to preserve the safety of water supplies, it would be advantageous for the officials concerned to confer together."

After the meeting, which concluded with a hearty vote of thanks to the Chairman, it was suggested that the County Medical Officer should draw up an account of the meeting and resolutions to be submitted in the first place to the Sanitary Committee of the County Council.

List of Sanitary Districts of the Administrative County showing the cases of Typhoid notified each year, and the yearly average, together with the rate per 1000 of the population. An illustrative map will accompany it.

District.	1895.	1896.	1897.	Total Typhoid Notifications.	Yearly Average.	Rate per 1,000 Population.
Barnes	10	10	9	29	10	0·6
Richmond	33	17	26	76	25	0·9
Wimbledon	12	10	17	39	13	0·4
Ham	1	1	0	2	·7	0·5
Kingston	8	14	18	40	13	0·4
Esher	1	3	3	7	2	0·2
Malden	2	0	5	7	2	0·3
Surbiton	7	4	1	12	4	0·3
Molesey	2	2	5	9	3	0·5
Chertsey	6	3	4	13	4	0·3
Chertsey R.... ...	5	4	3	12	4	0·4
Egham	1	3	7	11	4	0·4
Weybridge	3	2	2	7	2	0·5
Walton	5	0	4	9	3	0·3
Farnham	12	13	2	27	9	1·5
Farnham R. ...	10	3	8	21	7	0·5
Frimley	0	4	2	6	2	0·3
Hambledon	9	16	17	42	14	0·7
Godalming	4	4	5	13	4	0·4
Guildford	5	5	7	17	6	0·4
Guildford R. ...	5	2	0	7	2	0·1
Woking	16	8	7	31	10	1·1
Dorking R.	1	0	5	6	2	0·2
Dorking	2	2	2	6	2	0·3
Leatherhead... ...	0	3	3	6	2	0·4
Epsom R.	7	3	5	15	5	0·3
Epsom	1	1	4	6	2	0·2
Sutton	9	5	11	25	8	0·6
Carshalton	1	2	4	7	2	0·3
Croydon R.	18	14	13	45	15	0·5
Reigate	5	4	7	16	5	0·2
Reigate R.	6	7	4	17	6	0·4
Godstone	3	7	3	13	4	0·2
Croydon County Borough	46	119	51	216	72	0·5

NOTES TO THE TYPHOID MAP.

The accompanying Map tells its own tale sufficiently, and therefore needs but slight annotation.

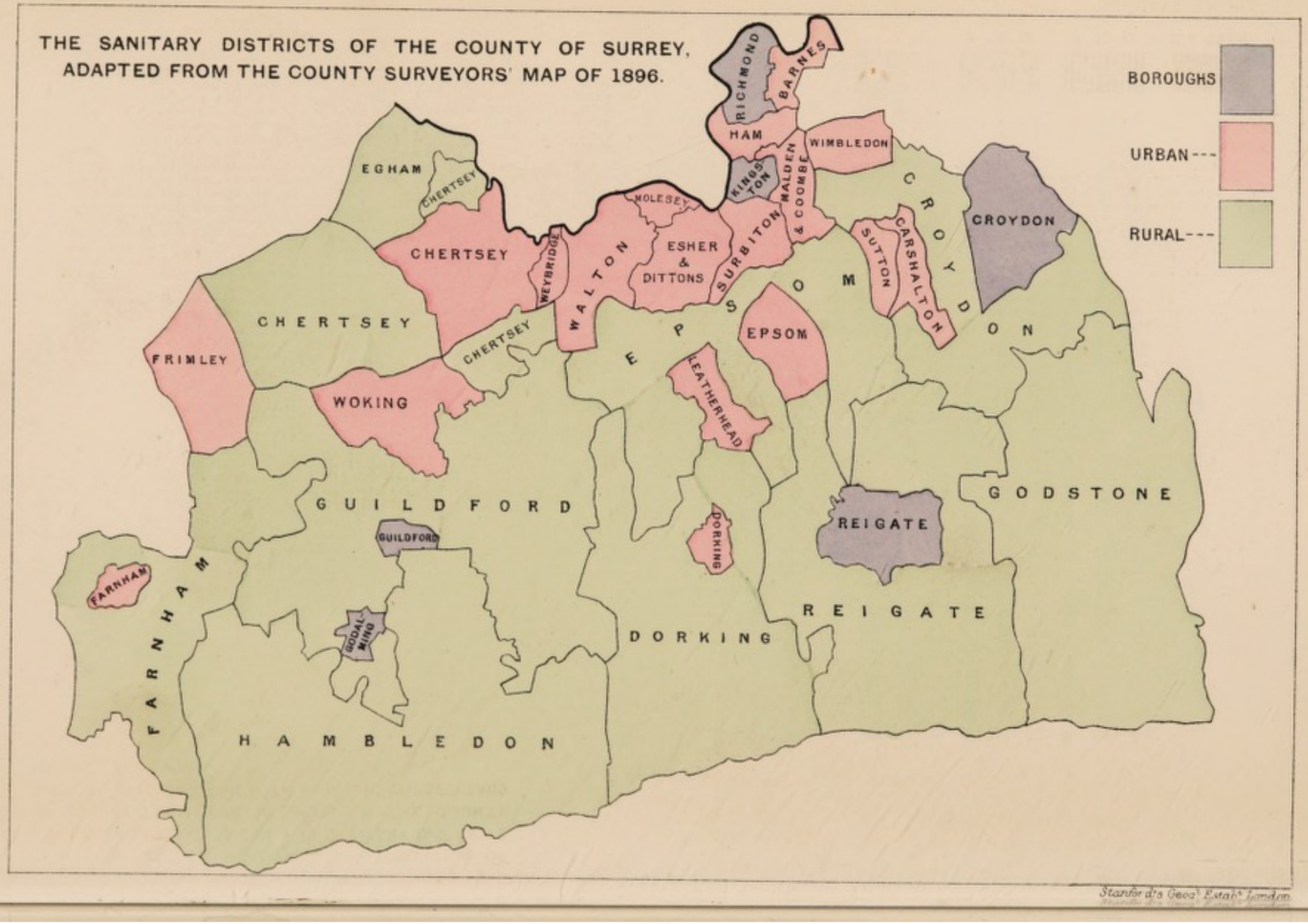
It will, however, be observed that the span of time—three years—is somewhat short for records of Typhoid prevalence, especially in Surrey, one of the comparatively speaking "Typhoid-free" counties in England (*vide* the Map in the last Report of the Medical Officer of the Local Government Board, 1896-97).

It may further be observed that the term "Typhoid-free" cannot be taken as synonymous with "Typhoid-proof." This fact is sufficiently obvious from the histories, since exact records were made in England, of water epidemics and the way in which they have arisen (*vide* "Public Health Reports," Sir John Simon, edited by the County Medical Officer for the Sanitary Institute in 1886 as well as the Reports by Medical Officers of the Local Government Board since 1876).

With the above explanation and limitation the Map will probably be found to be useful, mainly as an indicator of conditions which support and maintain Typhoid in the County. It is noteworthy that during the three years 1895-6-7 there has been no "explosion," or sudden prevalence connected with a water supply such as that which occurred in 1894 (*vide* Annual Report, 1895). But, on the other hand, there has been a sudden outbreak in which there was no connection whatever witn the water supply. This occurred at the St. Peter's Home, Woking, and was reported on by the Medical Officer of Health, a special account being also given by him in the St. Thomas's Hospital Reports.

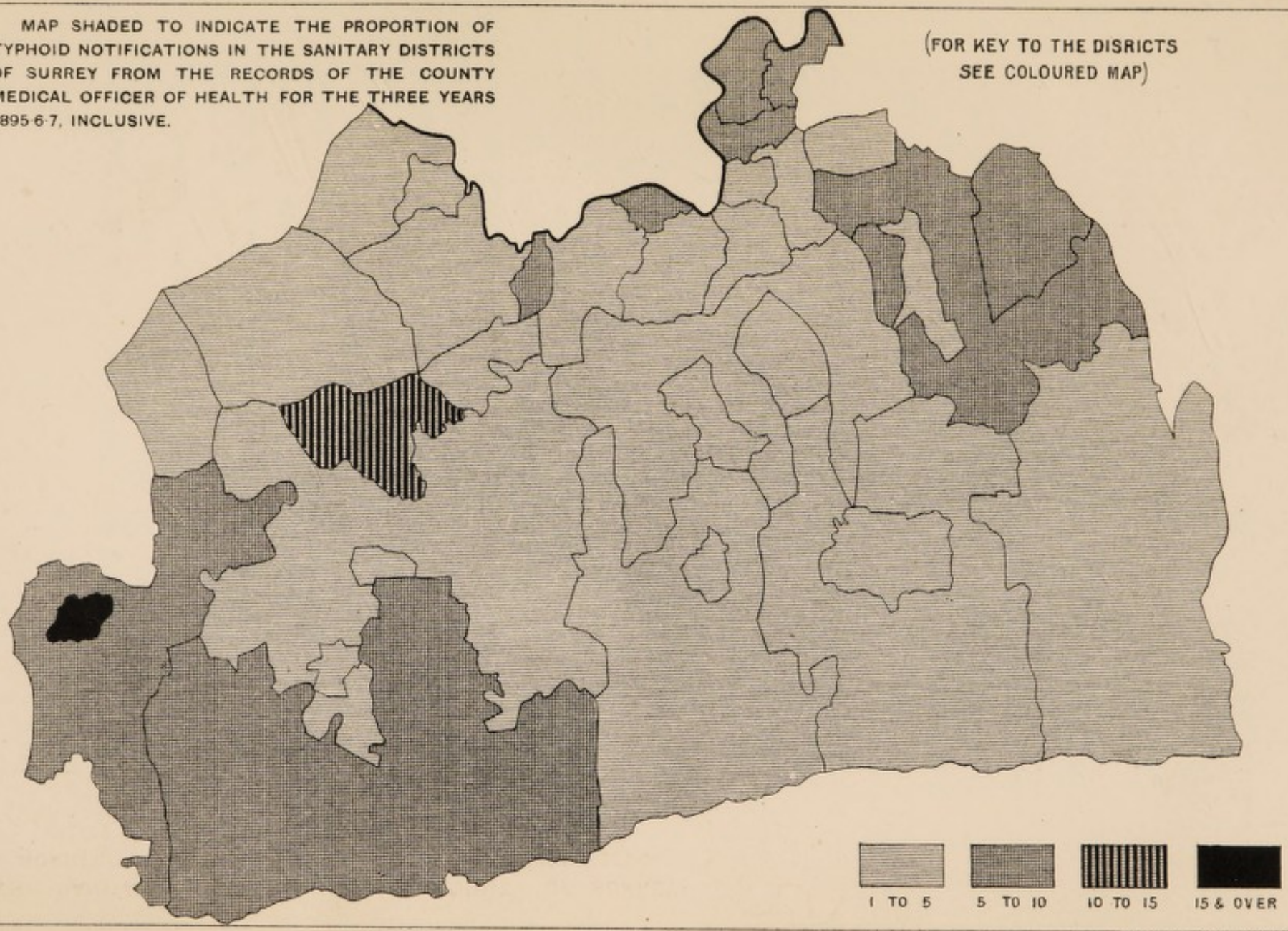
The comparatively high rate of Typhoid in Farnham has been the subject of comment in previous District and County Reports. It will be noted that the reported cases showed a marked decline in 1897. There would be better ground for satisfaction at this if it were known that the nuisances which tend (as the experiences of Maidstone have conclusively shown) to maintain Typhoid were being rapidly got rid of. Unfortunately this does not appear to be the case, as the Medical Officer of Health reports that their abatement and removal proceeds very slowly (Report Farnham Urban District, 1897).

Farnham and Woking are the only two districts with the deeper shading—Hambledon Rural, Farnham Rural, Croydon, Sutton, Richmond, Barnes, Molesey, and Weybridge are less deeply shaded. The rest of the County is faintly shaded. Some of the districts have a very light record, as will be seen from the accompanying table; but there is no district with an absolutely clear record.


THE SANITARY DISTRICTS OF THE COUNTY OF SURREY,
ADAPTED FROM THE COUNTY SURVEYORS' MAP OF 1896.
BOROUGHS
URBAN---
RURAL---
RICHMOND
BARNES
HAM
WIMBLEDON
KINGSTON
MALDEN & COOMBE
NOLESEY
SURBITON
CROYDON
SUTTON
CARSHALTON
EGHAM
CHERTSEY
WEYBRIDGE
WALTON
ESHER & DITTONS
EPSOM
LEATHERHEAD
FRIMLEY
WOKING
GUILDFORD
DORKING
REIGATE
GODSTONE
FARNHAM
GODALMING
HAMBLEDON

MAP SHADED TO INDICATE THE PROPORTION OF TYPHOID NOTIFICATIONS IN THE SANITARY DISTRICTS OF SURREY FROM THE RECORDS OF THE COUNTY MEDICAL OFFICER OF HEALTH FOR THE THREE YEARS 1895-6-7, INCLUSIVE.

(FOR KEY TO THE DISRICTS SEE COLOURED MAP)



Stanford's Geog.ˡ Estab.ᵗ London.

V.-THE BIOLOGICAL METHODS OF SEWAGE DISPOSAL.

Under this or similar headings a great deal has been written in the public Press during the year under notice. It may be well, therefore, to briefly review some of the chief ascertained facts connected with the methods of sewage disposal.

The recognition of the essential part played by living or biological processes in the disposal of refuse matters, liquid or solid, which are put on the soil, is no new thing. Seventy years ago, we are told, William Cobbett wrote a treatise on Gardening, in which he aptly applied the term "fermentation" to this action of the soil. Dr. Vivian Poore described this same fermentation by the light of the researches of Koch and others, in his lecture on "The Living Earth" in 1891. "Not only water, but everything else, when thrown upon the soil, disappears sooner or later. Such things as pieces of wood or leather, about the toughest of organic materials, become softened and permeated by fungoid growth, and finally crumble away. In some parts of the country, rags of all kinds are largely used for manure. Through the autumn and winter these may be seen lying on the surface, but when in spring the tilling of the land goes forward, and the fermentation of the soil commences, the coarsest of these rags disappear. If wood, leather and rags disappear, leaves and animal excreta disappear, as we all know, far more readily. The disintegration is forwarded by birds, insects, worms and their allies. The excreta of large animals become, as it were, the excreta of many small ones, until finally, by the action of saprophytic fungi, these organic

matters become fertile humus." Surely then, Dr. Poore's term "the living earth" is very appropriate.

The microbes are most abundant in the superficial layers of the soil, and it is by their life processes that organic animal refuse and excreta are eaten up, assimilated or rendered available for the maintenance and nourishment of plant life. Any agent which destroys the microbes or impairs their vitality immediately affects the purifying powers of the earth. This has been shown experimentally by passing chloroform or acids through soils, which thereby lose their capacity for purifying sewage. The most active of these organisms are those which possess the nitrifying power—that is, the power of converting the nitrogen, which is present in all animal excreta, into nitric acid, by the processes of oxidation. But the nitric acid which the microbes tend to form is itself destructive of microbic life, so that, unless there be present in the soil some alkali which will unite with the acid to form a *Nitrate*, purification will be interfered with or arrested, just as if the acid were added experimentally. On referring to notes of his series of Lectures at St. Thomas's Medical School in 1886-7, the County Medical Officer finds illustrations of this, which were furnished by two friends, experts in Chemistry, Dr. Ashby, F.C.S., of Grantham and Reading, and Mr. Otto Hëhner, F.C.S., of London, who had practical knowledge of sewage farming. In one instance a sandy soil, containing little or no alkali in a form suitable for neutralisation of the oxydized nitrogen resulting from bacterial life, soon lost its purifying property, which was, however, quickly restored by the addition of a little lime; so that by liming the earth its purifying qualities may be improved. It may here be noted that at the Unstead

Sewage Farm (Godalming), a certain proportion of lime which came from the tanneries seemed to improve the quality of the soil, and to assist in producing a good effluent. The discovery that the virtue of the soil really depends on microbes, was extended to filters which had previously been supposed to act mechanically. The idea was conceived that by cultivating these nitrifying organisms on the surface, and in the interstices of filtering materials, they might be concentrated, so to speak, in a small area, where countless myriads of them might feed on organic filth. This is the system which has been going on at Sutton, of which so much has been heard in 1897. These microbes requiring the presence of light and air, are called "aerobic." Their function is to oxidize or mineralize organic filth. The fermentation process by which this is effected is quite distinct from that which is termed "putrefaction." That is a function of organisms which flourish in the absence of light and air, and which are therefore called "anaerobic." Whether the liquefaction of rags, &c., may be accomplished by aerobic, without the assistance of anaerobic, organisms and the putrefactive process is a question that cannot be regarded as quite settled.

The other process by which organic filth certainly becomes liquefied is putrefactive in character, it is what goes on in the ordinary cesspool. There it may be observed that rags, &c., and other solid materials, after a time no longer exist as such, but have all been changed into homogeneous liquid filth which the gardeners find so useful for the fruit and flower trees. These processes are putrefactive and must be accompanied by the evolution of gases, which, when the stage is reached at which the suphur compounds are decomposed, are necessarily offensive But it would appear that the liquefying action may be accomplished without reaching this stage, and this is what is said

to happen in "the septic tank," which was on trial in 1897, at Exeter and Yeovil.

These towns were visited by representatives of the Committee in June and September, 1897, for the purpose of locally investigating the system. It should be explained that the tank is virtually a "cesspool." But it is a cesspool of special type, construction and arrangement. It is planned for the purpose of facilitating the changes in sewage which take place when its motion is very slow or nearly arrested, and when sunlight and air are entirely excluded. These changes appear to be analogous to those which take place in cultivation tanks or strainers which have been described in other patent methods of sewage disposal. They are effected by the agency of microbes which can only grow in the *absence* of the free oxygen of the air. These microbes break down and liquefy solid organic matters, resolving them into simpler constituents and evolving gases in the process. Thus when the contents of a cesspool are drawn off, all insoluble albumens and fibres of rags, &c., have disappeared, and a homogeneous liquid is found to have resulted. This liquid contains organic matters of less complexity and of greater solubility than crude sewage. The object of facilitating this metamorphosis in sewage, while it is comparatively at rest in the dark tank, is to reduce the complexity of the organic matters and so *prepare them for the oxidation processes* which are necessary for purification.

The arrangements of the tank are especially designed to augment the efficiency of the anaerobic microbes. One of the essential features of the arrangements is the retention of the "scum" (which may be seen on the surface of the contents of any cesspool) intact over the whole of the liquid contents of the

tank, which is 64 feet long by 18 feet broad. Thus a kind of blanket is provided for the liquid contents of the tank while they are undergoing changes in their chemical constitution. In this way changes in the fluid beneath are hastened. These changes, which are violently "putrefactive" in character, are of course accompanied by the evolution of gases, which may be seen through a window specially constructed in the wall of the tank ascending among particles of floating matter to force their way through the covering of scum to the air under the domes of the tank or cesspool. As regards the nature of these gases much has been said, and a great deal may yet be said by independent observers.

One of the chief advantages claimed for the system is, that no straining is required, and that all solids are dealt with, no separate removal of solid matters being required.

The natural processes by which domestic sewage may become purified may, of course, be interfered with by the destruction of active microbes by chemical or other agencies. But it may be again noted that the addition of a *little* lime at certain stages may possibly accelerate natural processes by neutralizing or removing certain products of bacterial action.

As yet the first part only of the septic tank system has been referred to—that, namely, which consists in rendering the chief organic constituents of sewage *unstable* and prone to change. The sewage in this state is, chemically, speaking "ready for the purification process."

The process of purification is accomplished, or partially accomplished, by a continuation of "natural" processes. The

sewage in its unstable condition passes out of the tank in a constant flow. It becomes aërated in the process. It is then, by a most ingenious mechanical arrangement, directed into "filter tanks." These are of the type frequently referred to as in use at Wimbledon, Richmond, Merton, and some of the well-known model sewage works in the County of Surrey. The action of these filter tanks, whether made of coke breeze, clinker or ballast, is governed by the same principle. It is one of real purification analogous to that effected by land, and is due to the growth of microbes which demand the presence of the *free* oxygen of the air for their growth. Frequently these filters have been used for the purification of a clarified sewage effluent; sometimes they have been used for a crude sewage more or less strained. In the cases under notice they were used for the tank contents. The sewage is left in the filter tanks for some hours. What flows away at the end of that time looks like clear water and is free from unpleasantness at the time, though it would be impossible, without a long series of observations conducted with scientific accuracy and absolute impartiality, for pronouncement to be made of the degree of purification that the process can be actually relied upon to effect.

It will be seen, therefore, to quote from Messrs. Dibdin and Thudichum on "The Scientific Basis of Sewage Treatment," "that in the process of completely oxidising effete matters two stages may be recognised in which distinct classes of organisms play their respective parts. The actual identification of these organisms may be left for future discussion, it being sufficient for the present purpose to divide them into those that are able to break down and liquefy solid organic matter, and those that

deal with it when in solution. It is not pretended that a clear line of demarcation can be established, although between the extremes of either class there are very distinct and clearly defined functional differences. The first-mentioned class may again be divided into two, namely, those that do their work in the presence of air and those that thrive in its absence. Both of these are always present in ordinary sewage, and the predominance of one or the other is entirely in the hands of the sewage operator. If, as at Sutton, the first be employed, care is taken that oxygen shall have free access to every part of the culture medium; the beds are frequently entirely emptied to admit the air to every crevice; and the most successful work, hitherto, has been by working and resting intermittently. When, however, the anaërobians are employed, air is rigidly excluded, a fermentative action of a putrefactive character is encouraged, and the process is necessarily continuous."

Allowance must, of course, be made for the perhaps over-sanguine expectations of the promoters of these biological systems, but the County Medical Officer has had the opportunity of making observations at Sutton and Hendon, and he is much impressed with the importance of the subject.

The following is a report of an independent statement made by him at the conclusion of the Inquiry, which was commenced in November, 1897, into the proposed scheme for the drainage of Oxted and Limpsfield:—

"By consent of all parties the County Medical Officer made a statement." . . . . . "As to the outfall, so far as the septic tank system was involved, he took it that the system was upon its trial. The County Council was concerned, along with District Councils, in protecting rivers and streams and water supplies

generally. He had been making inquiries as to bacterial systems; whether the septic tank system was all that was claimed for it he could not undertake to say, but he wished to have more information as to the effect of storm water upon the working of the tank, and the possibility under certain circumstances of river pollution from storm overflow. As to nuisance from the tank itself, he did not regard that, so far as his experience went, as anything serious. As to the extent of purification effected by the system, he also wanted further information. On the whole, he thought it was a system that might be considered worthy of trial. Looking at the question as one that affected many districts in the County, he would not like to go further than that."

It has been necessary to go into the subject rather fully in this Report, as it is obviously of great importance to so many districts in Surrey, and, indeed, throughout the whole country. This is shown by the fact that, as lately announced, a Royal Commission is about to be appointed to inquire into the subject of Sewage Disposal.

The subject of the biological treatment of sewage is of immediate interest in village sanitation, which is a pressing question in the County of Surrey. It is also of concern to the Authorities, which have already got land for sewage disposal work; for, as at Wimbledon and Merton, the more advanced Authorities are naturally taking advantage of the knowledge and experience acquired of late years.

But before concluding this section on sewage disposal, it may be briefly stated that the year has been one of progress on the old-established lines. It has witnessed the practical completion of several extensive systems, requiring, of course, loans in

proportion. Weybridge, Godalming, Guildford, and Molesey have been practically finished; Woking, Carshalton, and Cheam are well in hand; Walton (a loan of £45,000), Oxted, Shere, and others are fairly started. On the other hand, there are a great many schemes that have not yet completely emerged from "the discussion" stage: Leatherhead, Cobham, Ashtead, Stoughton, Holmwood, Westcott, are examples.

Where large and extensive drainage systems have not been adopted, scavenging (often very bad scavenging), with badly constructed cesspools, is the rule. The Medical Officer of Health for Chertsey thus refers to the subject:—

"As to works of sewerage and sewage disposal. In October I again drew the attention of the Council to the recurring nuisances, likely to injuriously affect the health of the inhabitants of Chertsey and Addlestone, which resulted from the costly cesspool system prevailing in those important localities, and I suggested the provision of the long-talked-of sewers and works for the purification of the sewage, in the populous portions of their District, as the only efficient means of stopping these nuisances and also the pollution of the water-courses, of which the Thames Conservancy Board from time to time complained."—*Annual Report*, 1897, *Chertsey Urban District.*

The Report of the Medical Officer of Health for the Godstone District, under the heading of the Emptying of Cesspools, puts the subject in its most serious light:-

"The result of the Inquiry held by Dr. Sweeting at the instance of the Local Government Board on October 22nd, 1896, and alluded to in my Report for that year, was that an order

was issued requiring the work of emptying the cesspools to be done by your Council, and the cleansing of privies and earth closets also. The arrangements were left in the hands of the Parish Council, acting as the Parochial Committee, who purchased the requisite plant, contracted for hire of horses, and engaged a foreman at 35s. per week, and two men at 23s. per week each. The cleansing of earth closets has been contracted for separately. The foreman was engaged on March 1st, and since that date to December 31st, 555 cesspools have been dealt with, and 1806 van loads of sewage removed, equivalent to about 830,800 gallons. Now the population for which this work is done amounts to about 5,000 people, and allowing 10 gallons of sewage per head per day, which is a fair quantity seeing that they had a constant supply of water, the amount of sewage produced during that period during which the work has been done, viz., 41 weeks, would be 14,350,000 gallons; so that the quantity removed represents only 6 per cent. of the whole. The question naturally arises as to what becomes of the remainder, and the answer is that it soaks away into the soil, which being chalk, and the source of the water supply, is too serious to contemplate."—*Annual Report*, 1897, *Godstone Rural District.*

VI.—RIVER CONSERVANCY.

It would be impossible, in the scope of this Report, to give an account of all that was done under this head in 1897 by the Council and kindred Authorities. It will be sufficient to state here the principal matters on which the Council or Committee has been called upon for an opinion or a decision. They are as follows :--

(*a*) The condition of the River Wey in that part of its course from Godalming to below Guildford.

(*b*) The condition of the River Wandle.

(*c*) „ „ „ Blackwater.

(*d*) „ „ „ Beverley Brook.

As regards (*a*) THE RIVER WEY, the position of things may be very briefly stated as follows :—

1. The Godalming system, so far as domestic drainage and river pollution is concerned, is virtually complete. The last published Report of the Medical Officer of Health states that the number of houses still draining into old sewers was reduced to 16 (or less than 1 per cent. of the total number of houses in the Borough). The Corporation has been informed that in these cases they will be assisted by the Medical Officers in any proceedings which they may be advised to take under the Public Health Act.

2. There is no evidence at present of any serious trade pollution in the Borough.

3. The County Medical Officer has been informed that evidence is prepared for submission to the Magistrate's Bench at Godalming Borough as to intermittent pollution from the Catteshall Paper Mills. The prevention of this pollution appears to have interfered with the working of the outfall works, presumably by action of chemical refuse on the sewage.

4. The Godalming Outfall Works, owing, it is believed, to the mixture of refuse from the Catteshall Paper Works, turned out lately an effluent which was condemned by the Conservancy Board. This has been stopped, and the river close to the Paper Mills is watched for pollution.

5. There has been no other appreciable source of trade pollution or "discoloration" above Guildford, except the Summersbury Tannery, where works have now been completed, and are actually in operation, for the interception of any discolouring matters.

6. The Guildford Outfall has been put quite right, so far as the sludge is concerned; and from the Report of the Medical Officer of Health it appears that the Authority are about to adopt improvements in their system of sewage disposal which it is hoped will secure a satisfactory effluent.

The conclusions from the above are that, provided the Catteshall Mill refuse is so dealt with as to effectually prevent either direct pollution with masses of scum, which float down the river at intervals, or disturbance of the sewage disposal arrangements at Unstead Farm, the river *above* Guildford ought to be free of all pollution; and that in order to keep the river *below* Guildford as pure as it is *above*, further improvements in the laying out of the Farm or Outfall Works at Stoke seem to be absolutely necessary.

(*b*) THE RIVER WANDLE continues to claim attention chiefly on account of (1) the liability to pollution at the Croydon Outfall Works ; (2) the risks of pollution from the Mills at Beddington Corner, and in the District of Carshalton.

These two possibilities have necessitated inspections of the river, especially during the summer and autumn months, from the Anglers' Cottage at Mitcham up to Beddington. The County Medical Officer has always endeavoured to secure the co-operation of the Authorities and officials of the districts through which this river flows. At the time when the Croydon Corporation made proposals for extending the Sewage Farm at Beddington, a special watch was kept by the staff of inspectors acting under the direction of the Medical Officer of the Croydon Rural District, whose office is now at the Croydon Town Hall. The following is extracted from his Report, just issued :—

"The Sewage Farm of the Croydon Corporation at Beddington again attracted attention during the year by reason of the nuisance to which it gave rise, more especially at Beddington Corner, and also by a proposal to extend the area used for irrigation towards Beddington Village. If the original proposition had been carried out, crude sewage would have been treated on land in close proximity to the bulk of the houses in Beddington Village, and also to the main stream of the River Wandle. Ultimately, however, the Corporation agreed to limit the new extension to an area coterminous with an adjoining area which has been irrigated for some years, and also to execute certain works to prevent pollution of the river. The nuisance, however, which results from this farm generally, and

which is especially derived from those portions which receive crude sewage, is very annoying to a large number of people in this residential district, and, in these days of advancement in the methods of sewage disposal, ought to be easily obviated."—*Annual Report*, 1897, *Croydon Rural District.*

With regard to risks of trade pollution, as well as crude sewage, in the district of Carshalton, it may be well to quote from the Report of the Medical Officer of Health of the district.

"As to *Works of Sewerage* and of *Sewage Disposal.* Satisfactory progress was made with the task of laying sewers in all the populous parts of the district, and with the buildings, tanks, and other works for the disposal of the sewage at the outfall. The Surveyor informs me that the Council have decided to lay a sewer for the use of about a dozen dwelling houses and three mills in an isolated portion of their district, near Beddington Corner, and have agreed with the Croydon Rural District Council as to the terms on which the latter will admit the sewage and trade refuse into their sewers, which are close at hand, and that they have agreed with the Sutton District Council as to the terms on which they will admit the sewage from a house in Albion Road (one frontage of which is in the Sutton District) into their system of sewers. The Surveyor also informs me that during the year the drains of all the houses in Prince of Wales' Road, of four houses in Duke of Edinburgh Road, and of some in Wrythe Lane, were connected with the new sewers."—*Annual Report*, 1897, *Carshalton Urban District.*

(*c*) THE BLACKWATER, which is little more than a ditch or watercourse where it bounds the County of Surrey,

has claimed attention on account of the large and increasing population of the Aldershot, Farnboro' and Camp Districts, which form its watershed or natural drainage area. The Joint Committee of the County Councils of Berkshire, Hampshire and Surrey, appointed Mr. Robt. M. Chart, F.S.I., to report on "the obstructions to the flow of the stream which caused the flooding of some of the lands through which it passes, and also on the sources of pollution." Mr. Chart's Report is very careful and complete, but inasmuch as a great deal of it necessarily comprises information which the Sanitary Committee of the Surrey County Council already possessed, it would obviously be superfluous to repeat it here. It may, however, be useful to sum up, in as few words as possible, the present position of affairs in this drainage area :—

1. The few sources of pollution above Aldershot, mentioned in early Reports of the County Medical Officer, have ceased,

2. At the Bone Mills adjoining the Aldershot Sewage Works no discharge can now be detected.

3. At the Aldershot Sewage Works the improvement effected since 1894 would be deemed remarkable by those who knew the conditions at that time. It must not, however, be supposed that perfection has been reached, or that a sufficiently high standard of effluent is produced. It may be quite possible that the specimen given in Mr. Chart's Report represents a fair average, and if the quantity of organic ammonia present be taken as a criterion, it would certainly be classed badly among effluents which contribute to sources of drinking water. True, it is a

very great distance from any recognized source of supply. Still, having regard to the narrowness of the watercourse and the smallness of the stream into which the effluent is discharged, all will agree that nothing but the highest standard laid down by the Conservancy can be regarded as completely satisfactory.

4. The same remarks apply to the effluents from the Camp Farm, which, in the opinion of the County Medical Officer, has wonderfully improved under its present management. Col. Jones, who has the credit for this, frankly admits however that their present effluent will not do at all. In a letter to the County Medical Officer, dated December 31st, 1897, he mentioned with pleasure that independent authorities had just reported most favourably on the results of his work, and that they have declared that the expenditure of £5000 on *permanent* improvements ought to satisfy legitimate requirements as to effluent, and that there would then be no need to remove the sewage.

5. The most urgent case in the whole area at the present time is, however, that which is still further down the Blackwater, viz., the sewage farm (so-called), at Farnborough, which now alone of all the outfalls in this district, which but a few years ago was so neglected, merits the title of a "sewage marsh." What escapes to the stream from this extremely nasty place is reported chemically as "not to be distinguished from raw sewage."

6. The Yorktown Sewage Farm is the only one of the outfalls on the Surrey side. This, like the Aldershot Works, was reported in 1897 as turning out "an inferior effluent." There is, however, immediate prospect of improvement. The Medical

Officer of Health for the District of Frimley says, under the heading Sewage Farms :—

"The work of relaying the surface drains, and constructing filter beds at the Yorktown Farm, has been proceeded with, and as a result there has been an improvement in the effluent. Two more filter beds have yet to be made, and it is hoped may still further reduce the chance of pollution entering the Blackwater River. Through the kindness of Mr. Hollings, we have been permitted for a time to distribute the main body of sewage over his adjoining fields, and so have been able to give our own land a needed rest. I have inspected the Outfall Works of the Yorktown and Frimley Farms as occasion seemed to require, and have also accompanied the Medical Officer for the County, who was much impressed with the necessity of securing a first-class effluent."—*Annual Report*, 1897, *Frimley Urban District.*

It will be seen, then, that while Surrey is not yet quite perfect; Hampshire has very heavy arrears to make up; that much has yet to be done at the Camp; but that Farnborough is far behind the present line.

THE BEVERLEY BROOK is another ditch or watercourse which demands special attention, on account of its passing through recreation grounds, &c. The course lies in the area of different sanitary authorities. It has been the endeavour of the County Medical Officer to bring about co-operation of the officials concerned in improving the condition of the stream. The Medical Officers of Health for the districts chiefly affected by the nuisance report thus :—

"The Beverley Brook has also been a great trouble, annoy-

ance, and expense. This so-called brook was and is polluted by the effluent discharging into it from the new sewage works at Cheam: the Authority responsible was duly notified of the fact. There is, I am glad to say, every likelihood of a conjoint arrangement being carried out to abate this nuisance in the future."—*Annual Report*, 1897, *Malden District.*

"Nuisances due to the pollution of the Beverley Brook in Merton by drainage from Cheam and Worcester Park, in another district, were the subject of great complaint during the year. Sewage disposal works, however, have been recently inaugurated, and, although not by any means satisfactory as yet, it may be hoped that the trouble will be over before long." —*Annual Report*, 1897, *Croydon Rural District.*

VII.—GENERAL.

There are a number of subjects of varying interest and importance referred to in the District Reports. It is not possible to do more than summarize them in this County Report.

The sanitation of dwellings is receiving more attention now, and it is especially gratifying to record that, apart from special complaints, systematic inspection is being undertaken with reference to conditions of domestic water supply and drainage. In the Reports of the last four years special notice has been taken of the excellent administration in the Croydon Rural District. It should also be mentioned that very valuable work has been and is being done, under the direction of the respective Medical Officers, by Mr. Nesfield (Surbiton), by Mr. Tribe (Guildford) by Mr. Humphrey (Redhill), and in a few Rural Districts, notably by Mr. Rapley (Dorking), whose sanitary survey of Westcott is a model of what is wanted.

Overcrowding is everywhere a subject of anxiety on account of the danger to the public health—witness the state of things revealed last year at the "Devil's Punchbowl."

The need for enforcing dwelling accommodation and sanitary provision for large numbers of workmen employed on works of construction such as those at the Horton Estate, Epsom; Lee Park Estate, Witley; at Haslemere, and many other places, is a matter for serious consideration at the present day. So, also, are the insanitary conditions associated with gipsy encampments, which have been seen close to sources of water supply.

The overcrowding of the Albert Orphanage, in the Frimley District, should not be lost sight of by the Authorities concerned. There can be no doubt that the risks of Diphtheria arising and spreading in this and other parts of the County, depend largely upon the sufficiency of floor space for every child in the dormitories of public institutions of this kind. The following is from the Report of the Medical Officer of Health.

"*Royal Albert Orphan Asylum.*—For the second year in succession this Institution has been entirely free from infectious disease, and the health of the inmates has been very good. During the month of December I made a surprise visit, and found the dormitories, passages, closets, drains, and domestic offices in a thoroughly clean condition, and no lack of fresh air throughout the building; but it must again be mentioned that the cubic space, and especially the superficial area per head in the dormitories, are still under the proper standard, and although every care is being taken by thorough cleanliness and good ventilation to make up for this defect, it must be looked upon as being a source of danger in the event of an occurrence of infectious disease. I must also refer to the unsatisfactory condition of the farm buildings, which require to be entirely rebuilt. I understand, however, that this work is in contemplation."—*Annual Report*, 1897, *Frimley District.*

With reference to the reports on "houses unfit for habitation," and the provision for house accommodation generally, the experience of the County Medical Officer leads him to think that in districts which are not yet provided with good accommodation for the sick, especially the sufferers from infectious diseases—as is the case at Egham—the provision of isolation hospitals is a most urgent necessity, and that in such cases attention might with advantage be concentrated on this great public want.

Further, among the very urgent sanitary requirements which Medical Officers feel it their duty to keep before the Authorities, is that of a Public Mortuary for every town or populous district.

The experienced Medical Officer for Surbiton reports as follows :—

"The provision of a mortuary and post-mortem room is a very pressing matter, but obviously one that is difficult to arrange for. It has been dealt with at length in my Reports year by year, and the urgent need has been clearly demonstrated, and I believe the subject has not been lost sight of by the Sanitary Authority. Now that a new Council Building is about to be erected, and there is land at disposal, this matter should again come up for consideration, and if there are no funds available from the loan account, then I trust it will be borne in mind when the estimates are being prepared for the forthcoming year. We are at present taking our dead for post-mortem and inquest purposes to Kingston."—*Annual Report*, 1897, *Surbiton*.

The Medical Officer for New Malden also reports :—

" As your district increases, the need for a mortuary will be felt more and more. It is not generally known, but nevertheless is a fact, that under the Infectious Diseases Act, no person without the sanction of a medical officer or a registered medical practitioner shall let remain unburied, elsewhere than in a public mortuary, or in a room not used at the time as a dwelling, sleeping place, or workroom, for more than 48 hours, the body of any person who has died from any infectious disease. This is a subject of great importance, not only in a health point of

view, but to relations, witnesses, juries, medical men, in fact, all ratepayers. The necessity, at present, of moving to Kingston a body on which an inquest must be held, followed often by its removal again, is not only harrowing to the feelings of relations, but involves considerable expense and loss of valuable time to those concerned. For these reasons I venture to hope that when the plan of our future District Council Buildings is drawn, a place will be found for a mortuary."—*Annual Report*, 1897, *New Malden District.*

Lastly, the disposal of the dead is referred to in some reports. The increasing difficulty in finding sites for cemeteries free from objection of all kinds, sentimental and hydrogeological, will necessitate the consideration of other methods than that which continues to be almost universal. Public Inquiry is about to take place respecting the interment of the dead at the Banstead Paupers Lunatic Asylum, the management and control of which is under the London County Council. In the course of this Public Inquiry, "Cremation of the Dead," hitherto regarded as too expensive a method for general adoption, is bound to be considered from every practical point of view.

I am, my Lords and Gentlemen,

Your obedient Servant,

(*Signed*) EDWARD SEATON, M.D.,
Medical Officer of Health for the Administrative County of Surrey.

Dated April 19th, 1898.

To the Council of the
Administrative County of Surrey.

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