

**Third annual report on the work of the Bacterial Laboratory, January 1st to December 31st, 1903.**

**Contributors**

West Riding of Yorkshire (England). County Council

**Publication/Creation**

1903

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*Will be pleased  
from S. J. Cambridge*  
WEST RIDING COUNTY COUNCIL.

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THIRD

ANNUAL REPORT

ON

The Work of the Bacteriological Laboratory.

*January 1st to December 31st, 1903.*





# THIRD ANNUAL REPORT

## ON

### THE WORK OF THE BACTERIOLOGICAL LABORATORY.

*January 1st to December 31st, 1903.*

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Since the laboratory was opened in April, 1901, nearly 6000 specimens have been received for bacteriological examination. Each year has seen an increase in the work the department has been called upon to perform. In the first nine months of its existence 868 examinations were made; in the following twelve months 2236 specimens were investigated, and this year the total number of samples received has been 2803. That these steady yearly additions have not been due to exceptional outbreaks of infectious disease, or to increased activity on the part of a limited number of medical men, is shown by the simultaneous growth in the number of practitioners taking advantage of the facilities offered by the laboratory, and the larger number of districts from which specimens have been received each year. During the past year 300 medical men practising in the West Riding, of whom 75 were Medical Officers of Health, have asked for an opinion on specimens sent by them, while in 1902 there were but 251, and in 1901 only 175. On comparing the list of Sanitary Districts given in the appendix, with the similar table in previous reports, it will be seen that 114 have this year contributed samples as compared with 106 in 1902 and 99 in 1901. Such figures are most satisfactory, for they not only prove that the work done in the laboratory is appreciated, but also that the policy that prompted this extension of the Sanitary Department of the West Riding County Council was fully justified.

The annual stock-taking of the outfits in the hands of the various Sanitary Authorities, in January 1904, showed that in nearly all instances their stock corresponded with the record kept in the books of the department. In those where it did not, satisfactory explanations of the discrepancy were forthcoming. The outfits themselves have proved both convenient and economical. Their mode of supply to the medical men of each district, through the local Medical Officer of Health, has worked smoothly and well. The returns, abstracted from the books of the department at the end of the year, showing the number and nature of the samples received during the



previous 12 months from each Sanitary District, have been embodied by many of the Medical Officers to whom they were supplied in their Annual Reports to the Local Authority. In doing so, several of them have commented on the benefit their district has derived from the prompt recognition by bacteriological means of obscure or doubtful cases of diphtheria, enteric fever, &c. Dr. Erskine Stuart in his report to the Batley Borough Council points out that the examinations undertaken free of charge in the laboratory "place the ordinary country practitioner on a footing equal to that of his city brethren as regards the scientific bearing of some of the features of cases under his care."

The system instituted last year of telegraphing the result of the examination of any specimen, with which the practitioner enclosed sixpence or a stamped telegraph form, has been found a great help in many urgent cases. During the year 219 telegrams relating to 393 specimens have been despatched from the laboratory. Of these, 206 were concerned with cases of diphtheria or suspected diphtheria, six with examinations made for the diagnosis of enteric fever, and one with a case of suspected anthrax.

The form enclosed in each outfit for the clinical history of the case and other information concerning the patient has, as a rule, been satisfactorily filled in. From them, and the final diagnosis forms sent out three to four months after the examination has been made, the information contained in the tables embodied in this report has been compiled. Some practitioners, evidently under the impression that a pathologist should not be told too much for fear his judgment should be biassed, have supplied little or no information about their cases. If they would realize that the data asked for on the forms is sought not from a motive of curiosity, but in order that the returns of the laboratory may be more useful to their contemporaries, and a richer legacy for posterity than they otherwise would be, they might reconsider their position and help to clothe the dry bones of statistics with a little human interest.

On February 27th, 1903, I gave a demonstration in the laboratory to a large gathering of medical men, on the "Bacteriological Diagnosis of Diphtheria," and on July 11th, when the Annual Provincial Meeting of the Incorporated Society of Medical Officers of Health was held in Wakefield, I had the pleasure of showing the Department, and explaining its working to the Members of the Society and their friends. In connection with the course of lectures and demonstrations for Sanitary Inspectors and others, held in Leeds, under the auspices of the West Riding Sanitary Lectures Joint Committee, I gave a lecture, illustrated by numerous lantern slides and specimens, on the "Bacteriology of Diseased Meat and Unsound Food." I also assisted at a demonstration, given by Dr. J. Spottiswoode Cameron, in the Leeds Dead-meat Market, on diseased meat.

In the following table a general summary of the examinations made during the year is given and, for the sake of comparison, the figures from the corresponding table in last year's report are inserted.



## GENERAL SUMMARY OF THE SPECIMENS EXAMINED IN THE LABORATORY

	Total.		Serum Reaction for Enteric Fever.		Sputum for Tubercle Bacilli.		Suspected Diphtheria.		Miscellaneous	
	1902	1903	1902	1903	1902	1903	1902	1903	1902	1903
January...	226	302	22	18	32	50	162	219	10	15
February	161	263	12	16	39	43	101	199	9	5
March ...	145	290	11	18	31	45	91	218	13	9
April ...	137	203	14	21	42	35	74	137	7	10
May ...	158	181	23	9	43	29	85	140	7	3
June ...	139	156	12	17	33	40	89	96	6	3
July ...	149	210	11	16	31	40	101	147	6	7
August ...	135	241	11	30	34	31	83	170	7	10
September	159	265	18	39	34	42	100	176	7	8
October ...	279	263	34	49	44	35	191	157	10	22
November	298	211	30	42	41	26	221	119	6	24
December	250	218	21	34	33	44	188	112	8	28
Total ...	2236	2803	219	309	437	460	1486	1890	94	144

Investigation of this table shows that the increase of work has not been confined to any one section but that in all more examinations have been made than in 1902. The increase has not however been uniformly distributed, for while over 40 per cent. more specimens of blood were tested by the serum reaction for enteric fever, and 27 per cent. more swabs for diphtheria, the examination of sputum for tubercle bacilli only exceeded those of last year by five per cent. Considerably more miscellaneous examinations have also been made. It is most satisfactory to notice that here the increase reached nearly sixty per cent., for it is in this direction that the main future expansion of the department may be expected to take place.

Enteric, or Typhoid Fever has been slightly more prevalent in the administrative County during 1903 than in 1902, there having been 1210 notified cases this, as against 1064 last year. The number of specimens examined by the serum reaction has also increased, for 90 more samples of blood have been received for investigation this year than in 1902.

Serum  
Diagnosis  
of Enteric  
Fever.

On comparing the ratio of laboratory examinations to notified cases it is found that it is not quite as high as might have been expected from past experience, for this year it works out at 1 : 3.8 as compared with 1 : 4.6 for the previous twelve months. If the 116 cases that gave no reaction be excluded however, over 16 per cent. of the notified cases were examined in the laboratory, which is a considerably higher proportion than the 11 per cent. examined last year. There is still room for much improvement in these figures, for although an examination of the blood is not necessary in well marked and typical cases, there are a large number of doubtful and anomalous outbreaks of sickness in which such an investigation might throw light on the diagnosis, and thus assist in the enforcement of suitable precautions for the localization of the



disease to the original patients. A large increase in the number of negative examinations would be a welcome sign that practitioners were becoming more keenly alive to the importance to the public health of an accurate diagnosis in doubtful cases.

In the following table the results obtained are analysed, and the cases arranged in groups according to the chief points in their clinical histories, and the diagnosis given by their medical attendant after the lapse of three months :—

EXAMINATION OF 309 SPECIMENS BY THE SERUM REACTION FOR ENTERIC FEVER.

*RESULTS of Serum Reaction.	FINAL DIAGNOSES, ascertained after the lapse of three months.	CLINICAL CHARACTERS, as recorded by Medical Attendant.			
		ROSE SPOTS PRESENT		ROSE SPOTS ABSENT.	
		Diarrhoea	No diarr.	Diarrhoea	No diarr.
MARKED  161	Affirmative ... 132	46	42	15	29
	Negative ... 0	0	0	0	0
	No Return ... 29	12	8	6	3
	<b>Total 161</b>	<b>58</b>	<b>50</b>	<b>21</b>	<b>32</b>
DOUBTFUL  32	Enteric Fever. 23	7	6	4	6
	Not Ent. Fev. 4	1	0	3	0
	No Return ... 5	1	2	2	0
	<b>Total 32</b>	<b>9</b>	<b>8</b>	<b>9</b>	<b>6</b>
NEGATIVE  116	Enteric Fever. 5	1	2	0	2
	Not Ent. Fev. 84	2	23	8	51
	No Return ... 27	2	5	9	11
	<b>Total 116</b>	<b>5</b>	<b>30</b>	<b>17</b>	<b>64</b>

\* The Microscopical method has been employed throughout, and two dilutions, 1 in 20 and 1 in 40, with a time limit of one hour, used for each case. The reactions obtained have been interpreted as follows :—Where both dilutions showed clumping and loss of motility at the end of the hour a diagnosis of "enteric fever" was made, but if the reaction was present only in the 1 in 20 dilution a guarded opinion was given and the case stated to be "probably enteric fever," if both preparations were unchanged the case was reported as "probably not enteric fever."

A marked reaction was given by 161 specimens, and 132 of the patients from whom these were derived were subsequently stated to have suffered from enteric fever. No reply was received to the enquiry as to the final diagnosis in 29. Of the 32 samples with which only a doubtful reaction was obtained, no information was supplied concerning 5, and in the remaining 27 all but four of the cases turned out to be enteric. Five cases that gave no reaction



were diagnosed as clinically "typhoid," and in 27 a final diagnosis was not made. So that in nearly 98 per cent. of the cases where it was possible to check the laboratory results, the diagnosis based on the examination of the blood was confirmed by the subsequent course of the case. In the five negative cases the blood examination was made in one on the fourth day, one on the sixth day, one on the seventh day, one on the twelfth day, and one on the fourteenth day of the disease.

The average day on which a positive reaction was obtained was the 11th this year, as in the two previous years. Twenty-five cases were examined, and gave the reaction in the first week of their illness, eighty-five during the second week, and fifteen in the third week. In ten instances a month had elapsed between the first appearance of the symptoms and the investigation of the blood, while in one the examination was delayed until the sixth week, and in another for two months after the onset. All these gave a characteristic reaction.

Seventeen of the 160 cases in which the after-history is known died, four from perforation of the bowel, two from hæmorrhage, and one during a relapse. Seven cases are stated to have had relapses but recovered. Influenza and pneumonia again head the list of diseases most frequently mistaken for enteric fever. Various forms of tuberculosis also gave rise to a mistaken preliminary diagnosis in a considerable number of cases. While septicæmia, malignant endocarditis, rheumatic fever, new growth and nephritis are also mentioned in one or more instances as causing difficulties in diagnosis.

The probable source of the infection is only stated in 53 cases, but in 26 of these it is attributed to contact with a previous sufferer, a striking evidence of the need for greater care in the isolation and nursing of enteric fever cases in the West Riding. Seven of the patients are said to have contracted the disorder while nursing relatives or friends. There is no doubt that ignorance on the part of the friends of the infectious nature of the discharges from the patient is responsible for many outbreaks that might, with care, have been localized to the original sufferer. Intelligent and efficient nursing is in enteric fever a matter of prime importance, not only to the patient himself but also to the community at large. Unless this can be secured, and in the homes of the working classes it is almost impossible to obtain it, all suspicious cases should be removed to an isolation hospital where suitable precautions to prevent infection can be carried out. If the case proves not to be enteric fever the patient is none the worse, but if the serum reaction and the subsequent symptoms prove the correctness of the provisional diagnosis the disease will probably have been limited to its original focus. In some instances enteric fever runs such a mild course and the symptoms are so few that the patient and his friends are apt to regard it as a somewhat trivial disorder. They neglect all precautions accordingly, even when a medical man has expressed a more or less decided opinion as to the nature of the malady. These are just the cases that are likely to light up an epidemic that may prove both troublesome and expensive, and it is here that the examination of the blood may be of the utmost service. Tentative isolation of all suspicious cases, examination of the blood to determine the diagnosis and, in proved cases,



continued isolation with good nursing, may be said to be the most efficient means we have at present of controlling the spread of this disease. It must not be forgotten, however, that the excretions may remain infected with the typhoid bacillus long after the patient is convalescent, and that a bacteriological examination of these, especially of the urine, is necessary before the precautions taken can be discontinued.

In ten instances this year the infection has been attributed to articles of diet. The evidence pointing in that direction is not given, but most of them appear to have been isolated cases. Three were stated to be due to consuming contaminated shellfish, two to ice-cream, three to milk, one to watercress, and five to defective water supplies. Faulty drainage and, in one instance, working with manure are given as the probable sources of infection in the remaining cases where the information has been obtained.

Examination  
of Sputum  
for Tubercle  
Bacilli.

During 1902, 437 specimens of sputum were examined for tubercle bacilli, this year 23 in excess of that number have been received, giving a total of 460 for the twelve months. The results of the examinations, classified according to the clinical manifestations of disease and the presence or absence of a family history of tuberculosis, are displayed in the following table:—

RESULTS OF THE EXAMINATION OF 460 SPECIMENS OF SPUTUM  
FOR TUBERCLE BACILLI.

Tubercle Bacilli found in 143.			No Tubercle Bacilli found in 317.		
Physical Signs of Disease.	Family History of Tuberculosis.	No Family History of Tuberculosis.	Final Diagnosis ascertained after lapse of four months.	Family History of Tuberculosis.	No Family History of Tuberculosis.
Present 64	16	48	Not Tuberculosis 264	35	229
Doubtful 39	7	32	Tuberculosis 22	10	12
Absent 17	4	13	Doubtful 6	1	5
Not Recorded 23	—	—	No Return 25	—	—
Total ...	27	93	Total ...	46	246

From this it will be seen that in 143 specimens (31 per cent.) tubercle bacilli were found, while in 317 samples (68 per cent.) they could not be discovered. In only 22 of the cases in which the laboratory examination was negative was a final diagnosis of pulmonary tuberculosis made, so that the specific bacillus was detected in 87 per cent. of the undoubted cases of tuberculosis submitted for examination. This is a very similar result to that



obtained last year, when 89 per cent. of the cases were successfully diagnosed bacteriologically. Although it is satisfactory to note a continuance of the high proportion of cases in which the bacteriological examination was in agreement with the final clinical diagnosis, it is disappointing that only eleven more negative examinations were made this year than in 1902. Such a slight increase may speak well of the powers of diagnosis of practitioners in the Riding, but it suggests that they are not employing the resources of the Laboratory to an appreciably greater extent now than formerly in the detection of early and doubtful cases. A large addition to the number of specimens coming under the headings "No tubercle bacilli found," "Final diagnosis, Not tuberculosis," would be a welcome sign that their activities in this direction were becoming more pronounced. Experience of the open-air and other forms of treatment has clearly demonstrated that material and lasting benefit can only be hoped for when an early commencement is made. To wait for the development of unmistakable physical signs of tuberculosis is to wilfully lessen the patient's chances of ultimate recovery. By repeated careful bacteriological investigation of the sputum the presence of tuberculosis can be detected in the vast majority of cases at quite an early stage, and there is therefore no excuse for such delay, at least not in the West Riding of Yorkshire, where the County Council has provided for every inhabitant the means for having the necessary examinations carried out free of all expense save the postage to the Laboratory.

A family history of tuberculosis was recorded in 22 per cent. of the cases in which tubercle bacilli were found, and also in 14 per cent. of those finally diagnosed as "Not tuberculosis" and in whose sputum no tubercle bacilli had been discovered. The age and sex of the patient was given in 131 cases where tubercle bacilli were detected. Seventy-seven of these were males and 54 females. The average age of the men was 36 years and of the women 31 years. Their distribution in age periods is shown in the following table:—

		Under 15 years.	From 15 to 25 years.	From 25 to 35 years.	From 35 to 45 years.	From 45 to 55 years.	From 55 to 65 years.	Over 65 years.
Males	...	—	15 (20 per cent.)	28 (36 per cent.)	18 (23 per cent.)	14 (18 per cent.)	1	1
Females	..	1	16 (28 per cent.)	23 (43 per cent.)	7 (13 per cent.)	4 (7 per cent.)	2	1

An earlier age incidence in females than in males was noticeable in the returns for both 1901 and 1902, and an analysis of this year's figures gives results that closely correspond to those then obtained. The greater liability of males to pulmonary tuberculosis is also again emphasised in this Table, and, when considered in conjunction with the later age of incidence, suggests that the onset is influenced by their mode of life and the conditions under



which they work. Dusty occupations, especially where the dust is gritty or irritating in character, defective ventilation and a moist warm atmosphere are the most common predisposing causes. In men these conditions may obtain more or less in many cases all their work-a-day lives, but in the majority of women employed under similar circumstances their labours are transferred to another sphere by 30 or 35, so that fewer cases of tuberculosis are met with in women after that age than in men.

In 124 of the positive cases the occupation of the patient is recorded. It is stated that 28 were employed in mills, 17 were clerks, 13 shop assistants, eight school teachers, three dressmakers, two carters, two clergymen, two cooks, two blacksmiths, and one was a student of medicine. Only two were coal miners, which, considering the large number of men following this calling in the Riding, is a striking tribute to the immunity of that calling from tuberculosis. Of eight ganister miners, six were found to have tubercle bacilli in their sputum. Two stonemasons and one bricklayer were found to be suffering from tuberculosis. The sputum of a rag-picker was also found to contain crowds of tubercle bacilli. Thirty-four patients, mostly females, were at home and did not follow any particular occupation.

The after-history of 135 of the 143 cases in which bacilli were found was obtained four months after the examination of the sputum had been made. Of the 82 males, 23 (28 per cent.) had died, 24 had improved, and 35 were worse. The death-rate among the females was considerably higher, 18 out of 53 patients (35 per cent.) having succumbed, 14 are stated to have improved and 21 were said to be worse. In 14 cases where improvement was noted the patients had been undergoing the open-air treatment, but in all tubercle bacilli were still to be found in the sputum. In several however they were only discovered with difficulty, and in five cases, where it was possible to compare films made from the sputum after treatment with those prepared from specimens sent when the diagnosis was first made, a noticeable diminution in the number of staphylococci and other secondary infecting organisms was observable.

The sputum of one patient who was undergoing treatment with Beraneck's serum was repeatedly examined. A considerable number of tubercle bacilli were found both before the injections were commenced and in the earlier stages of the treatment, but they gradually diminished in number and finally in two successive examinations were not found at all, although a most careful search was made on both occasions. The physical signs of the disease also disappeared and the last information obtained was that the patient was in apparently perfect health. In another case, however, where no special serum or particularly novel line of treatment was employed a similar result was obtained. The sputum, which in November, 1902, contained crowds of tubercle bacilli, was found in two examinations made in July, 1903, to show only a few staphylococci. The patient was then stated to have regained his normal health. As showing the difficulty of being sure that a permanent "cure" has been wrought in tuberculosis the case of a woman may be mentioned in whose sputum a large number of tubercle bacilli were found early in the year. The clinical history accompanying the specimen stated that bacilli had been detected ten years before, but that the patient had apparently



recovered and had remained in good health until shortly before this examination was made. Whether the recurrence of the disease after such a long interval was due to a renewed activity of the original lesion, or to a fresh infection, is not certain. In any case it suggests that a soil that has once proved to be a suitable medium for the growth of the tubercle bacillus may, under favourable circumstances, again afford a nidus for the multiplication of the organism.

The belief, at one time prevalent, that tuberculosis is an hereditary disease is no longer held. Although the specific bacillus of the disease is not transmitted from parent to offspring, there is every reason to believe that the peculiarities of chemical composition of the tissues that predispose to attack are often transmitted, and that the children of tuberculous parents are in many cases more liable to infection than those of healthy ancestry. Five instances have been met with this year where two or more members of the same family have successively been affected with pulmonary tuberculosis. The infection has in each case been apparently brought about by one member of the family being nursed by others. In each there has also been a strong family history of tuberculosis and it would appear that, once the source of infection was introduced into the household, it was quickly passed on to others; the intimate and continued contact of the patient with his nurse and others in the family sufficing to overcome what little resistance they possessed. Children of tuberculous parents require special care to strengthen their resisting powers, and more than usual precautions are needed when one member of a family with a tuberculous family history is attacked by the disease. Early diagnosis is more than ever necessary in such cases, not only for the benefit of the patient himself but also for the sake of his associates. Repeated bacteriological examinations of the sputum should be undertaken until the presence or absence of tubercle bacilli can be decided with very considerable certainty. The members of such a family should not be allowed to nurse each other, but strict isolation enforced and great care taken to prevent the infection of the remaining members of the family with the disease.

There have been 12 deaths among the 264 patients suspected to be suffering from consumption, but in whose sputum no tubercle bacilli could be found, and which were finally diagnosed as "not tuberculosis." The causes of death given were bronchitis, emphysema, pneumonia, acute miliary tuberculosis, diabetes, nephritis, and malignant disease of the lungs.

As will be seen from the General Summary on page 65, 1890 specimens have been examined for diphtheria bacilli, 404 more samples under this head have been received than in the previous year, and 1507 more than in 1901. Altogether, out of a grand total of 5,902 specimens examined in the laboratory since it was opened in April, 1901, 3,759 have been connected with the diagnosis or isolation of cases of diphtheria. Although the number of examinations made in the laboratory has thus continuously increased fewer cases of diphtheria have been notified each year in the administrative county. In 1901, there were 2159, while in 1902, they had decreased to 1,554, and this year the number has fallen to 1,382. The increase in the laboratory returns is therefore to be attributed to a larger proportion of cases being submitted to bacteriological investigation.

Diphtheri  
Examina-  
tions



The work coming under this heading may be divided into two distinct groups, namely, that which deals with the diagnosis of diphtheria, and that which is concerned with the determination of the freedom from infection of patients who have suffered from the disease. Both are important from a public health point of view, but the latter is probably the more useful, so far as the community at large is concerned. The clinical symptoms presented by a typical case of diphtheria are sufficiently striking to at once indicate the infectious nature of the malady, but there is no certain criterion by which the period of isolation required to insure freedom from infection can be determined, except repeated bacteriological examinations. It is, therefore, somewhat disappointing to record that although the diagnostic examinations have increased this year by 222, there has not been a corresponding increase in the examinations of convalescent cases, which only exceed those made in 1902, by 182.

An analysis of the results obtained under the two headings, classified according to the final diagnosis made by the medical men in charge of the cases is given in the following table :—

RESULT OF BACTERIOLOGICAL EXAMINATION OF 1890 SPECIMENS  
FOR DIPHTHERIA BACILLI.

Final diagnosis ascertained after the lapse of three months	Diphtheria bacilli found in 873	No diphtheria bacilli found in 1017
Diphtheria 488	469	19
Not Diphtheria 352	0	352
No Return 134	55	79
Convalescent Cases 916	349	567

From this it will be seen that 524 out of 974 suspected cases of diphtheria (53·82 per cent.) yielded diphtheria bacilli on culture,—a proportion practically the same as that found last year, when 53 per cent. gave a positive result. In 19 cases where no diphtheria bacilli could be found in the specimen sent for examination, a final diagnosis of diphtheria was made. As the grounds for the clinical diagnosis are not given in any of the cases, and a second specimen was not sent to the laboratory for further investigation, the true bacteriological nature of the disorder from which these 19 patients suffered must remain in doubt.

The age and sex of 481 of the cases in which diphtheria bacilli were present has been ascertained. Of these 215 were males and 266 females. The



average age of the males was 6·4 years, and of the females, 11·8 years. Classified according to age periods they may be arranged as follows:—

	Under 5 years	From 5 to 15 years	From 15 to 25 years	From 25 to 35 years	Over 35 years
Males ...	72 (33·4%)	113 (52·4%)	16 (7·6%)	9 (4·1 %)	5 (2·3 %)
Females ...	54 (20·6%)	139 (51·8%)	43 (16·4%)	18 (6·8 %)	12 (4·8 %)

This table corresponds very closely to that given in last year's report, and again indicates that males under five years of age are more frequently attacked by diphtheria than females; from five to 15, the rate of incidence in the two sexes is about equal, and after the fifteenth year more cases occur in females than in males. It will be noticed that over 52 per cent. of the cases in males and slightly more than 51 per cent. in the females occurred at an age when children are brought into very intimate contact with each other at school. The influence of schools on the spread of diphtheria is well recognised, and one of the weapons employed in combating an outbreak of the disease is the closure of the schools in the affected district by the Sanitary Authority. To prevent an epidemic is, however, more satisfactory than to attempt to stay its progress. Among other precautions that might be taken with this end in view are the early bacteriological examination of those children who are suffering from sore throat or have a discharge from the nose or ear. The abandoning of the custom that prevails in many schools of permitting slates, pencils, drinking cups and other articles to be used promiscuously by the scholars, would also tend to lessening the spread of diphtheria and other infectious maladies.

The information contained in the final diagnosis returns shows that 28 cases in which diphtheria bacilli were found died of the disease, giving a death-rate of just under six per cent. Thirteen deaths occurred in patients under the age of five, eight being in males and five in females. Between five and 15 there were also 13 fatal cases, six being in males and seven in females. Between fifteen and 25 there were two deaths, both being females. Paralytic symptoms are stated to have supervened in 43 cases, and nine of these subsequently died. An example of the sudden fatal result that may follow bodily exertion in diphtheria is the case of a child of six who fell dead while getting out of bed. He had only complained of "sore throat" for one day, but at the post-mortem examination ordered by the coroner the larynx was found to be covered with membrane, and a profuse growth of diphtheria bacilli was cultivated from a sample of this sent to the laboratory for examination. The details of another case are also of interest as bearing on the same subject, and further, as emphasising the need for care, even in mild cases of diphtheria, during convalescence. The patient, a boy of 12 or 13, was accidentally seen by the medical man of the family while attending a brother. He remarked that the boy did not seem well, and that there was a peculiar nasal twang in his speech. The mother said that he had been like that since he had had



a "sore throat" a week or two before, and when warned that he had probably suffered from diphtheria and might die from paralysis of the heart, she was inclined to scoff at the idea. Subsequent events, however, proved the need for the warning, for shortly afterwards, when engaged in some light work, the boy suddenly expired. As crowds of diphtheria bacilli were found in the throat of the brother whom the doctor had been originally called in to treat, there is little doubt that the same organism had been the cause of the "sore throat" from which the boy who died had suffered.

The exceedingly important part played by personal contact in the spread of diphtheria is again emphasised by this year's returns, and little can be added to what has already been said in previous reports. Mild and unrecognised cases have, as in the past, been answerable for a considerable number of attacks in their associates. "Sore throat" in one member of a family has frequently been the prelude to an outbreak of diphtheria in others, and the nursing of a relative or friend is, in a considerable number of cases, given as the source of the infection in the older patients. The death of an undertaker's assistant, aged 17, was attributed to diphtheria contracted a week previously while conducting the funeral of a child who had died of the disorder. The child's sister was also attacked by the disease but recovered. Examination of a number of "swabs" from the fellow pupils of a child who had suffered from diphtheria showed that two of them were harbouring the germs of the disease. The mother of these two children subsequently developed a typical attack of diphtheria, although the children themselves remained apparently unaffected.

The use of anti-diphtheritic sera may prove a source of danger to the community unless it is combined with careful and systematic bacteriological examinations of the recipient. A case that illustrates this in a striking manner has been met with in the past year. A woman who had been attending to a fatal case of diphtheria was given a prophylactic dose of the serum. Although she herself remained free from symptoms three other children with whom she afterwards came into intimate relation contracted the disease, and a subsequent bacteriological examination of her throat gave a typical culture of diphtheria bacilli.

An outbreak of diphtheria in a County Borough situated in the West Riding was attributed by the Medical Officer of Health for the town to a contaminated milk supply, derived from a Sanitary District in the Administrative County. At the request of the local Medical Officer an investigation of the supply was undertaken. Examination of the milk failed to reveal any organisms having the characters of diphtheria bacilli, and it was also proved experimentally to be non-pathogenic. Specimens taken from the throats and noses of all the workers who came in contact with the milk showed that while from several of them cultures of the pseudo-diphtheria bacillus could be obtained, (a by no means uncommon occurrence even in healthy people), typical diphtheria bacilli were absent. In the course of the investigation a visit was paid to the home of one of the helpers on the farm, who resided in the affected district of the Borough. It was there noticed that one of the children of the house had a discharge from the nose and that the margins of the nostrils were excoriated. Cultures from the discharge gave an abundant



growth of diphtheria bacilli. Enquiry revealed the fact that a number of children in the neighbourhood had suffered from swollen glands, or as it had been termed "mumps," and that in some this had been followed by a discharge from the nose. Although it was not feasible to prove it bacteriologically, it is highly probable that many of these had been cases of mild unrecognised diphtheria, and that they had served as a focus of infection for others in the district. No diphtheria bacilli could be found in swabs taken from the farm labourer who resided in the house where the child mentioned above lived.

A preliminary examination of all specimens sent for diagnostic purposes has been made by means of cover-glass preparations direct from the swab, and stained by Neisser's method. In over 50 per cent. of the cases that eventually proved to be diphtheria, a sufficiently well marked result has been obtained to allow of a provisional report being at once sent to the practitioner in charge. This year's experience of the method therefore tallies closely with past results, and it may be inferred that, after a little experience, it is possible to arrive at a correct conclusion in from 40 to 50 per cent. of diphtheria cases, within a few minutes of the arrival of the specimen, by the help of this stain.

In the subjoined table the results obtained by Neisser's method, and on culture are compared :—

#### RAPID DIAGNOSIS OF DIPHTHERIA WITH NEISSER'S STAIN.

Cover-glass preparation from the "swab," stained by Neisser's method.	Culture.	Final Diagnosis ascertained after lapse of three months.	
Positive 246	Positive 456	Diphtheria 488	Total 974
Negative 210	Negative 32		
Positive 13	Positive 0	Not Diphtheria 352	
Negative 19	Negative 352		
Positive 0			
Negative 0			
Positive 0			
Negative 352			
Positive 25	Positive 55	No Return 134	
Negative 30	Negative 79		
Positive 0			
Negative 79			

In a disease like diphtheria where the infection is almost entirely spread by the contact of susceptible individuals with persons who are suffering from the disease, or who still harbour the germs of the disorder during convalescence from an attack, the importance of an efficient means of determining the duration of the infective period is not difficult to realize. A study of the laboratory returns of convalescent cases for the past year, however, suggests that a considerable number of medical men who take advantage of the facilities offered them for diagnosis are still content to rely on an

Diphtheria  
Convalescent  
Cases.



arbitrary time-limit, unchecked by bacteriological investigation, for determining their patients' freedom from infection. Although there were 222 more examinations made in 1903 than in the previous year for the diagnosis of diphtheria, and of these 125 were positive, only 182 additional examinations were made from convalescent cases. If the proportion existing between primary and convalescent examinations in 1902 had been maintained there should have been 965 of the latter this year instead of the 916 that actually obtained. Such a falling off, slight though it may be, is to be regretted, for it shows that the appeal made in last year's report for a more thorough and systematic bacteriological examination of all convalescent diphtheria cases has not met with the response that was hoped for.

In order that the unreliability of clinical methods for determining the time of isolation necessary after an attack of diphtheria may be more clearly seen, 679 convalescent cases, in which the period that had elapsed since the first onset of the symptoms was known, have been tabulated according to the results of the bacteriological examination made in the laboratory with following result:—

DURATION OF DISEASE IN WEEKS.

Result of Bacteriological Examinations.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Positive	12	103	113	30	22	10	3	6	0	1	2	0	3	0	1	0	0	1
Negative	2	83	156	54	19	14	8	6	5	2	1	1	0	1	0	0	0	0

This table shows that there is no particular time at which it may be expected that the patient is free from infection, and further, that in some instances bacilli may linger in the throat or nose for as long as 12, 14, 16, or even 19 weeks after the first onset of the disease. One case was examined seven times before it could be declared free from infection. Two were examined six times, six five times, 16 four times, 31 three times, and 191 twice before a negative result was obtained.

Miscellaneous  
Examinations

**Miscellaneous Examinations.**—Special investigations, outside the routine work of the department dealt with in the preceding sections of the report, have been much more numerous than in the two previous years. Many of them have been of an intricate character involving careful research and the expenditure of much time and labour.

Inquests.

On two occasions I have been called upon to assist coroners in the Riding in determining the cause of death in persons on whom inquests were held. The first of these was a child who had died somewhat suddenly with symptoms of irritant poisoning. The death was certified as being due to ptomaine poisoning and was attributed by the medical man who was called in to certain articles of diet taken shortly before the onset of the symptoms. The liver, spleen, stomach, and intestines were examined bacteriologically, but no organism likely to have given rise to the symptoms met with during life could be isolated. The remains of some ham and jam of which the child had partaken were also investigated. The former proved to be sterile and the latter only yielded a culture of staphylococci which proved not to be pathogenic. The second







## Urine

The urine of only a small proportion of the cases of enteric fever occurring in the Riding is submitted for bacteriological investigation at the end of the convalescent period. As nearly 37 per cent. of the specimens that have been received have been found to contain typhoid bacilli, the importance of such an examination to determine the patient's freedom from infection, is obvious. This year 14 of the 46 specimens examined have yielded typhoid bacilli on culture, as compared with 13 out of 29 in 1902, and 9 out of 23 in 1901. Thirty-six cases out of a total of ninety-eight have therefore been found to be capable of spreading the disease, although they had apparently quite recovered.

Twelve samples of urine have been examined for tubercle bacilli. In ten the search was unsuccessful. In two tubercle bacilli were found. One of the negative cases is stated to have died from tuberculosis of the kidney. Four were found to have a renal calculus. One died of tuberculous peritonitis, and one of chronic nephritis.

## Fæces.

The appearance of ankylostomiasis in the miners employed in certain parts of Great Britain has caused considerable anxiety to those responsible for the public health, especially in mining districts such as the West Riding of Yorkshire. The disease is caused by a small worm, some half-inch or so in length, that takes up its abode in the upper part of the small intestine. The eggs of the worm, when voided in the patient's fæces, are quite immature but quickly undergo development outside the body under favourable conditions of moisture, warmth and air. The resulting embryo, after passing through various stages, becomes sexually mature and may exist for weeks, or even months, in moist soil or mud. It is then transferred in polluted water or soil adhering to the hands, food, etc., to the alimentary canal of a fresh host in whom it gives rise to a severe and often fatal form of anæmia. This anæmia presents no characteristic symptoms by which it can be clinically recognised although certain changes in the blood have been described as invariably present in patients infected with the ankylostoma. A microscopical search of the fæces for the worms and their eggs is the chief point on which the diagnosis of the condition depends. Two such investigations have been conducted during the past year on specimens taken from miners in the West Riding who presented suspicious symptoms, but in neither instance was any evidence of the disease found. As much sickness and consequent great financial loss would follow the introduction of ankylostomiasis into the mines of the county it is to be hoped that every endeavour will be made to prevent such an occurrence by improving the sanitary condition of the mines and carefully examining the excreta of all workers who are likely to introduce the infection.

A sample of fæces from a case of suspected enteric fever has been examined for the typhoid bacillus by the method of Drigalski and Conradi with a positive result. This method of diagnosing enteric fever is of great service, according to Professor Koch, especially in the earlier stages of the disease before the serum reaction has developed. By means of it, he successfully dealt with an epidemic at Trier, a locality where the disease had obtained a firm hold on the inhabitants. The result obtained in the laboratory in the one case examined by this method suggests that further trial might be useful under certain circumstances.



Two samples of pus from suspected cases of actinomycosis in man have been investigated, but in neither was any evidence of the disease found microscopically. A specimen of pus has also been examined for tubercle bacilli with a negative result. The discharge from the ear of a child, whose blood had been examined by the serum reaction for enteric fever and given a characteristic result, was sent for investigation. Cultures prepared from it yielded a profuse green growth of a bacillus having the characters of *bacillus pyocyaneus*. Death from septic pneumonia is stated to have occurred shortly after the examination was concluded. Three specimens of pleural effusion have been examined for tubercle bacilli all with a negative result. Microscopical examination of a small quantity of cerebro-spinal fluid drawn off by lumbar puncture from a case of meningitis showed a number of organisms having the appearance and staining re-actions of the *diplococcus intracellularis meningitidis* (Weichselbaum).

Pus, Pleural  
Effusion,  
Cerebro-spi-  
nal Fluid.

The bacteriological examination of food materials and water supplies should form an important item in the work conducted in the laboratory. It is therefore not satisfactory to have to note that fewer samples under this heading have been received than in 1902. The accurate diagnosis of an infectious disease is primarily a matter of importance to the individual affected, but so far as the public is concerned the discovery of the source whence it was derived and the preservation from contamination of milk, water, and food supplies, are matters of much greater moment. This is particularly the case with regard to milk and to water. Both are important articles of diet, and both are vehicles by means of which it has been shown that a number of diseases may be spread. The individual consumer is practically at the mercy of those who supply these commodities, and unless there is efficient public control he has no guarantee that his milk or water may not be, as in some cases it undoubtedly is, diluted sewage. The question of national degeneration has recently excited much discussion. By some competent observers the diminution in physical vigour that is claimed to have taken place in the last generation or so is attributed to faults in the diet of infants and young children. As milk is the most important food of this section of the community it is not difficult to see that unless it is of good quality and reasonably free from bacteria likely to set up deleterious changes in it, much harm may be done at a time when they are laying the foundation of their future well-being. In towns where the milk has often come some considerable distance and is not consumed until many hours after it has been drawn, the risk to the consumer is greater than in the country. Changes unappreciable by ordinary chemical tests are liable to take place, especially in the summer time, and to result in digestive derangements and mal-assimilation in the infants who partake of it. Bacteriological examinations of samples of this description will often reveal a number of micro-organisms much in excess of what should be present in a normal well preserved milk. In some cases, too, evidence of specific contamination can be obtained shewing that the milk has been collected under deplorably insanitary conditions. If the sanitary authorities of the West Riding would seriously take in hand this question of ensuring a pure milk supply they would do much to improve the stamina of the race and materially lower the death rate especially in infants and young children. Three of the five samples of milk examined in the laboratory during the past year have

Meat, Milk,  
Jam, Water.



been found to be polluted. In one a number of tubercle bacilli were found and the other two showed such an enormous number of bacteria, many of which were of intestinal origin, that there was no doubt that they had been grossly polluted either with contaminated water or with faecal material.

Tubercle bacilli were found in a sample of meat taken from a carcass seized by the officers of a Sanitary Authority in the Riding. While in another specimen, which had also been exposed for sale, crowds of anthrax bacilli were detected in section and on culture. Actinomycosis was found to be present in the tongue of an ox examined in the laboratory, but in a sample of meat and lymph gland submitted for investigation no evidence of the disease could be found microscopically. Three specimens of ham believed to be associated with outbreaks of food poisoning yielded no bacteriological evidence that such was the case. Reference has already been made to one of these, and also to the specimen of jam mentioned in the above table.

Only four water supplies have been submitted to complete bacteriological examination this year as against nine in the previous twelve months. Two of them showed evidence of having been polluted and two were free from any sign that the source from which they were derived was contaminated. A microscopical examination of the sediment from 13 waters, sent for chemical examination, has been made and the results added to the chemist's report on them.

Air, dust.

The investigation of the air of a school where a series of cases of diphtheria had occurred was undertaken early in the year. It was found that the number of bacteria in three measured samples from various points inside the building closely corresponded with that obtained from a similar sample taken from outside, so that the ventilation was evidently satisfactory. None of the bacteria isolated from the cultures prepared from the inside air were found to be of a pathogenic nature. In one of four samples of dust collected from a room in which most of the children who had suffered from diphtheria had been working, bacilli having the cultural, morphological, and staining characters of the diphtheria bacillus were isolated. Unfortunately, owing to a press of work, the investigation of the exact nature of this bacillus had to be postponed for some time and when it was possible to continue it the culture was found to have died out. It cannot consequently be definitely asserted that the organism was a true diphtheria bacillus although it had every appearance of being so.

Diseases  
Animals.

The bodies of two cats, supposed while alive to have been the source from which the infection in two cases of diphtheria in children had been derived, have been examined bacteriologically. Both were free from diphtheria bacilli. The left lung of one of them was, however, deeply congested, and sections examined under the microscope shewed a typical picture of early lobar pneumonia. Specially stained sections revealed the presence of pneumococcus, to which the pathological changes in the lung were evidently due.

Anthrax

Six cases of suspected anthrax occurring in human beings have been investigated during the past year. That occurring in a rag-picker has already been dealt with at length. In three of the remaining five no anthrax bacilli could be found in the specimens received, while two gave typical pathogenic cultures.



An outbreak of what was diagnosed as epidemic jaundice, or Weil's disease, having occurred in a village in the Riding, a number of bacteriological experiments were conducted with samples of blood, fæces, urine, &c., derived from patients suffering from the disorder. From the urine of several cases a bacillus belonging to the proteus group was isolated in pure culture. It was not found constantly in the urine, however, nor did several preparations made from the blood of two patients show it. It is, therefore, not at all certain that its presence was more than accidental. The fact that this bacillus was isolated from the excretions of a number of patients suffering from the disease is of some interest, as the investigations of Jaeger render it not improbable that the *Bacillus proteus fluorescens* is the organism to which acute febrile jaundice is due. Epidemic Jaundice

The process of disinfection is usually carried out in a more or less routine fashion, and no attempt is made to determine whether the disinfectant employed has in any particular instance fulfilled the purpose for which it was intended. Various chemical and physical tests have been suggested for determining the penetrating power and activity of disinfectants, but the best and most rational is to expose specimens of living micro-organisms to the conditions selected, and then to see what effect has been produced on them. In a large room which it was found necessary to disinfect during the past year, this method of testing the efficacy of the process was adopted. Pieces of sterile glazed paper and sterilized cotton thread were inoculated with broth cultures of staphylococci, diphtheria and spore bearing anthrax. After being dried in the incubator for two hours, they were exposed to the formalin vapour with which the room was being disinfected for 20 hours, the formalin being produced by heating paraform tablets (one tablet to each 50 cubic feet) over spirit lamps specially designed for the purpose. Cultivation of the inoculated materials in broth on the completion of the test, showed that all non-spore-bearing organisms on the surface of articles in the room had been destroyed, but that those lying more deeply had escaped, as had also those bacteria more superficially placed that contained spores. That is to say, growths occurred in all the cultures made from the cotton threads, and also in the paper infected with anthrax, but that the diphtheria and staphylococci infected papers proved to be sterile. Disinfectant

Three outbreaks of supposed ptomaine poisoning have been enquired into during 1903. In none of them was any bacteriological evidence obtainable that the articles of diet believed to be the cause of the symptoms were specifically infected or contaminated with any organism likely to set up deleterious changes. Ptomaine Poisoning

In an Annual Report, such as this, a certain amount of repetition from year to year is unavoidable. The figures recording the work of the department must of necessity be grouped in a similar fashion each year if they are to be of any permanent value for purposes of comparison. Uninteresting as such statistics may be, they yearly become more valuable, for, as the experience of each report is added to the deductions derived from a study of the work of previous years, many interesting and important facts can be slowly established. It is yet too early to dogmatise on the inferences made in this and previous years from the figures already collected, but certain facts appear even now to Conclusion



be fairly well established. For instance, it can be said with a considerable degree of assurance that in about 95 per cent. of cases of enteric fever the serum reaction gives reliable results, but that in 5 per cent. diagnosis by this means, at least with a single examination, is not possible. The accumulated statistics of the past three years also show that tubercle bacilli may be found in some 85 per cent. of the specimens of sputum from cases that eventually prove to be suffering from tuberculosis of the lungs, but that in 15 per cent. the search is not successful. An experience of the examination of nearly 2000 samples from suspected cases of diphtheria, by Neisser's stain, has demonstrated that about half the cases that show characteristic bacilli on culture may be correctly diagnosed in a few minutes by this method.

Conclusions such as these, apart from their abstract interest, are of real practical value in estimating the reliance to be placed on a particular result obtained by one or other of the methods mentioned. One is sometimes called upon to give an opinion in a case so beset with difficulties on the clinical side that more than a guess at the nature of the malady is impossible; under such circumstances a standard, whereby the value of the bacteriological examination can be judged is most useful, and indeed essential, if grave mistakes in diagnosis are to be avoided. Other inferences, such as the relative part played by direct infection in the spread of typhoid, tubercle, and diphtheria, are supported by the facts accumulated up to the present, but a much more extended experience is necessary before their real value can be established. The statistics given in this and previous reports leave little doubt, however, as to the need for repeated bacteriological examinations during convalescence from diphtheria, and it is to be hoped that next year's report will see a very considerable rise in the number of examinations made for this purpose.

A larger proportion of negative examinations, confirmed, of course, by a corresponding final diagnosis, in all the main divisions of the work of the Laboratory would be welcome as a sign that more use was being made of bacteriological help in unravelling doubtful cases. Ambulatory cases of enteric fever, the early stages of tuberculosis, mild attacks of diphtheria, and convalescents who are still infected, are potent factors in spreading disease. It is particularly in connection with cases of this description that the Laboratory can help the practitioner to arrive at a satisfactory conclusion, and aid the sanitary authorities in stamping out some of the maladies that yearly call for such a heavy toll from the communities under their charge.

While the diagnosis of transmissible diseases is undoubtedly important, the discovery of the source from which the primary infection has been derived is still more so. In work of this description the Laboratory might be much more frequently employed than it has hitherto, and, judging from the large number of cases each year in which no attempt is made to indicate the probable origin of the disease, there should be no lack of material. In the protection of the food and water supplies of the Riding from contamination much useful work might also be done. Recent advances in our knowledge of the bacteriology of water have placed this subject on a much more certain footing, and instances have been reported where an outbreak of water-borne disease has been foretold by bacteriological methods some time before it actually occurred, and when there was no chemical evidence that the water



supply was polluted. Until this class of work occupies a much more prominent place in the Annual Report than it does at present it cannot be said that the Laboratory is taking the share it might reasonably be expected to do in the prevention of disease in the West Riding of Yorkshire.

Before concluding I should like to express my indebtedness to those medical men who during the past year have been kind enough to supply clinical and social details concerning the cases under their charge. Without their assistance the value of this report would have been much diminished, and it is only as a consequence of their co-operation that it has been possible to continue an analysis of the results on the lines adopted in previous years. My thanks are also due to those who have assisted me in the scientific and clerical work of the department and contributed in no small measure to its success. Finally, I take this opportunity of placing on record my deep appreciation of the many courtesies and kindnesses I have continually experienced from the County Medical Officer, Dr. J. R. Kaye, during this and previous years that I have had charge of the Laboratory.

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August, 1904.



## APPENDIX TO BACTERIOLOGICAL REPORT.

TABLE SHOWING THE DISTRICTS FROM WHICH SPECIMENS HAVE BEEN RECEIVED DURING 1903.

<i>Urban Districts :—</i>			Hoylandswaine	..	—	Sowerby Bridge	..	6
Altofts	..	—	Hunsworth	..	—	Soyland	..	2
Ardsley	..	2	Ilkley	..	86	Springhead	..	—
Ardsley, East and West	..	—	Keighley B.	..	86	Stainland-with-Old Lindley	1	—
Baildon	..	—	Kirkburton	..	11	Stanley	..	8
Balby with-Hexthorpe	..	3	Kirkheaton	..	—	Stocksbridge	..	20
Barkisland	..	—	Knaresborough	..	5	Swinton	..	25
Barnoldswick	..	2	Knottingley	..	1	Thornhill	..	—
Barnsley B.	..	121	Lepton	..	—	Thurlstone	..	28
Batley B.	..	33	Linthwaite	..	—	Thurstonsland	..	—
Bingley	..	46	Liversedge	..	29	Tickhill	..	2
Birkenshaw	..	2	Luddendenfoot	..	2	Todmorden B.	..	26
Birstal	..	6	Marsden	..	—	Wakefield C.	..	107
Bolton-upon-Dearne	..	40	Meltham	..	1	Wath-upon-Dearne	..	3
Brighouse B.	..	35	Methley	..	—	Wheatley	..	3
Burley-in-Wharfedale	..	4	Mexborough	..	2	Whitley Upper	..	—
Calverley	..	4	Midgley	..	2	Whitwood	..	8
Castleford	..	6	Mirfield	..	7	Wombwell	..	1
Clayton	..	1	Monk Bretton	..	—	Worsbrough	..	4
Clayton West	..	1	Morley B.	..	38	Yeadon	..	—
Cleckheaton	..	9	Mytholmroyd	..	14	<i>Rural Districts :—</i>		
Cudworth	..	2	Netherthong	..	—	Barnsley	..	29
Darfield	..	—	New Mill	..	1	Bishopthorpe	..	2
Darton	..	11	Normanton	..	4	Bowland	..	—
Denby-and-Cumberworth	2	—	Oakworth	..	1	Doncaster	..	5
Denholme	..	—	Ossett B.	..	12	Goole	..	—
Dewsbury B.	..	11	Otley	..	31	Gt. Ouseburn	..	58
Dodworth	..	1	Oxenhope	..	5	Halifax	..	1
Doncaster B.	..	107	Penistone	..	10	Hemsworth	..	707
Drighlington	..	—	Pontefract B.	..	8	Hunslet	..	4
Elland	..	—	Pudsey B.	..	44	Keighley	..	—
Emley	..	3	Queensbury	..	7	Kiveton Park	..	—
Farnley Tyas	..	—	Ravensthorpe	..	—	Knaresborough	..	5
Farsley	..	8	Rawdon	..	14	Leeds (Roundhay and	..	—
Featherstone	..	—	Rawmarsh	..	23	Seacroft)	..	8
Flockton	..	—	Ripon C.	..	32	Pateley Bridge	..	1
Gildersome	..	1	Rishworth	..	9	Penistone	..	1
Golcar	..	5	Rothwell	..	22	Pontefract	..	—
Gomersal	..	—	Roystone	..	1	Ripon	..	2
Goole	..	289	Saddleworth	..	1	Rotherham	..	—
Greasborough	..	—	Sandal Magna	..	3	Sedbergh	..	2
Greetland	..	2	Scammonden	..	—	Selby	..	—
Guiselley	..	1	Selby	..	2	Settle	..	21
Gunthwaite-&-Ingbirchw.	—	—	Shelf	..	—	Skipton	..	25
Handsworth	..	30	Shelley	..	—	Tadcaster	..	6
Harrogate B.	..	14	Shepley	..	—	Thorne	..	9
Haworth	..	9	Shipley	..	3	Todmorden	..	2
Hebden Bridge	..	9	Silsden	..	21	Wakefield	..	—
Heckmondwike	..	—	Skelmanthorpe	..	2	Wetherby	..	114
Hipperholme	..	4	Skipton	..	110	Wharfedale	..	5
Holme	..	—	Slaithwaite	..	—	Wortley	..	20
Holmfirth	..	2	Soothill Nether	..	3			
Honley	..	—	Soothill Upper	..	1			
Horbury	..	11	South Crosland	..	5			
Horsforth	..	30	Southowram	..	1			
Hoyland Nether	..	—	Sowerby	..	3			
						Total	..	2803