

Dr. F. St. George Mivart's report to the Local Government Board on the prevalence of diphtheria in Holywell parishes, and on the sanitary state of those localities / [F. St. George Mivart].

Contributors

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Dr. F. St. George Mivart's Report to the Local Government Board on the Prevalence of Diphtheria in Holywell Parishes, and on the Sanitary State of those Localities.

R. THORNE THORNE,

Medical Officer,

May 14th, 1897.

The Board having become aware through the Registrar-General's returns that during the quarter ending September 30, 1896, 13 deaths from diphtheria had occurred in the rural parish of Holywell, I was instructed to inquire into the circumstances associated with the prevalence of this illness, and accordingly repaired thither at the end of November 1896.

There are probably few districts in England or Wales of which the sanitary condition has occupied the attention of the Local Government Board more frequently, or with less satisfactory result, than the tract of flat marshy land extending along the south bank of the Dee estuary from Chester to the Point of Air.

In consequence of the prevalence of epidemic illnesses during the past 25 years repeated inspections of the various districts, parishes, and townships hereabouts have from time to time been made. Thus, in 1871, Mr. Power visited the sub-district of Whitford owing to the prevalence of scarlatina and diphtheria. In 1875 Dr. Blaxall examined into the sanitary state of the whole Registration District of Holywell. In 1882 Dr. Parsons made a report to the Board on the sanitary condition of Holywell Urban and Rural Districts, and in 1886 on an epidemic of diphtheria in the last-named district, at Llanasa. In 1890 Mr. Spear reported on a prevalence of typhoid fever at Northop in the same district. Still more recently Dr. Reece investigated a very serious outbreak of diphtheria in the Borough of Flint in October 1895. Moreover, in addition to these various inspections and reports, this region was visited, in connexion with the Cholera Surveys in 1885 and 1895, by Dr. D. S. Davies and Mr. Evan Evans respectively. And at the beginning of the present year, Dr. Bruce Low, in his report on the sewage pollution of the River Dee and its tributary streams, dealt with a large portion of the area which is the subject of the present report.

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Among the several infectious diseases which have prevailed in the Holywell District, diphtheria has of late years shown a preponderance. Diphtheria is no new disease hereabouts. In "The History of the Parishes of Whitford and Holywell," by Thomas Pennant (B. and J. White, Fleet Street, 1796), I find, on page 278, that a similar illness is spoken of as prevailing more than a century ago. The passage is in some respects so applicable to the present time that I deem it well to quote it *in extenso*.

"*Diseases*.—All the coast of Whitford and Holywell parishes are more particularly subject, than the drier parts, to pleurisy, intermittents, and fevers of the putrid kinds. The last chiefly in the places where the poorer people are obliged to crowd into small apartments, by which the air so becomes foul and produces this species of fever. A cruel kind of quinsy has of late years infested these parishes and others adjacent. In 1794 it raged particularly in the township of Greenfield and parish of Halkin, and made dreadful havoc among children from the age of three to that of five. The average loss was four or five in seven. The name given by the learned to this fatal disease is Angina maligna or Cynanche maligna." That the "cruel kind of quinsy" referred to by Pennant was really diphtheria there can be little doubt.

The old civil parish of Holywell, situated in two sanitary districts, Holywell Urban and Holywell Rural, has under the Local Government Act of 1894 been divided into three parishes, two of them bearing the name of "Holywell" and distinguished as "urban" and "rural" respectively, the third parish being that of Coleshill Fawr. The diphtheria prevalence to which the Board's attention had been particularly directed had occurred mainly in the Holywell rural parish, but as I found on my arrival that there had been prevalence of the malady in the urban parish also, it was deemed advisable to include this district in my inquiry. Both these parishes are in the Holywell sub-district of the Registration District of the same name, which forms the northern portion of the county of Flint.

HOLYWELL URBAN PARISH.

GENERAL DESCRIPTION.

This parish is coterminous with the Holywell Urban District. It is roughly wedge-shaped, the apex being at Morfa at the foot of the hills and approaching very near to the Dee Estuary. It is, however, shut out from the shore and is practically surrounded by the Rural District; a matter of importance, as the configuration of the ground prevents the Urban District from having any means of disposing of its sewage except by carrying it into or through the Rural District.

The market town of Holywell, which is the only populous place in the parish, occupies a plateau nearly 300 feet above the sea level, situated on the northern slope of the Flintshire Hills.* It stands at the head of a ravine down which flows an important stream, which rises in a spring known as St. Winifred's Well and hereafter to be referred to. The town consists of a short main street running north and south and bifurcating at either extremity, the two streets thus formed to the north descending the hill and becoming merged in the village of Greenfield.

The town is not busy except during the summer months, when it is much visited by "pilgrims" from the northern and midland counties to St. Winifred's Well; and these visitors form by far the most important extraneous source of profit. Formerly many of the inhabitants found employment in the copper, paper, and flannel mills built over the St. Winifred's Stream in its descent to the Dee, and deriving from it their motive power. But the closure of the copper works and the lessened activity of the flannel mills has restricted this means of livelihood, and hence the population is decreasing.

* Almost the whole parish stands upon the boulder clay or a bed of sand and gravel resting upon the Millstone Grit or Carboniferous Limestone.



The following Table (A.) shows the population of Holywell Urban District at the census of 1871, of 1881, and of 1891 respectively :—

TABLE A.—SHOWING POPULATION and NUMBER of INHABITED HOUSES in HOLYWELL URBAN DISTRICT in 1871, 1881, and 1891.

	1871 Census.		1881 Census.		1891 Census.	
	Population.	Inhabited Houses (Estimated).	Population.	Inhabited Houses.	Population.	Inhabited Houses.
Holywell Urban District (Rateable value (1895), 8,249 <i>l.</i>).	3,540	821	3,090	719	3,018	680

SANITARY STATE OF HOLYWELL URBAN PARISH.

The sanitary condition of Holywell has altered little since Dr. Blaxall's visit in 1875. The Board's sense at that date of the sanitary shortcomings is expressed in the following "Recommendations," which were appended to Dr. Blaxall's report :—

(1.) The Medical Officer of Health should be definitely instructed as to the nature of the duties appertaining to his office, and the Sanitary Authority should (in accordance with the recommendations contained in the circular letter of the Local Government Board, dated 23rd March 1874) make such arrangements as would insure the Officer of Health being furnished with immediate information on the appearance of any dangerous infectious disease.

(2.) The Inspector of Nuisances should be supplied with a book in which to keep a continuous record of the sanitary condition of premises, in respect of which sanitary action has been taken. (Section III, 11 of Board's Order of 11th November 1872.)

(3.) In place of the unwholesome middensteads now in use, some such method of excrement removal and disposal should, without delay, be substituted as would insure its being effected without creating nuisance or injury to health; and with this view the authority should see that every house is provided with suitable privy accommodation (Section 36, Public Health Act, 1875). For information on this subject, the authority might advantageously consult the "Report to the Local Government Board on certain means of preventing excrement nuisances in towns and villages."

(4.) The sewage should no longer be permitted to pollute the Holywell brook, but a comprehensive scheme for sewerage the town should be adopted, which should include :—

(a.) The laying down of sewers and drains in such parts of the town as are at present unprovided, and the re-constructing of such of the existing sewers and drains as may require it.

(b.) The laying down of a main sewer or sewers for the removal of sewage to a distance from the town, where it might be disposed of without producing a nuisance.

(c.) The efficient ventilation of all drains and sewers, the proper trapping of drains in the vicinity of houses, and the preventing of direct communication between indoor sink, and waste-water pipes, and the sewers and drains.

(d.) The compelling of all houses to drain into the sewers.

(5.) With regard to the scheme now in contemplation for providing the town with water from St. Winifred's Well. The supply should be on the continuous system, and should be made available to all parts of the town, every precaution being taken to prevent the possibility of the water becoming contaminated; to this end it will be necessary, in the event of any closets being supplied with this water, that the communication be indirect, that is through the medium of a cistern or service box.

(6.) It is desirable that means should be organised for the systematic removal at short intervals of refuse and manure from the vicinity of dwellings. Courts and yards should be kept properly paved and cleansed. Pigs or other animals should not be permitted to be kept in situations where they produce nuisance injurious to health.

(7.) Slaughter-houses in unwholesome relation to dwellings should so far as possible be abolished, and the blood and offal from all slaughter-houses should be duly removed, and disposed of in such a manner as not to create nuisance.

(8.) Proceedings should be taken under the provisions of the Public Health Act, 1875, as to nuisances, to require the owners or occupiers to adopt the

necessary measures to remedy such structural and other defects in dwellings, or on their premises, as may be injurious to health.

- (9.) The authority should provide a place for use as a hospital for the reception of cases of contagious disease (Section 131, Public Health Act, 1875). A disinfecting chamber (Section 122) and a mortuary (Section 141) should be provided. Sections 120 and 121, also 126 to 129 inclusive, should be enforced.

(a.) *Condition of Dwellings.*—Generally speaking dwellings are of a poor description. In Penybally Street several houses appeared quite unfit for habitation, and elsewhere a number of others were falling to pieces from decay. In Allen Square there were very dilapidated cottages forming two sides of the square. Some of the houses in "Bluebell Yard" are in the last stage of decay, and in the backyards were heaps of miscellaneous decaying animal refuse. The paving of yards is very bad and irregular in almost all cases, so that pools of liquid filth are found close to the doors of dwellings.

(b.) *Water Supply.*—There is no public supply, and the parish remains in this matter in the same condition as it was 20 years ago. The two principal sources of supply of drinking water are St. Winifred's Well and a well known as Roff Tob. The water of the former has been repeatedly analysed, and, though very hard, no objection has been taken to it on the score of purity. From this well most of the inhabitants of the northern end of the town obtain their drinking water, which they have to carry up a steep hill, unless they pay for this work being performed by other persons. From the Roff Tob Well the southern and south-eastern end of the town is largely supplied. This well is situated on a slope, some 40 yards below the cemetery. It is merely a shallow well, and was formerly nothing more than a dipping place, but now it has been covered in, and fitted with a pump, to protect it from pollution. The wall adjoining this well had apparently been used as a urinal, and at my visit I found chloride of lime plentifully strewn about the spot. Besides these two wells, there are a number of shallow dip wells in the place, every one of them obviously exposed to pollution. The objectionable dip wells in the cellar kitchens in Panton Place, referred to by Dr. Parsons in 1882, still exist, and water from them is actually used for drinking. Close to the door of the King's Head Hotel there is a dip well in use in the main street. I was told that its water is not used for drinking, but inquiries made induced me to doubt the statement. In summer there has often been great scarcity of water in some of the wells, but so apathetic are the ratepayers and the District Council that no steps have been taken to obtain a more certain and purer supply.

(c.) *Drainage.*—This is in the same condition as described years ago, first, by Dr. Blaxall and, later, by Dr. Parsons. The old main brick sewers running down the hill still exist, and discharge into the stream coming from St. Winifred's Well. These sewers have no ventilation or means of inspection. They are ancient, but their precise date is unknown. Whatever sewage matter passes into St. Winifred's stream flows into it in a crude state. At the date of my visit little offensiveness of the stream was perceptible. But I was informed that the various mill ponds in its course occasionally gave out offensive odours. In the various streets of Holywell there are smaller sewers, some leading to the main brick sewers, others discharging into ditches and watercourses; the ultimate destination of the contents of all sewers is the stream from St. Winifred's Well. In the case of rows of small cottages such as "Summer Hill," "Primrose Hill," and others, situated on a steep slope, the common drain runs close to the houses, and the waste pipes from sinks within dwellings, where such exist, are not disconnected from the sewer and are unprovided with any trap. In many cases the drain is an open channel, which in dry weather is very offensive. Under existing arrangements the drainage of Holywell is likely to remain a difficulty. The only course for the drains is downhill in the direction of the Dee Estuary, and the space intervening between the foot of the hills and the boundary of the Urban District is narrow and too populous for a sewage farm. Being shut out from the Dee Estuary by the Rural District, the Urban District must obtain the concurrence of the former in any scheme for disposal of its sewage outside its district.

(d.) *Excrement and Refuse Disposal.*—In this respect matters are in the same state as they were 20 years ago, if indeed they are not worse. I

met with no dry earth closets as described by Dr. Blaxall, with the exception of the privies at Spring Gardens Schools, where, however, there was no sign of the use of earth. The removal of privy contents and house refuse is left entirely to the individual householders, and it is grossly neglected. In the majority of cases the privy-pit and ashpit communicate, and the walls of these structures being old and out of repair the liquid contents overflow or leak on to the roads and pathways. A conspicuous instance of this was seen at Primrose Hill, close to the main road. The ashpit in this case—for the use of the whole row of cottages—was an open one about 9 feet square containing a pool of liquid filth at one end. In Allen Square, in Penyball Street, and in many other places, ashpit privies were full and overflowing. At the bottom of Swan Court was an immense middenstead receiving daily accretions from six privies close together. This midden is surrounded by houses, and is a serious danger to health. A precisely similar condition at the same spot was referred to by Dr. Parsons in his report in 1882, and the ground thereabouts must by this time be saturated with sewage. Among the worst spots in the Urban District are “Boar’s Head Yard” and “Bluebell Yard.” In the former yard is a large open midden into which excrement from four privies was flowing in a stream. Just below this midden was a draw well, which, I understand, is now condemned; but it was evident that free soakage of matters from the midden into the well was going on here, and other shallow wells in the neighbourhood are no doubt similarly polluted. In “Bluebell Yard,” in the centre of the town, almost every species of nuisance is collected together in a small area, surrounded by dilapidated houses. Here are two slaughter-houses, one of which was in a very foul condition. Hard by these slaughter-houses was a great manure heap on the bare ground, upon which blood and offal had just been thrown. Adjoining the manure heap was a tumbledown privy, which was so full that excrement appeared above the seat. Open gutters from these slaughter-houses conduct the liquid refuse into pipes leading to one of the main sewers. In the same yard pigs are kept in decaying wooden styes from which liquid filth freely escapes into the road. And there is also here an overcrowded and ill-paved cowhouse. It is perhaps a sufficient commentary upon the sanitary administration of the Urban District of Holywell to record that this state of affairs is found within a few yards of the District Council’s offices.

GENERAL ADMINISTRATION BY HOLYWELL URBAN DISTRICT COUNCIL.

The Medical Officer of Health is Mr. Kenrick Morton Lloyd, M.R.C.S. Eng., who receives an annual salary of 15*l*. He is engaged in private practice. He has many times, both verbally and in writing, urged the wants of the district upon his Council.

The Inspector of Nuisances is Mr. William Jones, who has held office about four years, having previously been employed as “timekeeper” or “manager” at a colliery. His annual salary is 30*l*., half of which is repayable from county funds. He does not seem to have had any special training whatever. He keeps a report book and notice book, which are fairly posted up, though I observed that his notices to abate nuisances dealt almost exclusively with overfull middens and with matters of a similar sort. He is about 70 years of age, and he was unable by reason of infirmity to accompany me in my round of inspection. Obviously, the question of this office calls for the immediate consideration of the District Council.

The byelaws in force in the district are those of the old Local Board of 1863. The Infectious Disease (Notification) Act, 1889, has been in force in the district since November 1890. But neither the Infectious Disease (Prevention) Act, 1890, nor any part of the Public Health Acts Amendment Act, 1890, has been put in force. Recommendations 3 to 9 (inclusive), which were appended to Dr. Blaxall’s Report of 1875, have not yet been acted on by the Local Authority.

PREVALENCE OF DIPHTHERIA IN HOLYWELL URBAN PARISH.

The urban district and parish has, so far as record goes, been almost free from diphtheria during 1893, 1894, and 1895.

During 1893 and 1894 not a single case of diphtheria or throat illness was notified, with the exception of one case returned as "diphtheritic sore throat." A similar case was notified in July 1895 by the same practitioner; but with this exception the register for the year contains no mention of the disease. A case notified as diphtheria in January 1896 was, however, deemed to be of doubtful character. The Medical Officer of Health is quite sure that the slight outbreak of diphtheria in October and the beginning of November 1896 was not preceded by any unusual prevalence of "sore throat."

The weather had been very wet during August and September, and the ground was exceptionally damp.

The first case of undoubted diphtheria in Holywell was that of Annie D., notified on October 19th. The child was attending the board school for infants at Spring Gardens. The actual source of her infection could not be clearly established. I am inclined to believe that infection may in this case have come from Bagillt, in which township diphtheria was prevalent, though Annie D.'s mother denied having had any communication with that place. However this may be, the child herself was, at the residence of her parents, living under unfavourable sanitary conditions such as may be thought of as rendering her specially susceptible of disease. The dwelling in question is the highest of a row of stone-built, slate-roofed cottages situated on a steep slope. The gable end of the house forms one side of a large open privy midden, serving the entire row of cottages. Previous to the illness of Annie D. this midden had not been emptied for a very long time, and during the heavy rains in August and September its condition is reported to have been exceptionally foul. Liquid matter from the midden freely leaked through the wall of the house into the dwelling itself, and soaked into the cracks in the irregularly paved flooring. To make matters worse, the waste pipe from the sink in the kitchen passed, without any intercepting trap, into a drain common to all this row of cottages. The mother of the deceased child, Annie D., informed me that the stench in the house had been offensive in the extreme, but that she had not been able to obtain any remedy until the occurrence of diphtheria in the family.

This first case was followed by others in succession in various parts of the town, and though several of those who suffered were not infants attending the Spring Gardens School, yet in each instance other members of their families were attending these schools. Locally stress was laid on the fact that the children attending the Spring Gardens School had been found to be obtaining water for drinking from a so-called well immediately adjoining and below the cesspit belonging to the school closets. This "well," really a "dipping" place fed by a spring rising on the hill side above the school buildings, has been condemned by the County Analyst (*see Appendix*). It was this circumstance probably which induced the Medical Officer of Health to believe that the cases of diphtheria in the urban district were all due directly or indirectly to the well above referred to.

As the epidemic appeared to be connected with these schools I thought it well to examine them. The Spring Gardens Infants Mixed School is brick built and of recent construction. It is placed in an open situation on a spur of the hill, the ground falling below it. There is one large schoolroom, with a large class-room opening from it. There is very fair cross-ventilation, though the means of warming seemed hardly adequate. There are lavatories for the use of the pupils, the waste pipes delivering outside over an open gully, draining to one of the sewers. There are four closets in the playground, constructed for the use of dry earth, but the hoppers gave evidence that this had not been used of late.

Diphtheria in Holywell Urban District seems now to have entirely ceased, and I am informed that from November 7th to the 15th December no

fresh case had been notified. The following Table B. shows its incidence on the parish:—

TABLE B.—SHOWING the DIPHTHERIA CASES in HOLYWELL URBAN DISTRICT in October and November 1896.

Date.	Name.	Age.	Residence.	Result.	If a Child—at what School, if any.	Remarks.
1896.						
Jan. 15	Harriet H.	22	High Street	Re-covered.	-	"A suspicious case."
Aug. 29	Annie G. T.	10	Bryn Offa	"	Halkin Street	"Very doubtful." No sequel.
Oct. 19	Annie D.	4	Summerhill	Died	Spring Gardens	First undoubted case.
" 21	Gwendolen L.	3½	Whiteford Street	Re-covered.	"	"
" 21	Lilly P.	4½	Brynford Street	"	"	"
" 28	Margaret We	2½	Lower Gardens Place.	"	"	"
" 29	James Ws	15	Penybryn	"	} Spring Gardens	One family.
" 29	John Ws	5	"	"		
" 30	Henry B.	4	Brynford Street	"	"	} One family.
Nov. 4	John B.	14	"	"	Halkin Street	
" 6	Sarah Jane Ws	20	Penybryn	"	}	One family.
" 7	Benjamin Ws	15	"	"		

ADMINISTRATION BY HOLYWELL URBAN DISTRICT COUNCIL WITH REGARD TO DIPHTHERIA.

The epidemic having been largely associated with the Spring Gardens Board School, this school was ordered to be closed. The school well has been condemned altogether, and the opening will be bricked up. Disinfectants, which apparently consisted chiefly of chloride of lime, were supplied *ad libitum* to the tenants of invaded dwellings, and used by them for scattering about on the ground, putting down drains and into privies, &c. There is no hospital for the treatment of cases of infectious disease.

I was unable to hear of any disinfection or of destruction of clothing. The urban district does not possess any means whatever of properly carrying out disinfection.

HOLYWELL RURAL PARISH.

GENERAL DESCRIPTION.

This parish (the population of which in 1891 was 6,453) consists of a strip of flat marshy land bordering the Dee estuary, and of a higher tract on the slopes and plateau of the hills which rise steeply immediately to the south. The most important portion of this strip is situated along the southern bank of the Dee estuary from between the Borough of Flint and Morfa. Here, the main Chester to Bangor road runs, roughly speaking, from S.E. to N.W. parallel to the North-Western Railway embankment; on this road is situated Bagillt, a long straggling collection of small houses and cottages. From the Holywell railway station another road, at right angles to the Bangor Road, ascends the valley to Holywell, some two miles to the south. Beginning near the station and extending along this road nearly to the level of St. Winifred's Well is another straggling series of small houses and cottages, chiefly in rows, forming the village of Greenfield. There is a small collection of houses known as Holloway, situate at a high level about 1½ miles from Holywell town along a road leading towards St. Asaph. Save for these villages, the population of the remainder of the parish is sparse. Bagillt and Greenfield are by far the most important and populous places in this parish, and are, as Dr. Parsons remarks in his report, of "an urban rather than a rural character, though lacking the advantages of an urban administration." The soil of the low-lying portion of the parish along the bank of the Dee is alluvial, but the rest of the

district is composed of Carboniferous rocks, viz., Mountain Limestone, Millstone Grit, and Coal Measures, more or less covered by drift deposits of boulder clay, sand, and gravel. These strata are broken by numerous faults, and the limestone formations are rich in metalliferous lodes, chiefly lead.

SANITARY STATE OF HOLYWELL RURAL PARISH.

Dealing with this area on the same lines as the Urban District, it is interesting to note what were its requirements (along with the rest of the Rural District) in 1876 when reported on by Dr. Blaxall. The recommendations appended to Dr. Blaxall's report on Rural Holywell in that year were these :—

(1.) The Sanitary Authority should make such arrangements as would insure the Medical Officers of Health receiving from the Poor Law Medical Officers immediate information on the appearance of any dangerous infectious disease, and likewise, from the Registrars, returns of death, as recommended by the Local Government Board in its circular letter dated 23rd March 1874.

(2.) The Inspectors of Nuisances should be supplied with a book in which to keep a continuous record of the sanitary condition of premises in respect of which sanitary action has been taken. (Section III., 11 of Board's Order of 11th November 1872.)

(3.) It is highly important that, in place of the unwholesome middensteads now in use, some such method of excrement removal and disposal should, without delay, be substituted as would insure its being effected without creating nuisance or injury to health; and with this view, the Authority should see that every house is provided with suitable privy accommodation, and should exercise strict supervision to insure the privies being kept in a wholesome condition (Section 40 of the Public Health Act, 1875). It would appear that some dry system would best meet the requirements of the district. For information upon this subject reference should be made to the "Report to the Local Government Board on certain means of preventing excrement nuisances in towns and villages."

(4.) It is important that all thickly peopled parts of the district should be provided with proper sewers or other channels for the removal of slop, waste, and surface water (Section 15-19, and 23 of the Public Health Act, 1875). Also that provision should be made for the disposal of the sewage in such a manner as not to be productive of nuisance. In view of the increasing character of the population of the villages situated on the shores of the Dee, also the extent to which the mud of the river is exposed at low water, it would seem undesirable that the sewage should be allowed to discharge into that river.

(5.) Means should be taken to insure to each village an adequate supply of wholesome water (section 51, Public Health Act, 1875). No middenstead, dung heap, pigsty, or other contaminating circumstance, should be permitted in the near vicinity of wells, or of other sources of supply. The Sanitary Authority, in their drainage of the district, and in their enforcement of the Nuisances Removal and other provisions of the Public Health Act, should keep in view the importance of preventing pollution of streams; and, under section 70 of the Public Health Act, 1875, proceedings should be taken to close polluted wells.

(6.) It is desirable that means should be organised for the systematic removal, at short intervals, of all refuse from the vicinity of the dwellings. Courts and yards should be kept properly cleansed and paved. Measures should be taken to secure the wholesome disposal of blood and offal from slaughter-houses. Pigs or other animals should not be permitted to be kept in situations where they produce nuisance injurious to health.

(7.) The law should be systematically enforced for the repression of overcrowding (section 91, Public Health Act, 1875).

(8.) Proceedings should be taken, under the provisions of the Public Health Act, 1875, as to nuisances, to require owners or occupiers to adopt the necessary measures to remedy such structural or other defects in dwellings, or on their premises, as may be injurious to health; these measures should include the placing of windows or openings with ventilators at the backs of houses where required for the purpose of securing thorough ventilation. Cellar residences should be dealt with under sections 71 to 75 of the above-named Act.

(9.) The provisions of the Public Health Act, 1875 (section 91), relating to smoke nuisance should be enforced.

(10.) The Sanitary Authority should provide convenient hospital accommodation for cases of infectious disease (section 131 of the Public Health Act, 1875). On this subject the authority may usefully consult the departmental memorandum "On hospital accommodation to be provided by Local Authorities." In view of the extent to which overcrowding has been shown to exist, and to favour the spread of disease and influence its fatality, it is highly important that this measure should be carried into effect with as little delay as possible. Carriages for the conveyance of infectious cases (section 123), also disinfecting chambers (section 122), and mortuaries (section 141), should be provided. The disinfection of infected houses and things should be carried out under the advice of the Officers of Health (sections 120 and 121), and sections 126-129, relating to the exposure of infected persons and things and the letting of infected dwellings, should be enforced.

(a.) *Dwellings*.—These consist of small houses and cottages built of brick or of "rough cast" and stone. A large number of buildings of the latter sort are so seriously out of repair as to be quite unfit for habitation. A few have been condemned, but for the most they seem to be allowed to stand until the process of natural decay compels the tenant to vacate the premises. I noted many defective roofs causing dampness of sleeping rooms, while dampness of downstairs living rooms was due in some cases to the cottages being built either "back-to-earth" or else with their backs separated from the excavated soil merely by defective "troughing." At "James' Row" and Penybont particularly bad specimens of back-to-earth dwellings were seen. "Littler's Row" consists of two rows of nine back-to-back cottages, two-roomed, of the most squalid description. "Conway's" and "Henry's" Rows are examples of cottages not actually back to back, but built so close together that the space between the backs is only about 3 feet. These houses have no through ventilation. The paving not only around but also inside most of the houses is defective, the bricks or flag stones having become separated and the intervening earth saturated with filth. Dampness arises further from the presence of ground water immediately below the surface, as the whole of this tract of land is water and sewage-logged. This makes houses below the level of the road, as at "Tottys Row," particularly undesirable. "Tabernacle Row" consists of a long row of cottages so decayed that only two are inhabited. In one the staircase had broken away and access to the bedroom was obtained by means of an inverted table. Two rows of hovels known as "The Walk" (Bagillt) contained perhaps the worst dwellings that I inspected. There was only one room in each cottage. None of them had back ventilation, while the fronts of one of the rows stood close against the excavated hill side—the intervening space being scarcely 3 feet wide.

At Greenfield dwellings are on the whole of a somewhat better class. The worst specimens seen were at "Crecas" and "Woodhouses." At the latter place is a long row of stone-built cottages, the backs of which are separated from the steep hillside by a narrow cutting in which storm water accumulates. These dwellings are rendered still damper by the defective condition of the roofs. Four or five privies, which served for the whole row, are placed high up on the hill side, and are, I was informed by a tenant, unfit for use. The cesspits in the two cases which I inspected were overflowing, and from them filth was flowing down the hill towards the cottages. It should be added that landlords complain that the habits of the people are such as to render permanent improvement of their dwelling accommodation difficult if not impossible.

(b.) *Water Supply*.—In Bagillt some improvement has taken place in the matter of water supply, which is perhaps now sufficient, except in dry seasons. Most of the old shallow dip and pump wells have been condemned, and water is now supplied from several separate sources to standpipes along the main road. These standpipes receive their water from tanks placed at some distance on the hill side above, each tank being fed by means of earthenware gathering pipes. The gathering grounds which serve these tanks vary from a quarter to half a mile in distance from the main road. The most extensive of these water services is that known as the "Gadlys Lane" supply. The main tank holds 25,000 gallons, and is situated about one third of a mile from the main road. It is cemented. Iron pipes conduct water to it across the fields from a covered but unbricked catch pit. This receives water from

feed pipes which run through the gathering ground on either side. This gathering ground consists of rough meadow and woodland forming an amphitheatre on the hill side. At the top are two houses, one of which is unoccupied, and a manured turnip field. The soil hereabouts is gravel overlying the Coal Measures. From the main tank the water is taken by iron pipes down to the main road. This supply was arranged for at a time when there was a great dearth of water, and though only constructed as a makeshift arrangement bids fair to be permanent.

Ffynnonrhedyn is the name of another extensive supply. Here the main tank—situated about a quarter of a mile from the main road up the hill—is open. The cubic capacity of this tank is unknown. It appeared about 2 feet deep, but at the bottom were seven or eight inches of mud. A local dispute as to ownership of land seems to be the cause of the neglected condition of this water supply. There are other supply tanks at New Brighton and at Graig.

At Greenfield the supply is as defective as it was 20 years ago. It appears an anomaly that a populous village having a few hundred yards above it a spring of pure water, pouring out at the rate of some 4,000 gallons per minute, should be constantly suffering from water famine in dry weather. Riparian owners' rights and antagonisms between the urban and rural districts are the chief difficulties in the way of a proper and sufficient water supply here. They should not be insurmountable.

There are a few stand pipes in Greenfield to which water is conveyed from a shallow well at Brenygywynt. The rest of the supply to the rural parish, including Holloway, is from shallow dip wells, which seem to receive little more than surface drainage.

(c.) *Drainage*.—Provision of suitable drainage is the great difficulty throughout the northern part of the county of Flint owing to the natural conformation of this tract of country. In Holywell Rural District the hills slope steeply to within a short distance of the bank of the Dee estuary. The intervening space is mostly below the level of the sea. The result of the rapid descent of storm water from the hills into this low-lying land, shut out from the river by the Dee embankment and by the L. and N.W. Railway, aided perhaps by subsidence of the ground owing to coal mining, has been to convert this area into a kind of marsh into which much of the sewage of the district has already found its way. There can be no doubt that if the present situation is allowed to continue a vast sewage swamp will be gradually created. Many ineffectual efforts have been made by the Rural District Council to deal with the matter, but the cost is too heavy for its unaided resources. One of the worst spots in this respect is close to Bagillt Station in the quarter known as Pentre, Pentre Isa, and Downhill. Here is the "Downhill pool," which is practically a lake of sewage. At low water the stench is such that persons unaccustomed to it cannot approach the mud and filth there accumulated. An attempt was made some years ago by the Rural District Council at a cost of some 4,000*l.* to deal with the drainage of this quarter by constructing an intercepting sewer which should receive the contents of numerous gullies and ditches which convey drainage from the houses of the neighbourhood, and which should discharge by a proper tidal outlet to the "wharf," a cutting near Bagillt Station which opens into the Dee Channel. But the pipes of this sewer were laid in quicksands, and have become displaced, and its outlet is silted up.

Speaking generally of Bagillt, there are a number of ditches at right angles to the main Bangor road throughout the portion of the rural district from Holywell Station to Coleshill, and into these the slop water and liquid refuse of all kinds find their way. These ditches communicate with various drain cuttings through the railway embankment, but as these cuttings have their outlets silted up the contents of the ditches are stagnant. In the neighbourhood of "Boot" a number of tumbledown pigstyes and privies stand close against these ditches, and pour excrement into them. Similarly at the back of "Pierce's Row" are some 20 to 25 piggeries, along with various privies, draining into an open tank in the ground. I was almost unable to approach the spot owing to the stench. Here excrement and refuse seem to be thrown about promiscuously upon the ground, and the inhabitants appear to be of the very poorest class.

I consider that the necessity of dealing with the drainage of Bagillt is imperative.

Greenfield also is without any system of drainage whatever. Slop and refuse water is either thrown on the ground or into open gutters, by means of which it ultimately finds its way to St. Winifred's stream or into other small brooks communicating with the Dee estuary at Greenfield Harbour. The latter outlet, together with various pools in its neighbourhood, is in a foul condition and exhales offensive odours at low water.

(d.) *Excrement and Refuse Disposal.*—Except in the case of a very few of the best class of houses, only cesspit privies exist in the parish, and these in most cases are of the rudest construction. They are also very few in number. Some rows of houses at Bagillt, such as "James' Row" and a portion of the Walk, are unprovided with privies or with receptacles for refuse. I believe the District Council are now compelling the landlords' attention to these wants.

In some parts of Bagillt, such as "Boot," "Pierce's Row," "Littler's Row," "Pentrebach," "Conway's and Henry's Rows," "Tabernacle Row," the privy accommodation was found in a filthy condition. At "Littler's Row" the roofs of the privies were falling in, the floors were full of holes, and some were unapproachable owing to excrement scattered about them. The habits of the people may be gauged from the fact that they accept this state of things without any effort to obtain improvement. A few of the ashpits are covered over, but this is exceptional; many of them are deep, and even where the sides and bottom are bricked the brickwork is out of repair, and tidal water rises and falls in them.

At Greenfield the privies generally are in a less dilapidated condition, but ash-pit privies in a very foul condition were seen at "Crecas," "Basingwork," "Woodhouses," and other places. At "Mount Pleasant" ashpit privies were overflowing on to the road. At "Battery Row" a row of some 30 cottages had nine ashpit privies close to the edge of the millpond, and evidently some of these overflow into it.

At Holloway a row of cottages, called "Seaview Terrace," in a very high and airy situation, had a foul midden beside the road and a small swamp formed by the liquid refuse draining from the houses.

GENERAL ADMINISTRATION OF DISTRICT COUNCIL IN HOLYWELL RURAL PARISH.

The Medical Officer of Health for the Holywell Division of the Rural District, in which this parish is comprised, is Mr. James Williams, M.R.C.S. and L.S.A. This officer has repeatedly, in his annual reports, as well as on other occasions, both verbally and in writing, urged upon the Rural District Council the pressing need of proper water supplies, as well as of arrangements for drainage and public scavenging. His annual salary is 35*l.*, half of which is repaid from county funds.

The Inspector of Nuisances recently appointed is Mr. John Philip Jones. He had previously acted as an architect and surveyor's assistant. He appeared to me to be energetic and capable. He devotes all his time to his duties, receiving an annual salary of 120*l.*, half which is repaid from county funds. His report book and notice book were fairly well kept.

The Rural District has a code of byelaws for the prevention of nuisances arising from snow, filth, dust, ashes, and rubbish, and for the prevention of the keeping of animals on any premises so as to be injurious to health; also byelaws with regard to common lodging-houses and to new buildings. The Infectious Disease (Notification) Act of 1889 has been in operation since March 1891, but neither the Infectious Disease (Prevention) Act, 1890, nor Part III. of the Public Health Acts Amendment Act, 1890, has been put in force in the district.

Although the Rural District Council does not give the encouragement to its sanitary officers that it should do, it cannot be said that it has been altogether inactive in that section of its district with which this report is concerned. But the extreme poverty of the rural district as a whole has

no doubt tended to discourage efficient and comprehensive action. Public scavenging should undoubtedly be undertaken by the Council for the portions of the parish which have an urban character, though, speaking from my own observations, I am doubtful whether this alone will suffice to restrain the abundant filth nuisances. It seems essential that extensive drainage works should be carried out in the near future, difficult and costly though those may prove.

PREVALENCE OF DIPHTHERIA IN HOLYWELL RURAL PARISH.

As a result of my inquiries it would appear that the prevalence of diphtheria in Holywell Rural Parish has been closely connected with a very extensive prevalence of this disease in the Borough of Flint in 1894-95, which was reported on by Dr. Reece in October 1895. From the notification register it appeared that since 1895 the disease had shown increasing prevalence in Holywell rural parish, and that it had reached its period of greatest incidence in August, September, and October of the present year.

The road from Flint through the township of Coleshill to Bagillt and onward, is almost a straight line, and constitutes the main direct thoroughfare from Chester to Bangor. The traffic along it is considerable, and communication between Flint and Bagillt is constant. Small houses and cottages, either isolated or built in rows, extend almost the entire distance between these places.

In January 1895 a good many cases of diphtheria occurred in the Township of Coleshill, at the extremity of Holywell rural parish, and on the edge of the Borough of Flint. From thence, as the notification register shows, the disease gradually extended along the course of the main road until in the month of November it was found at Henfuarth. After several cases had occurred at that spot, diphtheria made its appearance at the end of January at Boot. Later it appeared at Pentre, which is between Henfuarth and Boot, and thereafter it recurred now at one point, now at another, but with hardly an exception at places which were in direct communication by the main thoroughfare with other places where diphtheria had previously prevailed.

As illustrating the manner in which diphtheria was propagated among a population to be thought of as predisposed to it by insanitary surroundings, I may instance the following :—

A woman living at Pierce's Row, Bagillt, in a cottage in which there was diphtheria, went to Penrhewl, Mostyn, taking with her a child who at that time was not obviously ill. They remained two nights at Penrhewl, subsequently returning to Bagillt. On her return the child was distinctly ailing, and in a day or two the illness was found to be diphtheria. A few days after the departure of these people from Penrhewl a child in the house where the visitors had been staying at the place was also seized with diphtheria, and the disease subsequently spread to an adjoining house. Other instances of propagation in the same fashion could be mentioned as occurring at Boot, at Ysceifiog, and other places.

Among the inhabitants themselves great indifference to infection was manifest, and it is difficult to induce them to take even the most elementary precautions. In one cottage into which I entered I found the mother nursing a child suffering from diphtheria while she prepared the family meal. In many invaded cottages convalescents in an early stage were sitting at table with the rest, using the same cup, spoon, &c., and were said to sleep in the same bed with other children. In one cottage (Vine Cottages, Bagillt), one of the most unwholesome that came under my notice, and consisting of only two rooms, I found that the bedroom was only 7 ft. by 10 ft. and 6 ft. high. In this room there were two beds, in which seven people managed to lie down at night. In this family there had been three cases of diphtheria with one death. One patient was convalescing at the time of my visit, and was running about with other children. On October 5th, 1896, in a cottage at Pentrebach, there were no less than five children found suffering from diphtheria and all sleeping in the same bed.

From the notification register I was able to ascertain that 26 cases of diphtheria were reported in Holywell Rural Parish during 1895 with two deaths, the periods of greatest incidence being during the months of February

and November respectively. During the year 1896 down to the end of November 183 cases were notified with 22 deaths, the periods of greatest incidence being, as already mentioned, the months of August and September. But it is believed that these figures are far from representing the actual number of cases that occurred. A great number of mild cases probably escaped notice and very many never had any treatment at all. There was no means of obtaining information as to the ages of the majority of those who suffered, as only during the last few months has any record of age been kept. But I was able to ascertain that the epidemic had by no means been confined to children. Adults had suffered in considerable proportion, and in one case a woman over 50 years of age had been attacked.

There was no evidence that the various schools had been in any special manner responsible for the spread of the disease, notwithstanding that they had been only once closed, and that for a very short period, until the summer holidays of the present year. At the expiration of these holidays they did not reopen until 5th October; and they were at once closed again, much illness being prevalent. The chief schools in Holywell Rural Parish comprise the Bagillt board schools at New Brighton, the national schools at the eastern extremity of Bagillt, and the Holywell national schools at Greenfield. At the last-named schools the master informed me that so far as he knows there has not been a single case of diphtheria among the pupils, and that the schools have not been closed on account of sickness for many years.

The following Table C. shows month by month during 1895 and 1896, down to the end of November of the latter year, the number of cases of diphtheria with the number of deaths in the Holywell Rural Parish.

TABLE C.—SHOWING MONTH by MONTH the CASES of DIPHTHERIA notified in HOLYWELL RURAL PARISH and the DIPHTHERIA DEATHS in 1895 and 1896 (to the end of November).

—		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.	
		C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C. D.	C.	D.
1895	-	2 0	7 0	4 2	0 0	0 0	0 0	2 0	1 0	0 0	3 0	6 0	1 0	26	2
1896	-	3 0	2 0	1 0	1 0	10 1	7 1	4 0	46 10	51 5	34 3	24 2	—	183	22

C. = Cases.

D. = Deaths.

It will be noticed that, though the greatest number of cases were notified in September last, the disease was most fatal in the month of August, 46 cases being notified with 10 deaths.

In the month of November the notifications showed a decrease, and the Medical Officer is of opinion that diphtheria is now on the decline in the district.

ADMINISTRATION OF DISTRICT COUNCIL WITH REGARD TO DIPHTHERIA IN HOLYWELL RURAL PARISH.

The action of the Rural District Council with regard to the prevalence of diphtheria has not been of an efficient kind.

A good deal of bedding and clothing has been destroyed; there has been no disinfection of these articles, as the means are wanting. Chloride of lime has been freely supplied to tenants of invaded dwellings, and has been used by them for scattering about their premises. In many cases I found heaps of filth upon which chloride of lime had been thrown instead of removing the accumulation.

The Bagillt schools seem to have been closed on two occasions by order of the District Council. The first closure was from May 21 to June 15 of the present

year, being a prolongation of the ordinary Whitsuntide holidays for a period of 14 days. At the end of the summer holidays of the present year the schools were reopened for one week by way of testing the amount of illness prevailing, but were at once closed again and still remain so.

As with "urban" so with "rural" Holywell there is no hospital for the treatment of cases of infectious diseases, although, perhaps, there is no similar area where the need of such hospital is more urgent. During my visit of inspection I heard that there was shortly to be a conference of neighbouring District Councils with a view to ascertaining whether by joint action an infectious hospital could be set up.* The Medical Officer of Health, Mr. James Williams, has repeatedly urged upon the Rural District Council the necessity of providing suitable means of isolating cases of infectious disease in their district, and for providing also apparatus for the disinfection of bedding and clothing. Had means of isolation and disinfection been available at the commencement of the present epidemic, he is convinced that the diphtheria could have been largely controlled, if not altogether arrested.

F. ST. GEORGE MIVART.

December 1896.

APPENDIX.

Laboratory, Assay Office, Chester,
November 21, 1896.

I HEREBY certify that I have analysed the sample of water from spring, November 20, with the following results:—

In parts per 100,000 of water—

Total solid matter in solution	-	-	-	-	127.5
Chlorine	-	-	-	-	11.55
Nitrogen as nitrates and nitrites	-	-	-	-	4.24
Free ammonia	-	-	-	-	.003
Albuminoid ammonia	-	-	-	-	.011

Microscopical examination of sediments:—Fragments of cotton fibre and vegetable débris.

From the above results it is evident that the sample is seriously polluted, apparently, with sewage matter. I consider it a very bad water for drinking and domestic use.

W. F. LOWE, F.I.C., &c.,
County Analyst.

* I have since learnt that the Holywell Rural District Council did not participate in the Conference.