

Report to the Local Board of Health, Croydon, with regard to the causes of illness recently prevailing in that town / by John Simon.

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REPORT

TO THE

Local Board of Health, Croydon,

WITH REGARD TO THE CAUSES OF

ILLNESS RECENTLY PREVAILING IN THAT TOWN;

BY

JOHN SIMON, Esq., F.R.S.,

OFFICER OF HEALTH TO THE CITY OF LONDON, AND ONE OF THE SURGICAL
STAFF OF ST. THOMAS'S HOSPITAL.

CROYDON:

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1853.

1911

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REPORT

Final Report on Quality, Quantity,

and Value of the

Various Kinds of

Various Kinds of

Various Kinds of

Various Kinds of

Various Kinds of

THE CROYDON LOCAL BOARD OF HEALTH.

THE CROYDON LOCAL BOARD OF HEALTH having anxiously directed their attention to the origin of the late severe Epidemic, which has visited the Town, and having requested Mr. SIMON, the Officer of Health to the City of London, (a district exempt from the jurisdiction of the Public Health Act,) to institute a searching enquiry, now beg, without note or comment, to submit a copy of his Report to their fellow Parishioners.

TO THE LOCAL BOARD OF HEALTH, CROYDON.

London, February 7th, 1853.

GENTLEMEN :

AT your Chairman's request, I have been engaged for some days in collecting information, by personal inspection and otherwise, as to the epidemic illness recently prevalent in your town.

I.—The salient facts have been these two:—*first*, that during the last fifteen months there have been in progress at Croydon works of water-supply and house-drainage, calculated to effect a marked improvement in the health of the population; *secondly*, that, as these sanitary works approached their completion, there arose in the town an unusual prevalence of fever and diarrhœa, which presently reached an unprecedented and epidemic severity.

To these facts, and to the paradox of their concurrence, your Chairman directed my attention; proposing, as my line of inquiry, that I should endeavour to ascertain, whether there subsisted between them any relation of cause and effect—whether, namely, the new works, either by their failure or otherwise, had been instrumental in the production of disease.

It appears that unusual illness began in the middle of August; that it continued in the succeeding months, and

slowly grew intenser; that it underwent extreme aggravation about Christmas, and since then has rapidly declined.

Investigating the progress of the disease, I find in it some startling exceptions to what is usual in such visitations.

Its first and heaviest blows were struck—not in poor houses—not in ill-drained houses—not in dirty houses—not in low-lying damp houses; but in houses, where least of all one would expect any ordinary cause of fever to be in operation.

Croydon shelves from behind its High Street downward to the valley of the Wandle. In the High Street, and on still higher ground behind it, the poison seemed first and most fatally to fall. First-rate houses, standing at this level in the outskirts of the town, suffered in an extraordinary degree;—houses with open country beyond them, and nothing like foulness within. I may instance the Friends' School in Park Lane, as an establishment where cleanliness of all kinds has been sedulously cared for, and where, nevertheless, a fourth of the young inmates suffered from the disease. On the lower parts of the town, where common causes of fever are infinitely more rife, the action of this epidemic was comparatively indolent and mild.

Thus, at first blush, the facts of the case seem to intimate, that the cause of the disease cannot have been interior and proper to each several house attacked—such as filth or ill-drainage of the individual tenement; but that it must have been some general exterior influence operating on many houses at once and in common;—some influence, probably, to which the air was a vehicle, and which therefore fastened most easily on the highest and most exposed—the usually healthiest—parts of the town.

II.—Before my arrival in Croydon, numerous conjectures had been made as to presumed causes of the disease. My attention was consequently directed to a great variety of suspected circumstances; and I shall probably best fulfil the object of my Report by writing of these, as they passed before my mind, and endeavouring to measure the importance of each as I mention it.

1.—I am told that *fever has prevailed elsewhere* than in Croydon. Undoubtedly it has; though, probably, not with equal severity. But, be this as it may, if sanitary improvement means anything, it means that epidemic disease shall make its difference in favor of the improved locality; that—however much fever may elsewhere rage—yet here, where preventive medicine is supposed to have done its work, the hurtful influence shall become comparatively inoperative. Supposing, therefore, that Croydon had not suffered more than many unimproved localities, the question would still remain,—why it had not suffered less?—why, in short, it had not obtained that immunity from fever, which is the foremost promise of sanitary improvers?

2.—The *unusual rainfall* of the season, with its mild temperature, has been cited as a probable cause of the mischief. With this view I am not disposed to agree. In a semi-urban district, so well placed and so well drained as Croydon, a very rainy season ought not to produce epidemic fever. It may illustrate this opinion to observe, that during the past quarter the general mortality of your county has not risen above the average.

3.—*Impurity of water* has been guessed at, as it is apt to be on such occasions. Professor Way's analysis* quite disposes

* *Composition of Solid Residue in One Gallon of Water, drawn from a tap in High Street, supplied by the Croydon Water Works.*

SAMPLES ANALYSED.	March, 1852.	January, 1853.
Organic Matter and Combined Water	gr. 1 ·09	gr. 0 ·98
Silica	·93	·84
Sulphate of Lime	·53	·74
Carbonate of Lime	15 ·41	14 ·64
Chloride of Sodium	1 ·51	1 ·34
Carbonate of Magnesia	·61	·76
Sulphate of Soda	·18	·20
Sulphate of Potash	85	·74
Grains of Residue in the Gallon	21 ·11	20 ·24
<i>HARDNESS (in Clark's Degrees.)</i>		
Before boiling	16°	15½°
After boiling	4½°	4°

of that conjecture. No ingredient appears there which we can suppose capable of engendering an epidemic: and the inhabitants of Croydon seem to have enjoyed advantages heretofore unknown in their town, in respect of having water-supply adapted to their houses on principles best suited to the preservation of cleanliness and health.

4.—One of your medical advisers, in commenting on the epidemic, suggested that it might be partly due to the *great influx of day-laborers*, employed in the erection of the “Crystal Palace” at Sydenham, who are now lodged in the poorer tenements of your town. The history of the disease forbids me to attach importance to this influence up to the present time; but, if houses of the humbler kind, overcrowded with such a population, should become the seat of the epidemic, it would be indispensable for the protection of life, that the provisions of the Lodging-house Act should be enforced.

5.—The *absence of paving* has been noticed, and I think rightly, as an unwholesomeness in the town. I am strongly of opinion, that a thorough paving would much improve the healthiness of Croydon, especially for seasons like the present. Yet I cannot impute the generation of your present epidemic to the influence of an unpaved soil. Such an influence would have been exhibited at other places and in other manners than the inroads of your existing disease.

6.—*Defects in house-drainage* have been spoken of as not infrequent in houses recently drained by their owners under the orders and superintendence of your Board. The time at my disposal would not allow me to make personal verification of this statement, which could only be done by a house-to-house inspection of the town: but I hear, from unquestionable medical authority, that the new house-work has in many cases been done in an imperfect manner; that pipes have been inaccurately fitted, and syphon-traps so arranged as not to fulfil the purpose of their construction;—that thus in many houses there have been drain-stinks. Further I learn that there are

cases, in which the old cesspools have been left untouched by the side of the new house-works—the worst evil of the one system retained, to neutralise the advantages of the other. Assuming the accuracy of these statements, I cannot doubt that houses with such defects are very seriously endangered, and are in a condition to invite attacks of epidemic and infectious disease.

7.—Not only in private houses, but under the highway also, certain *remains of the former drainage-system* are said to be habitually offensive. Along a portion of High Street especially this is alleged to be the case; and the allegation deserves notice because of the many and severe cases of fever, which have occurred there. A clogged and stinking condition of the old drains in that locality might have exerted considerable influence in determining attacks of the disease.

8.—*Failure of your new sewerage*, by obstruction and breakage, has been accused of the mischief. Your Surveyor informs me, that in the fifteen months there have been about fifty instances of partial obstruction, and that for these an immediate remedy has been found; so that in no instance has there been anything approaching to a general interference with the sewerage; nor any stagnation of drainage in several houses at a time; nor any protracted stagnation in any one house. I cannot, of course, consider any obstruction of your pipes—however partial or transitory—otherwise than as a danger to health, especially during the prevalence of epidemic disease; and I can consider no precaution superfluous, which may guard against such occurrences. Still, in reviewing the history of those which have taken place, I do not feel justified in attributing to them any chief share in the causation of the recent disease. Indeed, against any such view it seems conclusive to state, that the fever has prevailed with its full virulence in several houses not in any manner connected with your new sewers.

III.—In many of the circumstances, to which I have now adverted, there have undoubtedly been sources of disease; but they have all been limited—some very limited, in their sphere of operation. Also, in regard of nearly all, it may be said, that Croydon is far better off at the present time than it was eighteen months ago. If the new house-drains are in some cases imperfect; if some disused cesspools remain; if your sewerage has had an occasional and transient obstruction; if the drain in High Street is offensive;—still it cannot reasonably be doubted that, in respect of these particular nuisances, Croydon was never so little unwholesome as at present, and that other grievous nuisances have been entirely removed.*

IV.—Yet now, for the first time within your memory—now, when your sanitary improvements are two-thirds complete, there starts up a new and virulent disease. It seems to me, therefore, that some main morbid influence must have been overlooked. Your sickness has been without precedent in the town. Among your most considerable practitioners there exists no record of

* From information I have gathered on the former sanitary condition of the town, I learn that, eighteen months ago, nearly all its house-filth was retained within it;—almost every house had its cesspool beneath or beside it;—such few drains as existed were of a kind to favor accumulation;—the water-supply was from wells, sunk in a porous soil in the midst of these contaminating influences;—there were several large ponds within the limits of the town, into which partial drainage of houses occurred, and which were nuisances of an aggravated character;—owing to a mill-dam within 300 yards of the church, the water-level of the surface-drainage stood six feet higher than at present, so that the Old Town was habitually in a state of the most unwholesome dampness. Under the operations of the Local Board, these deleterious influences have to a great extent been withdrawn; 1800 houses are now comprised in a system of drainage and water-supply, adapted to cleanse them of their sewage the instant it is generated; and the *Bourne* which, under former conditions, would have covered many acres of land in its periodical overflow, have streamed down the main highway of the Old Town, and filled the basements of houses there,—is now retained, for the greater part, within a culvert some feet below the surface.

anything like it. For an exceptional effect, surely there must be an exceptional cause, or an exceptional concurrence of causes.

Such it seems to me that I have found in the following facts:—and in considering them you will observe, first, that they represent an unquestionable and powerful agency of mischief; secondly, that it is one of new existence in your neighbourhood.

I refer to the *distribution of house-filth*, which has taken place during the progress of your works or in connection with your outfall of sewage: and which may be noticed under the following heads:—

1.—During the progress of your works *the cesspools of eighteen hundred houses* have been emptied—many of long accumulation: all, or nearly all of this concentrated animal matter has been bought as manure in the immediate vicinity of the town, and has been either stored or consumed within so small an area of ground as to constitute, I think, one probable focus of poison.

2.—The greater portion of your *daily sewage* passes to an open building, called the Filter-house, where it enters a large tank and is partially strained of its solid ingredients:—*

a.—These *intercepted solids*, amounting to from twenty-five to thirty cubic yards per week, are conveyed night by night through the town, and are allotted for agricultural purposes in the South-Eastern direction. During many months they were applied in the immediate vicinity of Croydon—namely, at Croham farm; but since the first week of December they are said to have been carried to Wickham, four miles distant, where they could scarcely deserve consideration in respect of my present inquiry;—

b.—The *residual fluid* matter passes, from the Filter-house onward, a short distance to the river Wandle, which it enters, unfortunately, just above a mill. Here—the fluid being suddenly brought to comparative rest—a further large deposit of

* At the time of my visit the surface of fæcal matter was about 3000 square feet. Over it some peat charcoal was spread.

solid matter takes place in the mill-pond, which becomes a dangerous loitering-place for what ought to be hurried away;—

c.—At the present time—the drainage being flooded by your periodical rivulet, the Bourne—the above arrangements have proved for the season insufficient; and it has been found requisite to furnish an *overflow-channel* from the Filter-house. A trench has therefore been dug for the excess of incoming sewage; and this eventually reaches the Wandle, after circuiting for some distance, as a very foul ditch, between fields and beside the road.

3.—The sewage of about four hundred houses at the *North end of the town* passes off by two pipes unconnected with the Filter-house, and is discharged without any interception or delay on to a field of about seventeen acres, where it collects in shallow pits, and is then diffused in trenches.

4.—An extensive *cartage and traffic of ordure* is constantly in progress;—first, from such cesspools, as are still from time to time exposed in the progress of your works; secondly, from your Filter-house to the farm already alluded to.

The several vents and depôts of sewage here enumerated occupy two situations:—one of considerable magnitude lies at the South-East corner of Croydon—the farm namely (2 a) which, till the beginning of December, was receiving day by day the entire allotment of all such solid matters as your filter intercepts; the others lie, in proximity to each other, grouped near the North-West corner of the district, and have been complained of in strong language by persons residing in that vicinity.

I take it for incontestable, that the distribution of faecal matter, here described, is quite without precedent in your neighbourhood. In its aggregate, I cannot but view it with much suspicion in relation to the recent disease. You see there, in short, immense gatherings of foetid animal matter at two points little distant from the town; and one of these even yet receiving day by day new additions of similar material in various stages of decay.

Whatever of this material is not incorporated with the earth and appropriated by it, continues to rot and stink in the air. A field of some acres, saturated with animal manure beyond its power of digestion, becomes in fact a gigantic cesspool.

The grounds near Waddon and those near Croham, have, for many months, been receiving an immense allotment of ordure, stale and recent. For a long while this might not be beyond the capacities of the soil. But at all events, in some instances, the foetid material has been delivered in such superabundance, as to require to be stored in considerable quantities; and the large field near Waddon, where one of your pipes debouches, has, at this time, quantities of human excrement lying unaltered on its surface. This particular suburb of your town contains then, in close proximity, not only the field just mentioned, but also those gardening establishments, which received between them the entire cesspool-accumulation removed from eighteen hundred houses of Croydon:—it further contains your Filter-house, with its large surface of recent sewage-strainings, and with its daily traffic in manure:—it contains the extensive mill-pond, in which sewage material is very largely deposited and decomposed; and of late it has contained, as an additional evaporating surface, the considerable stream and lateral soakage of your temporary overflow from the Filter-house.

It seems to me that this immense fæcal evaporation, reinforced from the opposite side of the town by similar agencies at Croham, does in its aggregate supply the desired explanation of your fever.

The difficulty has been to find not only a *sufficient* cause, but one of *new* origin, and one of *general or extrinsic* operation. Such—it seems to me, is found.

That fæcal evaporation and decomposition are a *sufficient* cause of disease you will not doubt; for the main object of your Board has been, on this account, to remove cesspools from the

immediate vicinage of houses. That, to the extent I have described, it is a *new influence* in your neighbourhood, can also not be gainsaid. That it is of *general operation* over a large district, accounts for the apparent anomaly of houses having been attacked, in which no sanitary fault or defect could be discerned.

I should suppose that for some months after your works began, the saturation of soil in the neighbourhood may have been within innocuous limits; that towards the close of summer it began to be a cause of disease; that the temporary flooding of your pipes by the Bourne, and the consequent overflow of sewage, began in December to make a sensible aggravation of it; that, meanwhile, the original source of mischief was day by day on the increase; and that the general disturbance of impure earth, necessary during the progress of your works, contributed continuously to the fog of fæcal evaporation thus engendered, which, floating at a slight elevation, would have gathered chiefly about the higher parts of the town.

V.—Such evidence as I have collected obliges me to consider this miasm to have been the peculiar and essential cause of your recent illness: and I may add that the nature of the visitation—as regards the concurrent epidemic prevalence of diarrhœa and fever, gives weight to the supposition. For this concurrence is characteristic, I think, as an effect of the influence adverted to.

Yet I little doubt but other agencies have been co-operative with it. It seems not unlikely that the eruption of the *Bourne** may have had further influence than I have yet ascribed to it; that its subterranean soakage in an impure soil may have favored the generation of poisonous gases and their rise from the valley where it flows. I can also believe that general epidemic

* This view seems confirmed by the fact that fever has prevailed with peculiar severity at other places traversed by the Bourne before its arrival in Croydon—at Oxted for instance: and old traditions are said to exist, which couple the periodical risings of the Bourne with unwonted outbreaks of illness.

influences, common to Croydon with other localities, may have helped to determine the zymotic operation of your own special causes: and the poison may have been powerfully assisted, in particular instances of its action, by defective sanitary arrangements in the streets and houses where it lit.

VI.—This terminates all I have to say in explanation of your epidemic; and the practical inferences appear to me too obvious to justify more than a few words of comment.

The following points have struck me during my enquiry as suggestions, which I might submit to you:—

1.—That it would be desirable for the proper officer, by house-to-house visitation, to ascertain the efficiency of all domestic drain-works constructed under your orders, so that none may remain otherwise than inodorous and wholesome;—

2.—That the utmost vigilance is requisite to guard against any renewed arrest of drainage—whether by obstruction of your sewers, or by their breakage;—

3.—That the earliest opportunity should be taken to fill up, in a proper and complete manner, all cesspools which have been left standing beside your works; but that, till the epidemic has quite gone, it would generally be preferable to use dis-infectant agents for such cesspools as remain, rather than to make any considerable disturbance of adjoining impure soil with a view to the construction of new drains;—

4.—That the old drainage of High Street should be scrupulously examined, in order to its perfect cleanliness;—

5.—That the general paving and street-cleansing of the town need considerable improvement;—

6.—Above all, that the arrangements of your sewage-outfall require re-consideration, and that steps should immediately be taken, to reduce within as narrow limits as possible the present evils to which I have adverted.

7.—It will of course not have escaped your attention, that your discharge of sewage into the Wandle renders the water of that stream entirely unfit for consumption; but, since any evil

results from this pollution cannot have affected the population of Croydon, I do not consider their discussion to lie within the scope of your Chairman's reference.

VII.—Throughout this Report I have been obliged by the nature of my subject to speak chiefly of *evils*; for to them my attention has especially been directed. In terminating so ungracious a task, I rejoice in being able to say of them, that they all appear to me removable; that some of them have belonged almost of necessity to your period of transition; that none of them can be accounted essential to the improved system. With this, I likewise perceive that the ulterior good conferred on Croydon is likely to be great and permanent.

If you have given your constituents the benefit of effective, rapid, inodorous sewerage, with pure and constant water-supply, instead of cesspools with their soakage; if you have made six feet difference in the water-level of your low-lying district; if you have removed such ponds and ditches of filth as existed within the town;—these are inestimable contributions to the public health, which must give their fruit, I am persuaded, so soon as you remove those interfering causes which have hitherto masked the result.

By appropriate measures, active and precautionary, this may soon be achieved. All that will then remain, so far as my knowledge extends, is unqualified sanitary gain: and—contrasting Croydon, as it will then be, with Croydon as it must have been before your Board began operations, I cannot but believe that its salubrity will be raised far beyond the standard of previous years, and that many painful recollections of the recent epidemic will be lost in a grateful appreciation of increased health and comfort among the population.

I have the honor to be,

GENTLEMEN,

Your obedient Servant,

JOHN SIMON.

POSTSCRIPT.

Since writing the above Report, I have had an opportunity of examining in detail the Surveyor's list of thirty-eight accidents which befel your sewers between March 27th and November 10th, 1852.

The following tabular analysis will convey to you at a glance the more important facts of their history:—

Analysis of thirty-eight Obstructions (some of which were repetitions) as occasioned by the following causes:—	Size of the Sewer in which obstruction occurred.					Total Number of Obstruc- tions.
	4-in.	6-in.	12-in.	15-in.	18-in.	
1.—By objects mischievously or forcibly introduced;—	5	3	..	..	..	8
2.—By average contents, including rags, sand, &c.;—	8	5	..	..	..	13
3.—By materials unknown, removed by rod; in most cases, probably, the same as last;—	9	1	..	..	..	10
4.—By breakage;—	1	2	1	1	2	7
TOTALS	23	11	1	1	2	38

In reviewing the list of obstructions, it is painful to observe several, which could hardly have been occasioned otherwise than with mischievous intentions.

But probably the majority consisted in an arrest of what may fairly be regarded as *average* contents of a sewer. No one will contend that rags and sand are necessary elements of sewage; but neither can it be denied that they will generally be found in it. And the drainage of a district would itself be at fault, if it suffered habitual stoppage by reason of such ingredients as nine-tenths of the house-drains are sure to shed into it.

Quite obvious is the advantage of draining town-districts with *the smallest sewers that are efficient for their purpose*; but practice has not yet, I believe, fixed the limit to which this reduction of size may expediently go.

It does, however, deserve attention in this point of view, that of your thirty-eight stoppages, while seven have occurred by breakage, thirty-one have depended on a blocking of the sewers by their own contents;—and that of these thirty-one, twenty-two have taken place in four-inch sewers, the remaining nine in six-inch sewers.

To these facts may be added two further points for consideration:—

To drain town-districts with small pipes, is at least an experiment of some delicacy. For its success, there are more conditions requiring careful attention than for the old system of cavernous sewers. Every imperfection of manufacture, every irregularity of laying-down, every defect of water-supply, every coarse and uneducated use of such apparatus, implies a probability of stoppage; and too much care cannot be given to obviate these sources of failure:—

Further—a people habituated to the filthy system of open cesspools (into which it was the custom to throw every refuse thing) requires education as to the more restricted purposes of tubular drainage; and it would, I think, conduce to the success of your new system, that the subordinate officers of your Board who are charged with the duties of House-Inspection, should explain among the poorer classes, as each house becomes connected with your works, what exact office—and what only, these works are intended to fulfil.

J. S.

February 22nd.

FINIS.