NUNN (R. J.)

Compliments of Author

THE

PROBABLE CAUSE

OF THE

EPIDEMIC OF TYPHOID FEVER

IN

SAVANNAH, GA., IN 1892.

HOW TO AVOID IT AND OTHER FILTH DISEASES IN THE FUTURE.

BY R. J. NUNN, M. D.

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Reprinted with Notes from Savannah Morning News, 19th March, 1893.

At a recent meeting of the sanitary board a letter was read from Dr. R. J. Nunn in reference to the sanitary conditions of the city, dwelling at length upon some of the causes, which in the minds of leading sanitarians are productive, to a great extent, of much of the sickness in Savannah, and which, if permitted to continue, are likely to result more seriously than most people, by whom the causes and effects of a lack of sanitation are given little thought, imagine.

The letter was written in reply to the invitation to Dr. Nunn, among others, to be present at the meeting of physicians called by the mayor last December for the purpose of locating the causes of the fever which prevailed in the city last year. The three days intervening between the invitation and the date of the meeting, in which the physicians were expected to obtain the information asked for by the mayor, was regarded by Dr. Nunn too short to permit of sufficient investigation upon which to base any reliable statement, and in consequence he did not attend the meeting. His subsequent investigations reach a different result than that reached by the physicians who did attend, as stated in the resolution adopted at the meeting.

The resolution referred to is as follows:

WHEREAS, After a full and free discussion of the medical gentlemen, by invitation of his honor the mayor, concerning the question of a better preservation of the public health; and

WHEREAS, We are of the opinion that an exaggerated idea now prevails in regard to a greater extent of fevers—malarial and typhoid—than in former years; and

WHEREAS, We cannot assign any local cause for the existence of these fevers; be it therefore

Resolved, That we earnestly recommend to his honor the mayor and the sanitary authorities the observance of the best known sanitary measures for the still better preservation of the public health, such measures as thorough drainage, flushing of sewers, removal of privy vaults, etc., etc.

From careful, personal inquiry of twenty-five of the forty-nine practicing physicians in Savannah Dr. Nunn found there were 136 cases of true typhoid fever in the city last year distinct from the other classes of fevers, sometimes called typhoid. Allowing the same percentage of cases to the other twenty-four physicians gives an estimated total of 266 cases of true typhoid in Savannah during 1892. Following the statistics Dr. Nunn dwells at length upon the causes productive of typhoid and other kindred diseases which exist in Savannah and which threaten the health and commercial prosperity of the city.

The letter was read at a recent meeting of the Citizens' Sanitary Association, and has received the hearty indorsement both of the sanitary association and the Board of Sanitary Commissioners. Mayor McDonough is strongly impressed with the facts it contains, and has authorized its publication. The letter is as follows:

SAVANNAH, GA., Feb. 14, 1893.
119 YORK STREET.

To His Honor the Mayor of the City of Savannah:

DEAR SIR—On Dec. 9, 1892, I received from his honor the mayor, through the clerk of council, an invitation to be present at a meeting of physicians, to be held Dec. 12, which was called to locate the cause of the fever which prevailed in the city during the summer of that year.

The interval of time between the receipt of the invitation and the date set for the meeting was altogether too short to admit of a thorough investigation of the subject, and all the information I have sought has not been received even yet, but there is enough at hand to enable conclusions to be drawn which may be valuable as guides in some of the future sanitary workings of the city government.

But before entering upon this inquiry, I desire to draw a clear distinction between two classes of minds which are not unfrequently mistaken for one another. These are the pessimists and the precautionists. The former see nothing but evil as the outcome of all occurrences. The latter, when danger and disaster are ahead, do not ignore the fact of their existence, but seek to avoid them by every legitimate means. With the former class I have no sympathy; but I hope always to be permitted to count myself as enrolled in the ranks of the latter.

It is proper when discussing a matter of so much importance to the city as is the one now under consideration, to proceed slowly and cautiously, examining carefully each step as we proceed, to the end that the conclusions reached may be the truth, or as near thereto as it is possible to arrive. To pursue any other course would be culpable in the extreme. It would be deceiving the public into a sense of false security; it would be jeopardizing the health of the people, and trifling with the lives intrusted to the keeping of the authorities.

Assertions upon one side and denials upon the other, unsupported by evidence, will never become fact, no matter how often repeated.

The first question to be asked is: Was there any unusual amount of sickness during the summer of 1892? To this the answer invariably returned by physicians of whom I have inquired has been in the affirmative, and here it may be well to observe that the mortuary reports are not sure guides to the amount of sickness prevailing in a locality during a season, for the reason that such reports show only the fatality; nor can more be done with them than to show the character of diseases causing deaths, and the proportion of these to the population. But as to the prevalence of non-fatal diseases, such as dengue, or as to the proportion existing between the number of cases of a disease, and the deaths resulting therefrom, the public mortuary reports can show nothing.

2. Were the diseases prevailing during the summer of 1892 of an unusual type or types? Answer, from the same sources: Yes; the types were unusual, and chiefly of two varieties (a), continued fever, sometimes called typho-malarial fever, and locally erroneously called typhoid fever; (b) true typhoid fever.

The mortuary reports are necessarily misleading and unreliable as to the existence of true typhoid fever in Savannah, for the reason just pointed out, viz.: that continued fever has been locally known as typhoid.

Here it may be well to observe that the fever called here typho-malarial is comparatively new in Savannah, the more virulent types of malarial fever which were usual in the early '50s having gradually disappeared before the milder, but far more protracted, forms which are seen at present. The causes which brought about this change may be the same which culminated in the typhoid fever of last summer, but these I will not now discuss, because, according to the terms of the invitation, the investigation is to be confined to typhoid fever.

It is proper here to remark that the medical profession in this city is much divided on the relationship existing between continued fever and typhoid fever; one portion believing that our continued fever is in reality typhoid fever, and differs from it only in the mildness of the attack. A second portion looks upon our continued fever and typhoid fever as separate, independent and distinct diseases, and incline to the belief that our continued fever is a disease coming from the decomposition of vegetable matter, but that typhoid fever is caused by decaying animal matter; while a third portion rejects the idea of the possibility of the existence of even a single case of typhoid fever in the city and would classify all forms of continued fever or protracted fever as malarial. Finally there are some physicians who believe that a malarial fever and a typhoid fever can coexist in the same individual, and run each its course independently.

The difference of opinion existing as to the pathology of these phases of disease can only be settled by autopsies, and to these the patients have a decided objection.

While, however, doctors differ about the classification of these diseases, there is not the least difference of opinion as to the sanitary measures which should be put in practice at once to prevent their origination or their spread.

3. Was true typhoid fever present to any considerable extent in Savannah during the summer of 1892?

Answer: A copy of the following letter was sent to each physician in the city (forty-nine in all):

SAVANNAH, GA., Jan. 28, 1893.

Dr. ————:

MY DEAR DOCTOR—I desire to arrive at an approximation of the number of cases of true typhoid fever which occurred in Savannah in 1892, and would be much obliged if you would aid me by letting me know the number of cases which came under your observation. Sincerely yours, R. J. NUNN.

I have to thank twenty-five of these gentlemen who have had the courtesy to favor me with replies, some of whom have not seen any cases of typhoid, but the total number reported is 136 cases, which would be an average of 5.44 for each of the twenty-five who reported. Allowing the same average for each one who did not honor me with a reply (24), would give a total of 266 cases of undisputed typhoid fever as having occurred here in 1892.

From the tenor of the letters received it is safe to say that the number of doubtful cases would far exceed the figure just given, say by double at least, and these again would be comparatively few if compared with the number of cases of continued fever.

Should any replies be hereafter received which would materially alter the estimate I have made I will change the figures given so that they may then be equally as accurate as are the above.*

4. Were the causes atmospheric?

Answer: Under date of Jan. 25, 1893, Mr. P. H. Smyth, observer weather bureau in this city, was kind enough to furnish me with the maximum, minimum and mean temperature and the rainfall for April, May, June, July and August for the past seven years. From this table the following summary has been computed:

AVERAGE TEMPERATURE.

1886.....76F	1890.....75F
1887.....74	1891.....75
1888.....74	1892.....75
1889.....74	

TOTAL RAINFALL IN INCHES.

1886.....28.01	1890.....19.12
1887.....22.16	1891.....28.00
1888.....15.55	1892.....18.06
1889.....26.15	

From this it will be seen that the temperature has been higher and lower, and the rainfall greater and less than in 1892; consequently the fever of 1892 cannot be attributed to atmospheric conditions.

In view of the very popular impression that the temperature and rainfall might have some connection with the prevalence of the fever under consideration, this discussion would have been incomplete without an analysis of the meteorological elements which are so often referred to as potent factors of disease.

5. Was the fever of local origin, or was it general throughout the country?

This is a most important question, because upon the reply depends the preventability of the disease in the future.

To determine this point I wrote to Brunswick, Charleston, Augusta and Macon. The importance of the replies from Brunswick induces me to attach copies of them for

*I regret very much to be compelled to state that even at this late date I have not received responses from all the physicians, seven having still failed to give me their returns. I am therefore unable to vouch for the absolute accuracy of the above estimate, but from what I can now see the exact number would not depart widely from the calculation given.

your consideration, for although they make no mention of typhoid fever, they show conclusively that the same neglect of sanitary laws which was seen in Savannah in 1892 was also practiced in Brunswick. They show the same disregard of the public welfare; the same ignoring of public warning; the same transgression of city ordinances by the very officers who were sworn to enforce them; and, stranger than all, they show that like results followed these acts in Brunswick as in Savannah.

But these letters show something more, which is of vast importance to our citizens, in that they point to the fact that the people are not entirely at the mercy of municipal authorities in sanitary matters. That designing politicians or greedy money getters, blinded by avarice, cannot usurp the place of science and use their power for their own selfish ends regardless of the lives of the people, but that the courts will, upon application, grant a mandamus compelling those in charge of the sanitation of a locality to do their duty in this most important particular.

From Charleston, Dec. 20, 1892, Dr. F. Peyre Porcher writes: "We have been singularly free from the prevalence of any special disease in this city for the last year."

Dr. Eugene Foster, president of the board of health of Augusta, writes Jan. 10, 1893: "There were cases of continued malarial fever, and of typhoid fever in our city during the summer and fall seasons, but not more than is usual with us. I feel satisfied that we had fewer of these cases in 1892 than for any year in the past five years."

Dr. William F. Holt writing from Macon Jan. 4, 1893, makes no mention of the existence of typhoid fever in that city during 1892.

From this evidence it will be seen that typhoid fever is not general all over the country and the conclusion is inevitable that the cause or causes are local.

This leads up to the question sixth. In what respect did the circumstances in 1892 differ from those of say, five previous years? Answer: In extensive street grading and digging, and spreading of thousands of tons of oyster shells during the hot months from May to September, and repairing stone paved streets during the same period.

7. The next important step in this investigation is to inquire if such work at such a season of the year would be likely to propagate or originate typhoid fever.

To give to this inquiry an intelligent answer it is necessary to review briefly the theories of disease.

THE GERM THEORY OF DISEASE presupposes the existence of germs as fungi, bacteria, bacilli and cocci of various kinds, which, finding within the body suitable requirements for their reproduction, rapidly multiply and produce the phenomena which we call disease, each variety of microscopic organism producing a different ailment.

It will thus be evident that, according to this theory, what we call disease is but the outward manifestation of the development of a crop of these microscopic bodies; in fact the germs of diseases are the analogues of the seeds of a crop, and, as the latter will not produce a crop unless the climate and the soil are suitable thereto, so with the former, and therefore it follows that, to have a disease, there must be the seed, the soil and the surroundings. One can no more grow a crop of bacilli upon a clean plate than one could grow a crop of wheat in the same situation, even supposing one to have the seed to commence with. The keeping of the soil in such condition that the seeds or germs of disease will not germinate is called sanitation.

DE NOVO THEORY.

It must not be supposed for a moment that the germ theory is universally accepted, although it is just now the most fashionable, but there are those who believe that diseases can and do originate "de novo" under suitable circumstances, and they can point to certain experiments of Pasteur himself, and of others, demonstrating the truth of their position.

Pasteur takes a poisonous bacillus and, by proper cultivation, he develops an innocuous one; but then he can take one of these innocuous bacilli and, by cultivating it in suitable soil, he can redevelop its poisonous properties.

Again, Dr. Dollinger, president of the Royal Microscopical Society, has taken a bacillus which, growing vigorously at a comparatively low temperature, is killed by a slight rise of 5° or 10°, and by careful cultivation has so changed its nature that, from being unable to endure a temperature of 90° Fahrenheit, he was able to keep it alive and vigorous at 180° Fahrenheit.

These experiments, it is claimed, demonstrate the immense power of adaptability possessed by these low forms of microscopic life, and they further show that the power of reaction upon the animal economy, so as to produce the phenomena which we call disease, can be modified in either direction of virulence or innocuousness, according to surrounding circumstances.

The proper surroundings for the propagation of disease germs, if the germ theory is adopted, or for the origination of disease, if the "de novo" theory is preferred, are precisely the the same, viz.: Heat, moisture and a suitable soil, which latter, in the case of typhoid fever, is decaying animal matter.

No better culture bed for the propagation of the germs of typhoid fever, or for its origination could be desired than miles of streets freshly shelled during the hottest months, faithfully watered by city water carts and heated by a midsummer sun.*

In Brunswick, according to the letters appended, it is not thought that the shelling of the streets did any harm, but there, be it observed, the shelling was done in winter, while in Savannah summer was selected for that purpose.

A letter from Dr. S. F. Dupon upon this subject gives the result of his experience when digging out shells as far back as 1848, when he lost four of the hands engaged in that work from fever, which he could trace to no other cause and which disappeared when the work was stopped.

From all this I am forced to the conclusion that the digging, grading and shelling of the streets in midsummer seems probably to have been concerned in the origin, spread or continuance of typhoid fever in Savannah in 1892.

8. If the germ theory is adopted the probable habitat of the germ must be sought out.

In a city like Savannah, in which are travelers from every part of this continent and of Europe, the germs of disease are not likely to be wanting. Falling on a paved street they would be carried under the paving stones by the rains, where they would remain until brought to the surface, when, if they found suitable surroundings, they would quickly multiply. Such was the case last summer.

Or falling upon a sandy street, they would be washed into the soil and would be exposed during the process of such work as pipe laying or street grading.

But then it must not be overlooked that, according to the evidence of Dr. Dupon, the germs of disease may be in oyster shells procured from localities in the immediate vicinity of the city, and the probabilities of this being a source of contagion is vastly increased when these shells are imported from a locality where typhoid fever is common.

So much for the immediate cause of the fever of 1892, but other sources of contamination have been suggested, as, for example, the mixture of a small percentage of river water with the artesian water, with which the city is supplied.

To argue against the possibility of infection from this source would be absurd, but it is safe to say that its probability is infinitesimal.

The river water was used in the city from 1853 until a few years ago, altogether for a period of say thirty-five years, and no such result obtained during all that time, yet during much of that time the source of supply was much nearer to the city than it has been in the last few years.

Of the other means of the propagation of disease germs, such as privy vaults, dry wells, improper sewers, damp and dirty lanes, unsanitary plumbing, want of house drainage, the Bilbo and Ogeechee canals, the drinking of sewage by cows, the bathing of children in the water of sewers, the raising of the level of the lanes above that of the adjoining lots, the filthy cellars, cattle marts and stables, the dirty houses of some sections of the city, the crowded lodging houses, the undrained lands around the city and other things of like character, I cannot now speak. They have all been brought to the attention of the authorities frequently for years, but although all of these, and other like conditions are elements of danger, they do not seem hitherto to have been productive of any positive results of a serious character, but they may have been the steps which led up to the fever of 1892; or, in other words, prepared the soil for its introduction.

What has been or will be the effect of covering up the vast filter bed upon which

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*The following streets have been paved with oyster shells during 1892: Jefferson street, from Charlton to Henry street, 83,422 bushels; length 3,750 feet by 27 feet roadway.

Jones street, from Tattnall to East Broad street, 116,334 bushels; length 3,350 feet by 40 feet roadway.

Bolton street, from East Broad to West Broad street, 90,684 bushels; length 3,220 feet by 30 feet roadway.

Summarizing the above figures, which are official, it will be seen that there were 290,440 bushels of shells, some of which were brought from Baltimore where typhoid fever is prevalent, spread over a surface of over 7½ acres (7.61) during 1892, and further I have been informed that many of the shells used were live shells.

the city stands with impervious pavements, and of the destruction of the shade trees, it is impossible to say; but the possibility of these being sources of danger was pointed out in my pamphlet, "A Medical History of Savannah," in 1887.*

Here I may be permitted to suggest that the method of cleaning the asphalt pavement by scraping only is, in my opinion, dangerous to health, as it leaves germs of disease and irritating matter to be blown into the air and inhaled by the people. These pavements should be thoroughly and frequently washed.

This is a suitable occasion to draw attention to the extraordinary sanitary advantages conferred upon this city by the immense sand bed upon which it is built. For more than a century the whole of the contents of the vaults were buried in the sand of the streets, and during all this time the people drank drainage water from wells sunk in the same soil without knowing anything of typhoid fever, scarlet fever, diphtheria (see letter of Dr. Morel in "Medical History of Savannah"). So thoroughly was the magnificent work of this grand filter done, that although the presence of the salts coming from the vaults and dry wells (which were also permitted) was plainly demonstrable in the drinking water, yet the disease germs were always excluded. In various ways, we in these later days, are shutting off this great filter and interfering with its usefulness, and the results do not seem to be to our advantage.

From this careful analysis of the causes and conditions which preceded the outbreak of typhoid fever in 1893, I am satisfied that it was directly due to a neglect of proper sanitary precaution and a disregard of those local traditions touching summer street work, which now amount almost to scientific certainties, but indirectly to a mass of other causes which have been accumulating for years.

To prevent the recurrence of an epidemic of like character would, I am convinced, be no difficult task in a city so hygienically favored as is Savannah, and the same measures would undoubtedly have the effect of freeing the community from typho-malarial fever, from diphtheria, scarlet fever and other filth diseases. The same fearlessness and energy displayed by the executive in stamping out small-pox after it had been permitted to spread, will, if turned in this direction, show equally as satisfactory results.

Systematize the health department, evoke the aid and advice of the most experienced, professional sanitarians; inaugurate a system of house drainage with closed drains to the point of discharge,* which should be as far from the city as pos-

*The passage referred to reads as follows (R. J. N.):

"There will probably, during the coming generation, be ample opportunity to judge as to what extent the immunity from disease enjoyed by Savannah has been the result of her porous soil, wide, unpaved streets, profuse forest growth and numerous squares.

"For in the march of improvement, it is in contemplation to pave the streets, and paving the streets has, so far, carried with it the total, unsparing, destruction of the shade trees.

"Then, too, some of the citizens loudly denounce what they are pleased to call the waste of ground given up to wide streets and open squares, and would willingly see buildings located in the squares and some of the streets closed up and appropriated to the same purpose; in fact, so great has been the pressure brought to bear that the municipal authorities, in laying out an extension of the city, felt forced to abandon the old plan, which has proved so good, and have adopted a more compact design.

"Whether or not this is best the irrefutable logic of events must determine; the facts of the future will be the basis of the verdict; but, unfortunately, should it be on the wrong side, there will then be no redress, it will be too late to retrace the steps taken or undo the injury inflicted.

"How much wiser would it have been to have adhered to the plan which has already borne the test of time and been found to be all that could be desired."

*The bottom of the new Casey canal will present an exceptionally cheap and practicable bed upon which to lay a pipe through which the house drainage may reach salt water six miles from the city, and at the point of exit it may be mixed with all the fresh water coming from the drainage of the southeastern swamps, in which it would be lost, so great would be the dilution.

I had hoped to be able to give the estimates of the cost of this and other routes, besides other interesting data, but I have been unable to obtain them in time for this publication.

sible; fill up all dry wells;* abolish privy vaults, and substitute either water closets or the pail system;† restore and maintain the relative levels of the lots and the lanes; inspect plumbing; keep the sewer traps clean; suppress the canal nuisance; inspect all cellars, and the houses of the lower classes; drain all wet and sobby lands; isolate cases of infectious diseases, and keep physicians informed of the location and character of all occurring in the city. All of this has been said time and again by others during the past decade or two, but without effect.

As ignorance is no doubt the principal cause of sanitary mistakes, educate the people; let the principles of sanitation be taught in the public schools and encourage private sanitary associations. When every person is a skilled sanitarian, and appreciates the danger, the anxiety and the suffering resulting from sanitary sins, then there will be less use for constant watchfulness on the part of the authorities. This will be in the long run a vast saving to the city.

A word touching the health of the coming summer (1893).

Those who have made a study of the period of a cholera epidemic, put it at three years from the time of its appearance in the east to its ultimate disappearance. The epidemic which has touched our shores, began in 1891 and has expended the violence of its second year in Europe, having barely shown itself in America, but having reached this side of the Atlantic, and

*The number of dry wells is about 1,300 (1891). In October and November, 1891, notices were served on the owners of the properties on which the dry wells exist and executions were issued so that these dry wells could be filled up before the summer of 1892, but in or about December, 1891, a petition from the owners was presented to council asking that the ordinance be not enforced, and council thereupon ordered that the ordinance should not be enforced, and therefore the dry wells remain. (Condensed from a private letter which I am authorized to use. R. J. N.) The records of the city show that during the last five years, 1889 to 1893 inclusive, there has been appropriated for house drainage $93,000, to which may be added $5,000 worth of sewer pipe on hand in 1889. The municipal reports do not show that any of this appropriation has been used in the construction of the work for which it was intended.

†That the public may fully appreciate the enormity of this danger I beg to submit the following calculation and comparison:

The number of vaults in the city proper is about 4,400, and the average size is fully 5 feet long by 4 feet wide, giving an area of twenty square feet. This will give a total vault surface of 88,000 square feet.

An acre contains 43,560 square feet, so that the area of vault surface exposed to and contaminating the air of Savannah is over two acres, which again is about equal in extent to one of our squares.

To this should be added another quarter of an acre for those vaults in the immediate vicinity of the city, and which, while not within its limits, are contributing their share of poisonous effluvia to vitiate the atmosphere and to breed or invite disease.

Surely this subject is important enough to provoke serious discussion and a rapid abatement of such a dangerous nuisance.

It may be interesting to glance at the financial aspect of the vault question.

The present cost of cleaning the vaults averages about $8.00 each, of which fifty per cent. is paid by the city.

The capacity of the O. E. M. department is about twenty vaults per week, or say one thousand per year.

Now as there are about five thousand vaults in the city and its vicinity it is evident that they cannot be cleaned oftener than once in five years and this at an expense of ($8,000) eight thousand dollars a year, or in other words it costs forty thousand dollars ($40,000) to clean the vaults once.

Now, if vaults are to be tolerated at all, they should be cleaned at least once a year and that during cold weather, which would make the cost forty thousand dollars ($40,000) a year, which in five years would give capital enough to pay for a system of house drainage.

But a properly organized system would not cost anything like this sum annually and even the present expense of eight thousand dollars ($8,000) a year would very nearly, if not quite, pay the interest on the cost of the house drainage, and then the work would be done continually and not once in five years.

It is evident that a proper system of house drainage would result in a great saving of money, in the supression of the two acres of putrifying matter, which is now pulluting the atmosphere and as a consequence the chances of disease infection would be correspondingly lessened.

having another year to run, it is safe to say that it is exceedingly probable that it will spread in America in 1893. With measures to be adopted to keep out cholera, this letter has nothing to do, but I desire to say that the line of sanitation just indicated, thoroughly and intelligently carried out, while stamping out other filth diseases, will also place the city in the best possible condition to prevent the spread of cholera within its limits.

The want of a properly organized health department as a portion of the city government has been the subject of so much comment on the part of the citizens that an explanation of the situation for the benefit of this generation may not be misplaced, although it might be fairly argued that in this respect the city is in advance of the state.

Up to the 50s the necessity for a health department did not exist, so well did the immense filter bed just alluded to do its work. At the time alluded to three citizens in each ward were appointed by the mayor to see that the yards were kept clean, and that was all there was to do. Nature did the rest. Closets were all on the lanes, forty or more feet from the houses. Sewers there were none, consequently there was no sewer gas laden with a dozen or more varieties of disease germs. There were no water works, and hence there was no plumbing to be defective nor water mains to lay. The streets were not yet covered up with impervious coating of different kinds, and as a consequence there was no pavements to repair. The legislature had not yet given private corporations the right to dig up the streets when and where they desired, nor had it then begun to cut up the streets and dispose of them to private citizens or societies, and the importance and value of the shade trees was appreciated, and they were preserved and cultivated.

Savannah was a village then comparatively, and may have had what would now be called primitive village ways, but they suited admirably to keep out filth diseases.

Gradually, unconsciously this has been changed. Water works came, bringing the water closets into the houses with defective plumbing. Sewers came with their attendant sewer gas and filth diseases.

Impervious pavements came, shutting off the filter. The odorless excavating machine came with cemented vaults, again stopping filtration and courting disease by increasing the chances of fermentation.

The shade trees were cut down and the hot sun allowed full play, and so on. The hand of improvement is upon us, and the modern city with its typhoid fever, scarlet fever, diphtheria, membranous croup and other filth diseases is here before we know it, and, as a consequence, the organization of the health department has not kept pace with the increasing requirements of the city.

The experience of 1892 will perhaps change all this. Filth diseases have invaded the houses of a class of citizens who will make themselves heard when they themselves are touched, but who have sat idly by for years nor heeded the warning of the coming evil until now it is beside them at their own hearths and firesides. Cassandra prohesied, but none gave ear to her prophecy.

The fever of 1892 will surely eventuate in good to the people. Such a result is not unusual; in fact, it is always so. It is the law of compensation.

But the history of the outbreak of filth diseases in 1892 has a still deeper lesson to teach, which, if properly learned, may not be too costly, even though it be at the expense of many valuable citizens sacrificed to typhoid fever, of time lost, of suffering endured and of expense incurred by those who recovered, of numbers of innocent children made victims to scarlet fever, diphtheria and other filth diseases, of terrified mothers, and families driven from their homes, and business lost by rumors of disease within our walls, which is, that the persistent negligence of sanitation on the part of the authorities is gradually intensifying the virulence of filth diseases which they tolerate, and is preparing the people for a repetition of the experiences of 1876. Who are they who will then remain to face the horrors of an epidemic? Who will then restore to Savannah her lost commerce?

The experience of 1892 is but the distant rumbling of the thunder warning us of the approaching storm. The "little cloud like a man's hand" is to be seen on the horizon. To the inexperienced these signs are meaningless, but to the educated seaman they are warnings to trim his sails to meet the coming storm.

Typhoid fever, scarlet fever and diphtheria are but the skirmish line of the advancing army of filth diseases whose advances have been courted and encouraged, rather than opposed and repelled. By all means let the responsibility for the death and disaster which will accompany its advent be placed where it belongs. It cannot

be laid to the charge of the medical profession, whose warnings have always been unheeded; and I pray the present city administration to so act that the blame may not be laid at its door. Your obedient servant,

R. J. NUNN, M. D.

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This letter has been submitted to Dr. J. B. Read for his criticism. He, being a native of this city, the oldest physician in active practice, with a local medical experience of nearly fifty years, is the best qualified to express an opinion as to the scientific and practical value of the views just given. Here is his reply:

SAVANNAH, GA., Jan. 30, 1893.

Dr. R. J. Nunn:

MY DEAR DOCTOR—I agree with you in all that you have written in your statement in regard to the origin and increase of the typhoid diseases that have prevailed in this city during the last summer, and that still exist at this time.

I hope the candid statement you have made of these causes, and the method of avoiding such diseases for the future, will be carefully studied by the citizens of Savannah. Respectfully,

J. B. READ, M. D.

—

BRUNSWICK, GA., Dec. 29, 1893.

Dr. R. J. Nunn, Savannah, Ga.:

DEAR DOCTOR—I must beg your indulgence for my procrastination in responding to your letter of the 15th inst., but, in fact, my professional duties have so absorbed my entire time, I have not been able to make out a tabulated statement of the malignant fever prevailing here two summers previous from my case book, and in lieu of same will submit in this communication the factors causing these summer fevers to assume such a fatal type from my observation and experience.

We have, in common with other cities and towns, the mild type of remittent fevers, runing their course, in many cases, without serious complications, and ending with convalescence from fourteen to twenty-one and thirty days.

During the summer of 1890 there was an excessive rainfall for two months (July and August), saturating the soil, and causing a rapid and vigorous growth of vegetation. This condition was succeeded in September by a very warm, dry period, causing decaying vegetable matter to disseminate malaria; producing distinct types of intermittent fever.

Our municipal government very ignorantly and unwisely permitted extensive upturning of "virgin soil" in Windsor park (the property of a private company), "booming" their real estate interests here. The result of such excavations here was cases of hemorrhagic and congestive fevers, terminating fatally in my practice, clearly and undoubtedly traced to this upturning of saturated soil to the hot sun, eliminating all its paludal causes.

This observation of cause and effect as to disturbing the soil during the heated term was continued by me in 1891 and the present year with the same unvarying results, clearly demonstrating to my mind the great danger of extensive and injudicious disturbing of soil in our southern climate during the heated summer months (May to November). Our city government, in their zeal for public improvements (not seeing anything deleterious in disturbing pure sand) ignored the ordinance governing the turning of soil during the summer months, and the board of health found it necessary to get out a restraining order from the court forbidding the city from further excavation, etc., and since that date our city has been remarkably exempt from severe forms of fever. In conclusion I wish to say, in my close and personal observation of our summer fevers that they *are* intensified by *extensive soil excavation* and dimished by its cessation with as *marked certainty* as the fall of a high temperature from an untipyretic.

As to shelling streets, no ill effect has been experienced from that source, as all of the extensive boulevards were done in winter months. I might add there was much cutting away of chaparral and underbrush on the peninsula point of our suburbs in the summer of 1890. This was allowed to remain on the ground for some time before burning, and I observed cases of intermittent fever about that period which had not prevailed before.

This was in May, 1890, and the excavation or grading of Windsor park was continued through the entire summer. The severe types of fever occurred in August and September in locality adjacent to park.

Not being a statistician, I regret my inability to furnish you histories of these cases, which would require much time to run through my books, hunt them out and write them up.

I hope these crude details may be of service to you. I remain, very truly and sincerely,

— HUGH BURFORD.

OFFICE HEALTH OFFICER,
BRUNSWICK, GA., Dec, 17, 1892.

Dr. R. J. Nunn, 119 York St., Savannah, Ga.:

MY DEAR DOCTOR—Yours of the 15th inst. to hand this morning, and the contents noted. I'll endeavor to answer your questions in order in which you ask them, and as fully as possible.

1. The fevers were of a distinctive form of congestive malaria. The upturning of soil during the summer, with very heavy rains, I think was the cause. There were no active steps taken in the matter. Fortunately very shortly after we had cold weather, which prevented, I think, a great many cases.

The shelling of streets is not detrimental to the public health. I think the danger is in preparing and grading of the streets, which necessarily requires an immense area of new soil exposed, which gives off sufficient malaria to endanger the public health.

I say the shells themselves do not, I think, occasion any trouble provided, of course, they

contain no organic matter. Most of the shell that we have used have been dead shell.

During May and June of this year we had several severe cases of malarial fever of a remittent form, and in some instances the bowels would become involved, resembling typhoid fever.

All during the winter, spring and far into the summer the city authorities continued to upturn the soil, directly against an ordinance that they themselves had made, and against the earnest recommendation of the board of health and my written opinion against it.

Finally, with the assistance of the board of health, I succeeded in having a writ, or an injunction, restraining them from further upturning of the soil until the time set apart in the ordinance allowed them so to do.

Almost immediately after this ceased the forms of fever became milder and fewer, yielding more readily to treatment.

In my opinion, the upturning of soil in any southern city, especially during the spring and summer, is one of the most potent causes of so much malarial fevers.

I trust that I have furnished you the information that you desire and will esteem it a privilege to serve you in any manner that I can.

With great respect, I remain your obedient servant, J. A. DUNWOODY.