Typhoid Fever.

Thesis.

By Alexander Mitchell
M B & C M.
West Canisbay House
Canisbay.
Caithness

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ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

Typhoid fever

Is it Contagious?

The disease I consider deserves more investigation as to its dissemination than this fever, when we take into consideration the dreadful fatality and misery produced by it, especially in our own country. The misery caused by it is something almost incalculable because as a rule the worst cases we meet with are those in which persons in middle life are attacked consequently when the members of a family are stricken we find if any succumb it is generally those who are the breadwinners of the family very probably the father or the mother or perhaps both; we can unhappily conceive the result should the outbreak be in the house of the working artizan, or in the cottage of the

Cottage.

To know the causes by which these appalling results are produced is a matter of the deepest import to all medical men, and when it is true that prevention must be based on an intimate knowledge of disease, we cannot expect to encounter this enemy successfully without thoroughly understanding the causes which produce it

Typhoid fever is a member of that group of diseases caused by definite and specific agents or organisms which have not only the power of multiplying within the body, but existing either in the active or dormant state external to it, if dormant only waiting for favorable circumstances to again become active organisms.

The part of the country in which I practice is inhabited principally by a class who by a little farming

and an equivalent of fishing must be a livelihood; the habits of the people generally speaking are the reverse of cleanly, so is the vale too frequently with fishermen; amongst all their filthy habits stinking manure, and dung heaps lying close to their doors which I believe have existed from time immemorial; typhoid fever has been of a rare occurrence here, and would probably have remained so had it not been for the circumstance I am about to relate.

A woman named Christina McDonald, returned here, when she had before served, from a place called Leybster, where for some time previously she had been nursing her illegitimate son who was suffering from an attack of typhoid fever, in the village of Leybster typhoid was very prevalent at that time. Eight days

after the arrival of the women, four of
which she had been confined to
bed, I was called to see her, this was
on the 20th July ~~August~~ 1874, when I found
her suffering from languor, and debility,
anorexia, and headache, epistaxis,
and slight Bronchitis, face having
a slight purplish appearance, she had
~~passed~~ passed very restless nights the last few nights
very restlessly, temperature 103°F. I again
saw her on the 23rd July ~~August~~, and she now
in addition to her former symptoms, had
tympanitis, diarrhoea, the stools were
very liquid, colour brownish with a
yellowish tinge; Urine (through the
whole attack indeed) being scanty, high
coloured with an excess of urea, and
a deficiency of the chlorides, temperature
10 o'clock a.m. 103°; called again
in the evening and found temperature
104.5; saw her again on the 24th
25th & 26th, symptoms somewhat
somewhat

somewhat similar with a rise of evening temperature over morning of from 1° to 1·5°, on the 27th inst saw several distinctly marked lenticular spots, over abdomen which disappeared on pressure, and the patient was now suffering from a marked dullness of hearing; and also suffered from considerable tenderness over the ~~region~~ ~~of the~~ right iliac region, with gurgling under the hand, the tenderness which increased on pressure, on the 29th, 30th July ~~August~~ and 1st of August saw no change, but on 2nd August, noticed in the evening a lowering of the temperature to 103·5°, and in the evening of the 3rd a still further lowering to 103° from this time patient gradually recovered being able to leave her bed on 18th August. While this case was progressing the mother of the girl who was nursing the patient patient

fell ill, this was on the twenty sixth of August, the nurse who was named Mowat, lived about 1½ mile off, and was in the habit at least once a day of going home to see her people, as the mother had not once visited the patient Mrs D, her daughter must necessarily have carried the contagion to her on her clothes, she had a very severe attack which lasted over six weeks. The nurse herself was the next seized, this was on the 16th of October, she had likewise attended her mother, she was also very severely attacked being confined to bed over 5 weeks.

About this time a man named Alexander Begg residing in Tille 2½ miles off aged 46 years, had called at Mowats two or three times regarding the purchase

of a pig, being a kindly disposed man on each visit he went up and bent over the bed of the sick to console them a little, shortly after his last visit he fell ill, at his own house, of Typhoid fever, the attack proved fatal his attack struck him as near as he could judge on the 11th August 1874, after 20th, the 9th day of his attack, he gradually sank lower and lower until on the 25th his pulse got dicrotous with subsultus tendinum, retention of urine and what little was passed ~~was~~ ~~high~~ being highly albuminous, hemorrhage from the bowels, with a temperature on the evening of the 25th until 106° F on the morning of the 26th he suffered much from pain

hiccough, cold sweats, and incol-
untary discharges from the bowels
[illegible] set in, and on the
afternoon of the 27th he died.
During his illness his eldest son
was struck down, and after the
other his remaining seven chil-
dren; during the time these
people were suffering, a person
five miles off called to see them
and assist a little but as she
grew afraid she left in the
afternoon for home, four or
five days afterwards she fell ill,
all her symptoms being well
marked; in her twenty one
other mothers fell ill just as
in the former case, a somewhat
similar catastrophe occurring;
as a still further proof of its
contagion, the F. C. minister of the
place + Rev James Campbell's Banch
[illegible]

who had visited the sufferers several times as their spiritual adviser, was attacked, and suffered very severely for nearly six weeks.

Now anyone reading over this series of cases could not surely entertain any doubt as to the contagion of the fever, that is of the fever having the power of propagating itself by contagion. As a still further proof however I may state that the sister of the woman Bell, who had come from Edinburgh to assist in nursing the patients, none of the neighbours now daring to enter the stricken house, fell ill in five days after her arrival and suffered from an attack of considerable severity; her case was a particularly well marked one. The next patients upon whom I was called to attend in

Gills

Gills, were two men, brothers, shoemakers by trade, who lived in a house next to that of Mrs Biggs, these men had assisted in cleaning up the cattle shed, and feeding the animals about the house, on different occasions, they had stepped in at the Biggs' door, this was all the communication that passed between the parties; both brothers were struck down in two days after the other, and suffered pretty severely.

The disease now gradually spread through the whole of Gills in which there were 10 houses.

Many outbreaks having histories very similar to the above, have from time to time been published, one or two of which for proof's sake I may be allowed to relate.

A series of papers was published by Gendrin de l'Eure in the Journal

Journal des Connaissances Medi-
-cales for 1848

1st

On the 8th of May 1848 a girl Lemmonier was brought to the village of Drumandience, she came from Laumont, a town one league off and on her arrival was already in the 12th day of her fever, contracted in her masters house, from being there. The inhabitants of those two places held little or no communication, they were separated by two communes in which ~~there~~ there were no fever cases. The mother of the girl, a woman 60 years of age, after nursing her daughter, for some weeks was attacked by the same fever, she was nursed in her turn by two neighbours named Gilbert and ~~Burdet~~

Bardet who relieved one another
until the arrival of another
of Lemmonier's daughters.
Guillet was next laid up with
Typhoid for 40 days. The
following persons living under
the same roof next suffered.
Madeleine Guillet 25 years
Guillet the father 53 years old who died
in the fourth week. Guillet the
son 17 years old. Two servant girls
who in fear and trembling rarely
visited the sick, but were never-
-theless attacked
The woman Bardet who divided
with Guillet the care of Lemmonier
took fever as well and remained
four weeks in bed
The following inmates of her
house were afterwards attacked,
Julien Bardet her son 11 years of
age, Constance Bardet 16 1/2 years

16 1/2 years died in the fourth week

Louis Burdet aged 8 years

Francois Burdet not resident with her mother but she visited her also caught fever.

Another instance may be cited, it is one by Bretonneau he says

Dr Potin has recently witnessed a case in which attacked all the young ladies of a school in Faubourgh St Germain without one escaping.

The first struck down was a young lady from the country. Now at this time there was no Typhoid at any place near the school

M Bretonneau asks to what can such a striking difference be due unless to the

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contagious nature of the disease. These cases to my mind show that the stinking drains and dung heaps were not the sources from which the epidemic sprang but those sources must be sought after in the imported fever itself.

The analogy existing between this and other contagious fevers is such that I think the proof is manifest: as in other contagious fever we have in this 1st a period of latency after the occurrence of the infection, 2nd the exception, as a rule, of secondary attacks by those who have already suffered, and 3rd the immunity from further attacks, even if exposed to the infection, these are all striking characteristics of contagious diseases.

As to the occurrence of re

period of latency, all the cases cited by myself are striking examples, perhaps I may be excused if I again bring up the first Case cited in my series, (viz) that of the woman McDonald who after attending her son for some time came home to the farm and did her usual work for two or three days previous to her being laid up, then her nurse the girl Mowat, who attended the patient for some considerable time before her attack, then the man Begg, Gills, who went about for three or four days after his last visit to the Mowats, then the woman Sinne after staying in Beggs for 1/2 a day went home and did not lay up for five days afterwards, then last the minister Mr Campbell Campbell

who must about for some days after the last time he visited the Lunes. 2nd as to the attack causing immunity against other attacks, I have not been able to discover that it does not, but such an authority as M. Bretonneau mentions that for a period of thirty years he had never seen an instance of this fever occurring twice in the same individual.
Chomel says in his Leçons de clinique medicale P. 333.
"We have already said that typhoid fever in ordinary cases only once expels the same individual. This appears from all the facts hitherto recorded. From the time when Physicians began to make special and consecutive researches on this disease, no authentic instance to the contrary has been observed
observed

although the number of cases of typhoid fever yearly admitted is so considerable that examples of recurrence must have been met with and the disease be susceptible of occurring more than once in the same subject, although when we interrogate our patients we have always taken care to draw their attention particularly to this point, they have never answered in a manner to lead us to believe that they had already had the disorder, and after all we have come opposite facts now and then found in a disease of such great frequency a few exceptions would have nothing extraordinary in them and would not destroy the kind of law which has just been enunciated, for could not result from, and

and

measles which ordinarily attack the same person but once, have sometimes, especially in great epidemics of these diseases; it would not therefore be ~~astonishing~~ astonishing if examples of the same kind would now and then be met with in the case of Typhoid Fever"

Louis (Recherches sur les Maladies connu sous les noms du fievre Typhoide) cites from Gendron de l'Eure remarkable in the case of the town of Cemmont which was twice stricken ~~with~~ by an epidemic of this fever in eight years, in which all those struck with the fever in the first epidemic escaped in the second.

Budd states that for seven years he made careful inquiries as to the point in question, in all cases

that came under his notice, and during the whole of that period, although his range of Observation included two epidemics in addition to his usual practice which is very extensive, he only met with three subjects in whom there was reason to believe that the disease had ever occurred before; and also he was continually meeting with persons who had had [illegible] once, and altho' during these epidemics they were always exposed in the most intense degree to the specific poison yet remained safe, although when ~~they~~ he discovered ~~they~~ those who had once had it he made inquiries of them still in not one instance did any of them take a second attack.

The three cases he mentions mentions

as having been stricken twice is still no argument against the contagion of typhoid fever, because even in small pox, a disease no one denies the contagiousness of, a few may take a second attack, Louis XV of France for instance died of a second attack of small pox, and I remember while practicing as an assistant in a colliery district at a time when an epidemic of small pox was raging, I had several cases in individuals who had suffered from small pox in their childhood, and one particularly in a man who was pretty evenly pockmarked previous to his second attack.

The occurrence of exceptions in the case of small pox is therefore I think the best proof that the

occurance of similar exceptions in the case of Typhoid fever does not in any way annul the law which fixes the course of both.

As a further proof of the contagion of this fever we have only still further to prove the analogy in its causes and in the course of the other exanthemata, taking small pox upon as an example "as being the most typical of the exanthemata" all I believe all the emanations from the sick body to be more or less contagious still for the very essence of its virulency we must look into the secretions and debris cast out from the bowels; all these who have studied the subject must have seen that when any specific diseases

have been employed for preventing the discharges thrown out by the bowels from contaminating the soil and atmosphere of the inhabited space, that the disease did not as a rule spread, but when these means were not employed, altho the patient was kept in the largest and best ventilated sick rooms, still even this was of no avail in stopping the spread of the disease, the means by which I allude are disinfectants of all kinds, anything indeed to destroy the germs in the first place, and thus prompt and complete conveyance to a safe distance, in the shortest

Should these two requisites in the proper treatment of typhoid fever not be attended to, there is a series of cases such as I draw your attention to at the beginning of the

keeping of this article will be the inevitable, on the other hand should a case occur in the hands of one in a middle of fair practice in large towns, where water closets and covered drains are employed for carrying off the discharges, and where the destruction of the virus is secured by the employment of proper disinfectants, the spread of the disease I believe is the exception, both diseases are known sometimes absent, but in the one case the alvine discharges are at once carried away from the house in which the patient lies, while in the other case discharges accumulate and accumulate day after day upon the very soil on which the dwelling place stands, may often as in the case of

some of my patients live, be within a few yards only of the door and there they are allowed to exhale their poisonous elements into the very air breathed by the inmates, or perhaps what is still worse, are allowed to percolate through the soil into their wells, which are by the way, are generally placed too near the doors of the poor cottagers once into the wells it is not long before their supply of drinking water is poisoned. The contrast between these two cases in point is almost decisive of the question, as to whether the disease is infect-ious or not.

The power of the properly used means in preventing, in almost every case, the spread of the disease, while in the absence of these means, one case of the tendency

leading to an epidemic of more or greater dimensions proves conclusively I think, that while the fever is contagious, the contagious form by which it is principally propagated is contained in the specific discharges from the bowell.

Some writers who go against the theory of the contagion of typhoid do so because they state that its communication depends upon some special condition, but as this may be said of all contagious diseases I do not consider it an argument at all; amongst these objectors we find many whose practice lies with the better class patients of large towns, where every possible means are employed to destroy the specific principle of the fever and where of course the stools almost

almost as soon as they are passed
are sent well disinfected down
the W.C., and cannot for any-
be known that the specific agents
by which all contagious fevers
are propagated, are cast off in
a natural form from the
infected body of the patient, since
being eliminated from one surface
some from another, the characteristic
excreta in each disease being in
the same disease the channel
by which the morbid poison is
carried; in this fever although
it is probable that all the ejecta
are more or less contagious, still
it is with the intestinal excreta
we have more particularly to do,
seeing that they are the most
characteristic. These discharges
undoubtedly contain the specific
the specific agent which constitutes
the

the fever poison.

Even epidemics of Typhoid Fever are not so common in large towns and cities as in badly drained villages and country places, the reason for this being obvious, the poisoned excreta in the one hand being carried away quickly from off, while in the other particularly in dry weather it is allowed to lie generating its specific poison all round.

Louis divides the changes seen in the bowels at Post Mortem Examinations into three classes, in accordance with the more or less specific relation they bear to the disease

1st

In this class he includes all morbid alterations which are distinguished by being always present

present in this disease and never
seen in any other
2nd
In this class he includes all
alterations which altho' not always
to be found in this fever are
nevertheless very frequent concomit-
-ants with the other changes, and
occur but rarely in other diseases
3
In this class he includes all the
morbid appearances which are
seen as often in other diseases
as they are in this one and
therefore not so important.
Louis shows that the diseased
intestine fulfills the two conditions
which form the first class:
without the diseased intestine the
dead body of a man who died
from an attack of Typhoid fever
differs almost in no way from
the

the dead body of a man who died from an attack of any other specific fever, but have the intestines, and take away the body and we can at once distinguish by certain marks on it, that typhoid fever was the cause of the man's death; these marks on the diseased intestines are therefore as much the specific characters of the fever as the pustules on the skin are the specific characters of small pox. When we trace the morbid changes through their earlier phases we are enabled to recognise their true character, because should death occur at a later period these changes assume a very different appearance.

Chomel who has examined the

the intestines of some who have died before the 9th day, says, that in the first stage a certain number of Peyers patches, and of the isolated follicles, as the case may be have a assumed a greater degree of thickness, and stand out in relief on the internal surface of the gut, in the site of these patches, the intestine feels as if a solid elastic substance were placed between its coats, if we cut through a patch in this state its substance is seen to be occupied by a yellowish white cheesy looking matter, of brittle consistence and about 1/10 of an inch in thickness, and showing a smooth surface when cut through by a knife. This yellowish matter is the peculiar Typhoid matter whose presence is typical of the disease, and whose formation and elimination constitute

constitute the very essence of the intestinal process. If death has occurred as early as the 7th day, the mucous membrane covering these patches, as well as that which intervenes between them, is sometimes quite natural in appearance, as regards colour, thickness, and consistency, this of course proving that the disease began in the structure ~~[illegible]~~ subjacent to the mucous membrane, and that the disease is produced by causes which proceed from a specific agent working from within. To still further prove that this disease is an exanthemata of the Glan bowell as small pox is an exanthemata of the skin, we have only to take into consideration the fact that the morbid process occupies that part of the economy which is a continuation

of

the skin itself, and that the morbid changes of which it consists are scattered over this surface with healthy tissue intervening between the diseased parts, and these morbid changes consist in the formation of a specific result, the development, growth, and shedding of which constitute the disease, just as in small pox, and the discharges resulting from this shedding are the specific products capable of transmitting the disease to others as in other exanthemata. These products constitute the yellow Typhoid matter itself; this yellow matter principally consisting of well defined nucleated cells, differing in shape and stage of development.

Rokitansky believes that this yellow matter constitutes the actual materies morbi of this disease itself

study, and states that then pneumonia occurs as a complication of typhoid the same. Yellow matter is deposited in the parenchyma of bronchial glands of the lung.

To conceive the extent of this disease we must first take into account the amount of discharge from the bowel, and the length of time it lasts; Now Louis states that about 15 days in mild cases and 26 days in severe ones is the average time the alvine fluid flows, and although in a few cases he may have the diarrhoea either very slight, or altogether absent this does not materially interfere with the fact pretty correct average stated by Louis; according to the report of the Registrar General we have an average of 100,000 cases yearly, that is very near one 1000 daily.

100,000 diseased bowels annually throwing on the soil, and into the drains their whole discharges, which contain the most specific of all the specific agents which propagate the diseases; no wonder then when the poor does occur in badly drained districts we have such dreadful epidemics occurring, when we take into account the small particle of the poison which will reproduce itself in the body of a healthy person, and so extend the fever; should the wells be near by when the drains pass that convey the discharges in their current of course percolation of a certain amount of the specific yellow matter will be the inevitable, and as positively as minute a particle of this matter thrown off by the diseased intestinal follicles

will

will produce the fever in another, as an equivalent atom of vaccine lymph or inoculated virus will produce small pox, hence the spread of the disease in infected districts is not to be considered at but to be looked for, so long as proper measures are not employed for the destruction of the specific germs.

We may now consider the seasons and places most likely to facilitate aid in the development of the fever.

Autumn is the season which above all others is the most favourable for its spread although we may have it in any season.

Places most likely to be infected are I think large towns and cities, because the villages and hamlets, no matter how badly their sanitary measures are looked

Isolated often may be exempt from Typhoid fever for long periods whereas in towns, altho' drainage may be most perfect it is always lurking about, more or less, ready at any favourable moment to break out with the greatest virulency; Of course the more well this fever ~~spread~~ spread the worse the sanitary condition of any locality in which an outbreak occurs, because if the means are not employed to prevent the alvine discharges from impregnating the soil and atmosphere ~~are~~ a rapid spread of the disease must be looked for, and vice versa. The disease spreads most completely through a few circle of families who use a common privy and do not employ disinfectants to destroy the virus, and spreads. And where each family has its own water closet and also

the use disinfectants.

In towns, where there is a good system of sewers, you will find the disease breaking out over wide spread districts, while in small villages and hamlets the cases will, as a rule, cluster round the place where it breaks out, in consequence of the discharges accumulating at a few spots. In the country, during an outbreak the contagious nature of the fever is obvious, but in towns, where in many cases the fever will arise from poisoned emanations evolved by drains or sewers conveying the alvine discharges of some one suffering from the fever and living perhaps at some considerable distance in a case of this kind it might be difficult to trace the cause, and blame the sewerage forgetting altogether

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the throp this the presence of the fever germs.

It would be of very use to separate the diseased from the uninfected unless means be employed to separate the discharges also, & unless we keep the healthy far distant, from the discharges of the infected, when this is not done effectually results ensue; should for instance an outbreak occur in a crowded Barracks, Poor house, or school house, where only one common privy is used, and should the discharges of the infected be thrown into the common privy, in use every day by all, it would be almost impossible for the disease not to spread, because these very discharges contain the most virulent agent of the specific poison which is the cause of the fever.

Regarding the contagiousness of Typhoid fever Alexis Clutes &c.

In the appendix to the fourth report of the poor law commissioners it is stated by Drs Arnott, Kaye and Southwood Smith that the malaria arising from putrefying animal and vegetable matter produces typhoid fever & now although we cannot help approving of the practical inferences which they draw from this; because I have no doubt that vitiated air acting as all other causes do which weaken the constitution favours the diffusion of the fever poison, still I cannot back up their opinion, as I do not believe that this cause is adequate of itself to produce a contagious fever.

As a further proof of the contagiousness of this fever it may be well to discuss shortly the nature of the relation which connects typhoid fever with

with defective drainage.
If we accept the theory that the intestinal discharges constitute the principle material by which by which the disease is propagated then we have the key to the relation existing between typhoid and defective drainage. It is a well known fact that sewers often contain the specific agent which causes the fever, but how they should do so is often a matter of great difficulty to determine unless it be that they form the receptacle for the alvine discharges of some one suffering from typhoid at our unknown place and distance: Many outbreaks of typhoid have occured from wells having become tainted with sewage this being due to the bursting of some common sewer in the vicinity of the well, in a case of this kind

kind everything of course depends on the nature of the communication between the drain or cesspool and the well, if the communication be large and direct the more rapidly will the outbreak spread whereas on the other hand if the matters have to percolate through a considerable distance of soil some time must elapse after its discharge before it can again reach the habitations of others: much also will depend upon the matter, should the matter be very dry a part of the time the alvine discharges are thrown into the cesspool they may lodge there some time, but on a sudden heavy fall of rain, or a complete thaw ~~[illegible]~~ coming on, the outbreak may be quite [illegible] apace: the same thing may happen

happen on suddenly emptying a well, which of course would cause a sudden inflow from the surrounding tainted soil, and so hasten its contamination.

Regarding the spread of this fever I may again be allowed to bring up as an illustration the cases which occurred in Gills in this parish.

Typhoid fever having broken out in the house of Alexander Begg by direct contagion from a house two miles off; the discharges of the patients in Begg's were thrown on the dung heap at the end of their house, and this heap communicated to a greater or less extent with a deep surface drain which acted as the common sewer for the whole of the valley of Gills, this drain carrying with it a considerable quantity

Quantity
of the poisonous sewage from
Biggs, on its way to the sea,
into which it ultimately flowed,
passed close to several houses and
two surface wells; the greater
portion of the inhabitants of the
houses in the valley (10 in number)
were struck down one after another
indeed out of the 10 houses not one
wholly escaped; from this we see
it was down the stream the seeds
of the fever flowed, and the curious
thing was that not a single house
<u>above</u> Biggs was stricken, altho' the
nearest is not more than three
hundred yards off. Consequently
we see that higher up the
drain contained sewage alone
lower down sewage plus the
specific discharges of those suffering
from typhoid fever; from this
we must surely conclude that
sewage

sewage not impregnated with the poison is perfectly harmless although when so charged it is a powerful vehicle for spreading the disease, and that so long as the drain conveyed sewage only, it had been powerless as a developer of Typhoid fever, but no sooner had it become charged with the specific agent than a considerable number of those under its influence were attacked by the fever.

From all this we see that the specific agent which causes Typhoid fever, has two separate modes of existence, one within the living body which is the place of its development, and the other outside of the body the place of its preservation.

Dr Murchison stated in a clinical lecture published in the British Medical Journal of

of the 16th March 1867 on the
eliminative treatment of Typhoid
fever,' ~~[illegible]~~ the advocates of the
eliminative plan of treatment
found their views on the assumption
that the specific poison which
gives rise to Typhoid fever is
contained in the excretions,
altho' Dr Murchison maintains that
there is no proof whatever that fresh
stools passed by a fever patient
are in anyway deleterious, ~~and~~
~~altho' it is probable that it is [illegible]~~
~~Yet altho' this is true~~ yet I think there is still
not the slightest doubt, that they
become so after they have undergone
decomposition. Dr Murchison
comes to this conclusion from the fact
that out of the 3862 cases treated
in the London fever Hospital for
the last five years, and of which
there were 1709 cases of
enteric

entire fever and all of which were indiscriminately interspersed together, that yet not one of the patients in these fever wards contracted typhoid fever. Night stools common to all beds were placed between the beds and used indiscriminately, the pans being emptied only once daily and no means taken for disinfecting the stools. The attendants in these wards enjoyed a like immunity.

Although I cannot believe that the discharges from the intestines of those suffering from typhoid fever as are not deleterious, yet very many, I think, know that when first voided they are more or less harmless in places where strict cleanliness is adhered to, yet from what has been said in this article, we cannot but believe that the fever is almost wholly propagated by them, since

if

It must be that although these dis-charges contain the germs which cause the disease the regenerative germ are a development of the infection power. We know the same phenomena occurring in Typhoid fever that we know in small pox (viz) that contagious specific agent which leaves the body in the impregnated discharges is the result of its own reproduction within the infected body, and all that the specific agent requires for the propagation of the disease is that it shall retain the reproductive powers of which it is itself the offspring; of course that the reproductive powers are never lost after being acted upon by the atmosphere and other external influences no one would attempt to deny. Vaccination has proved

proved that the contagious atom necessary to propagate a contagious disease may be exceedingly minute so much so that the patient may not know when he is infected. A draught of water precipitately differing in no way from other water, may be the cause, or by merely inhaling the effluvia rising from a common sewer, when the sewerage has been poisoned by the specific agent; and altho the poison is [struck out] impalpable on entering the body, a topical opposite occurs when it leaves it.

When voided although some of the poison may be in a state of fine subdivision, yet the greater quantity occurs in the shape of pellets of the yellow matter of Typhoid, and this being the case

it follows that before the Typhoid poison can exist in its fullest contagious extent, it must be liberated in some way or other, and this is most probably done by decomposition, because it must be freed from the net work which keeps it together in the yellow pellets, and reduced to atoms, as it is in this state we receive it from the surrounding media; from this we can understand that the dry air we breathe may act as the channel for this infection, and probably is the chief vehicle for the dissemination of the fever.

When an epidemic of Typhoid occurs from the use of water impregnated with the poison, the results as a rule, are more deadly, infection from the air however; although it acts much more slowly

closely does so in a milder sense and probably affect a greater number of people; of course the longer the above discharges remain external to the body the more effective they become in spreading the germ. I do not however believe that fermentation has any power in developing any new property in the specific agent, still it must act as a great disintegrator of the organic matter which holds which holds the poison germs together and the gases resulting from the fermentation may by their more free diffusion in carrying with [illegible] themselves, and so assist in a very great measure in spreading them.

It is also possible that the action of the oxygen in the air may assist in developing the contagious element, giving that unknown multiplicity

multiply much more rapidly in pure oxygen than in air, oxygen being a quickener of all vital force.

The length of time the typhoid germs may remain as germs is not absolutely known, but as the germs of certain infections and of many of the contagious diseases have been known under favourable circumstances to keep their vital force a long time there is no reason why the same should not be said of typhoid fever. The clothes of one infected by scarlatina after locked up for years have been known to infect others; and vaccine lymph kept in the dry state or even wet state if kept in tubes hermetically sealed, keep for a long time; the same may be said of typhus fever; indeed

I am attending two patients suffering from it just now, and the only way the outbreak can be accounted for is, the house they live in is a public Inn, in which three years ago, a large Ship, (many of the crew of which were at the time suffering from typhus fever) has [illegible] close by, the fever stricken sailors were lodged and attended ~~in this Inn~~ and at that time many of the proper inmates of the house took it also, and suffered severely, but from then until now no new outbreak occurred, and the cause of the present outbreak was clearly traced to the bringing out of some old bedding which had been laid away at the time, and never again used until now, with the result as stated.

Typhoid fever may be conveyed by many vehicles, such as by the hands of nurses, soiled linen and bedclothes, milk cans and other vessels which have become impregnated with the Typhoid germ; any ~~[illegible]~~ individual having their clothes or person vitiated by the specific excreta of any one suffering from the disease, as a dressmaker for instance, nursing a child, "labouring under an attack of Typhoid," and at the same time making up dresses for others: pawnbrokers are very liable to catch this disease, from bundles of poisoned clothes passing through their hands, the same may be said of dealers in dust ~~and~~ in the cast off clothing of others without knowing of [illegible]

History.

The period at which Typhoid fever becomes contagious, and the period at which it ceases to be so are both questions of considerable import in the investigation of this disease. I think that the contagion begins many days from the moment attention is directed to it, and as this period occasionally begins before the patient takes to bed, and in mild cases may exist without the patient going to bed at all, we can readily conceive the important influence this fact has on the spread and outbreak of the fever, when circumstances, many of them belonging to the itinerant vagabond class, such as tinkers, Gipsies, hawkers &c would happen to be attacked by an attack of this fever.

The precise period at which the patient ceases to be infectious to others cannot be very well defined cases having been known where fever has broken out in a locality formerly free from it, on the arrival of a convalescent whether this is due however to tainted clothing or certain specific exuvia given off by the convalescent is not easily determined, to render a ~~[illegible]~~ convalescent comparatively harmless however it is as well to demand an outfit of new clothing, and the necessity of disinfecting the night stool thoroughly.

Having got so far we may now take into consideration the Pythogenic theory of typhoid fever; all that has been written in this article goes to show that the
power

power possessed by the contents of common sewers of all kinds to propagate the disease is due, not to self development of the specific agent but to their frequent impregnation with the poison: in towns for instance where typhoid fever is being constantly traced to self development in sewers account is not taken of the fact that the fever is constantly present in their midst to a greater or less extent, and that consequently ~~that~~ these key sewers are never wholly free from the poison; ~~[illegible]~~ on the other hand villages or districts far distant from large towns, "in one of which I at present practice," (Inlow & Knott-Kenny) are seldome bothered by an outbreak of typhoid, altho' the conditions to which the origin of

of the fever is asserted by many
many centuries in full swing for
years without a single case occurring.
take the outbreak in Gillo in this
parish before cited, for example,
where Typhoid had not been for
years previous to the recent
outbreak, and instances of this
kind I have no doubt occur in
the practices of all country Physicians
especially, and between that attack
long intervals may elapse in
villages between the outbreaks of
Typhoid the fever producing
power is in no wise lost. We have
only to take into consideration the
fact that when outbreaks do
occur they are usually far
worse, that similar outbreaks in
in large and well drained towns,
the cause of this being due to the
want of the very drainage in the
villages

villages which is looked upon by so many as the cause of the fever. If the sewage were the sole developer of the specific germ, the country districts and villages would never be free from it because as a rule villages are badly, if at all drained, and have the supposed pythogenic sewage always present in rich abundance, and altho' this is the case we have these long intervals occurring between such attacks outbreaks, but when the outbreak does occur it is of a very virulent type, simply because the drainage is so highly defective, and it is this last fact that clearly explains the reason so often discussed, why outbreaks in rural districts are always so much more virulent than outbreaks in towns, for as soon as the seed is once

some

sooner the soil is the most prolific of all for its development. This may be further explained by the fact of the fever spreading by the alvine discharges, and the poison is no sooner passed, than as a rule it is swept away, or otherwise dealt with, which prevents it affecting at least those who attend the patients. While in country places the converse is the case, the discharges being thrown on the common dung heap and allowed to accumulate day after day, and from the dung heap allowed to spread round the infected house, from around the infected house, into the nearest drain, which in all probability may act as the common sewer, to a considerable number of families, the spread of the disease in a case of this kind being

bring the inundation, because this sewage has been at home in its most virulent form.

As another illustration of the fallaciousness of the Pythagorean theory, we may take into account the state of the river Clyde during the dog summer months, when at last the Clyde for miles below and at Glasgow is simply a common sewer of vast dimensions, while during June, July, and August, it contains its sewage in an appallingly concentrated state, so much so indeed that the noses of those normally supplied with olfactory nerves, and who are obliged to sail up and down the river, are sorely tryed, whereat the think caused by the decomposing sewage is simply abhorrent unbearable, but while these Pythagoreans

these pythogenic compounds are poisoning the surrounding atmosphere with a fever poison of, no one knows how many thousand poisons, as far as I can learn Typhoid fever is no worse than at any other season. If this pythogenic theory is correct I cannot see how the believers in it can reconcile the fact of the prolonged absence of the fever in localities where pythogenic compounds are exceedingly rife with their own theory.

The specific poison which propagates contagious diseases never die wholly out from amongst us, and altho' always existing somewhere, & it is only season and other conditions, permitting that an outbreak occurs, consequently the action of these germs

Annual

animal poisons hybernate as it were for a while, to deny that they do not exist would be highly illogical, the very same may be said of small pox measles, cholera &c, in the outbreaks of which we constantly see alternations of quiescence and activity, may have them attacking wide spread districts in certain localities, whilst in other localities quite close by entire immunity occurs, and may then prevail in the hitherto free localities just as the poison dies in the first attacked; it is only by taking a universal survey of this kind that we can always point to the one thing being present (viz) the specific poison agent, the origin of which cannot be found in the soil or in the air or be developed by certain seasons

reasons (per se) by which it is capable of being transmitted from one place to another, and which multiplies as it proceeds, and from certain unknown causes becomes again dormant in its action, ready however to be again brought into activity on the first favourable circumstances arising.

Typhoid is believed by the public generally to be so closely connected with defective sewerage, that many people scientific as well as illiterate consider it is the mother of of the specific agent, so far a length has this prejudice gone that the infatuated have lost sight of altogether of the fact that it is to the fatal influence of this disease that sewers have become a perfect terror, as it were

were, and not to the sewage they contain, which I conceive I have proved has no power to develope the disease but merely to disseminate it, from its opening a wider area to the specific poison.

The virus from the diseased cow long as it remains in the liquid state is easily destroyed however, by the free use of the proper means such as disinfectants of all kinds, much of it is also rendered inert by free dilution as by floods, which not only help to render the virus inert, but likewise carry it far away from human habitations, (hence in every community good drainage should be strictly enforced by the proper authorities,) from these causes a great-

a great part of the virus is destroyed before it can take effect, and were it not for this, the effects of the disease would probably be ample extermination of the greater part of the population of Great Britain however the germs of this disease as the germs of other contagious diseases obey the same law (viz) that for one that takes effect billions perish.

In conclusion I consider that from all that has been written in this article, the contagious nature of Typhoid cannot be doubted

A Mitchell
MB & CM

West Canisbay House
Canisbay, Caithness
6th March 1876.