Typhoid Fever

The elements of causation of every infective disease are to be traced, first, to the constitutional predisposition of the infected individual, and secondly, to the influence of the specific material in which the infective power is considered ultimately to reside. The first element is, what De Musset describes as "les conditions de réceptivité de l'organisme, c'est-à-dire les circonstances qui favorisent l'action de l'agent spécifique." And it may now be regarded as demonstrated that the specific material of the second element are micro-organisms, and that these micro-organisms give the character to the particular disease. The very nature of these two elements renders it unnecessary that our knowledge concerning the first, being a condition, should be vague and imperfect, while that of the second, being a living substance, should be more distinct and perfect.

What the first element really consists of, it is not yet possible to say. Two theories have been advanced in order to explain it. The one, associated with Pasteur's name, is the so-called Exhaustion Theory. According to it a certain substance must be in the fluid of tissues before the organisms can grow and multiply. When
this substance is wanting. The organisms cannot begin to flourish, nor can there be any resulting disease, and when the system becomes exhausted of this substance all organisms die, and the disease is at an end. The other theory, adopted by Klein, is the so-called Antitoxin Theory. According to it, the organisms growing and multiplying in the body produce, directly or indirectly, some substance which acts as a sort of poison against a second invasion of the same organism. This substance may be developed by a single attack, or protective for the whole of the rest of the life of the individual, or even be transmitted by generations following, or it may be transitory and protective for a very short time only, or, still further, it may take generations to develop it as seems to be the case with enterococci. On the one hand the excellent scientific experiments made by Pasteur in connection with Spleenic Fever and Chicken Cholera have shown that the chemical substance can be destroyed by an attenuated virus. On the other hand the poisonous substance in the form of arsenic or arsenic in the system in order to prevent
The growth of the material frame. If we accept Pasteur's theory then we must admit that often the same body carries in it many substances for the growth of the various organisms mentioned. For each particular organism requires each of its particular substance and also that the law is not universal seeing that some diseases flow always in the same blood vessel of others not at all. Dr. Colles objects to this doctrine first, "that we cannot explain the natural immunity which is so clearly allied to the acquired by such a vessel." The answer to this is that there is no reason why the absence of the alleged substance in Pasteur's blood should not be a hereditary characteristic. Secondly, Colles says, "we cannot suppose that those who are naturally indisposed to these diseases have blood which is defective in particular chemical principles." But we might well suppose that the blood is often imbued with superfluous or even injurious chemical principles in the healing of wounds of most modern cuts healing takes place by first or second intention, according to the strength..."
of the person's constitution who has been rebound. It is also well known that the liability to many of these diseases is greatly increased by a weak state of health at the time of infection. But Blundell Coates adds that "the organisms may be cultivated out of the body in the very blood in which they would not grow while it was in the living body." But this objection is as applicable to the second theory as the first; and Coates adopts the second theory. If Pasteur's theory be the correct one, the change may be something akin to what Nature does in the ordinary fermentation of yeast. Still it must not be overlooked that in the one case it is a living body and in the other it is inanimate matter. Nor must it be forgotten that the problem is solved by finding that the tubercle in which all these organisms can grow and multiply. No one would think that the disease produced in a living body is exactly the process as the cultivation of the micro-organism in broth made from meat, hydrocele fluid, agar-agar, or on a slice of a boiled potato. If a poison is produced in the body, as their holds, it may
epidemic influenza, pneumonia, and other fevers. These diseases are essentially diseases of cattle, while scarlet fever, typhoid fever, diphtheria, cholera, and other diseases are peculiar to the human race. But
not only is this the case with beings so widely different—such as man and the lower animals, where it might be thought that their different modes of life would be sufficient to account for it—but some animals of the same species do not possess the property of resisting the same kind of micro-organisms with others in it.

Pasteur has shown that the replicating of mice through highly inoculable in the ordinary house mouse is not at all inoculable in the nearly albino field mouse. Chauvenet has also shown that while ordinary sheep are easily affected by the bacillus anthrax, some of those from Algeria are not very susceptible. In the case of man, Coôte gives a good illustration of this. He says that a troop of Espaniard and visited Berlin in some were inoculated with ordinary vaccine lymph immediately afterwards. Three died of an acute fever. Shortly afterwards the remainder were vaccinated in Paris, and
They all insisted on what the PARISIAN physicians called severe small-pox. Vaccination amongst Europeans is never followed by such violent symptoms. Further it is the matter of every day experience that individuals in the same family are not all alike possessed by the same predispositions to these diseases. Finally the liability to the several diseases of the different periods of life proves the same thing. In the second place it has been directly proved by various experimentaliasts as Jenner, Klein, Passlow and Koch that protection from the violent and deadly forms of disease can be got by inoculation of innocuous micro-organisms or bacilli. Nothing would seem to prove more conclusively that this element exists. Than the ordinary vaccination of the cow-pox in man with the view of protecting from small-pox. For all the vaccination when properly done either prevents altogether an attack of small-pox when a person is exposed to the contagion, or what is stranger still modifies the character of the disease where it has not given complete immunity. Proceeding upon
This principle Pasteur and Klein have advanced a step further, and obtained for the lower animals a protection from some contagious diseases that infect them. Thus by successive cultivations of the bacilli of the disease plague and another they have been able to obtain innocuous bacilli and by inoculating with them they can prevent the virulent types of the diseases. Indeed in the case of anthrax Klein has shown that as regards virulence the bacilli differ in the different species of animals and in them even acquire different qualities. Pasteur has arrived at similar conclusions concerning chicken cholera. Koch has also shown that the softening of mice can be communicated to birds in the form of an inflammation of the skin, in which the particular bacilli grow by the inoculation of the blood of infected mice, and when the animal declines it will not take on any further inoculation. All these facts go to prove that this element of predilection exists. There is reason to believe that this mode of protection against deadly diseases,
by inoculation of harmless poxvirus will be developed in yet unknown thousands of regions, and as yet such merit a great share of the attention of preventive medicine for future man if it has hitherto to do.

The last proof that may be adduced in favour of the existence of this element of predisposition is the fact that many of these specific diseases attack individuals only once in a lifetime. The reason for this must be: if the second element is applied to the same individual in exactly similar conditions in the one case in which he takes the disease in the other he does not, there must be something wanting or something added in the second case which does not in the first. That something is the element of causation which we have been trying to prove existing. Hooping cough, measles, scarletina, smallpox may be mentioned as instances of such diseases.

Now if we apply these three tests in proof of the existence of this element in each disease which is the subject of inquiry...
paper, namely enteric fever, we will find that they are all to be found with it known to be a disease that occurs only once in a lifetime as a rule. It does not only infects man, but the lower animals, but the fact that the lower animals cannot be inoculated with its poison has greatly retarded the progress of study. And further, nature seems to provide a sort of natural protection against it. As is well known that people who have lived long in an infected district, drinking the infected water or breathing the infected air, are not so liable to take the fever as new-comers to the infected district are. As a corroboration of this fact # in the report of the Lambeth Sanitary commission on thetyphoid epidemic in Paris, the writer says that the fact is that Paris has become such a centre for typhoid fever that the bulk of its inhabitants are great exponents inoculated by its germs, otherwise the consequences of bad hygiene would be much more serious. Again W. Brouardel stated in his address to the
Academy of Medicine, that "we can acclimate ourselves to the influence of typhoid fever. We can suffer from some slight form of this malady which passes unnoticed, or by daily successive absorption of the unmarked ferment, that may be completed to preventive inoculations acquire in either case immunity, or at least relative though absolute immunity comes the law. Hence it is that foreigners rather than Parisians supply the greater proportion of victims to these epidemics of typhoid fever." It may be inferred that in typhoid fever sickness like diseases the relative position is an established fact, but that it is true what W.L. Cruickshank has remarked that a contagium is a given disease and as small-pox or measles has no more power to influence the uninfected body than yeast has to ferment alcohol or to turn pure water into beer. As a further confirmation of the above fact it may be mentioned that out of 100 patients, notes of which cases I possess, I could find only 3 that had second attacks, and on the other hand 33 were strangers to the
district in which they caught the fever.

Though it should not readily be granted that predisposition forms a necessary element in the causation of typhoid fever. The same unanimity of opinion does not prevail regarding the other element of causation. For some hold that the outward agent in this fever is specific, and others hold that it is not. At the head of each of these two schools stand prominently forward the names of Wm. Budd and Murchison.

Murchison's views may be given first as they are older than those of Budd. He held that no exciting cause of typhoid may be produced from the ordinary alimentary depictions of any human being under certain conditions. That is to say, that the cause is to be traced not to the particular person but to the results of the process. All sewage is prone to decomposition, and the products of decomposition are always accompanied by the formation of gases. In fact, it is the connecting link between living, animate, and inert matter. It is nature's way of breaking up the more
complex organic compounds into the less complex inorganic compounds. But it is not natural for these simpler compounds to again be directly taken up for use by living beings. The vegetable world interferes for that purpose. Accordingly, all or most of these gases produced by the decomposition of sewage are known when inhaled to have an injurious effect upon the human body, and the amount of injury caused in direct proportion to the kind of gas inhaled. Thus the gases formed at the commencement of the decomposing process are the least harmful, while those at the end are most harmful, if they are confined and heated under pressure a gas is generated which is capable according to Bouchardet's producing a fever that always has as definite symptoms as any specific fever, and leaves a residue of indigestion. If these alveine defecations are the stools of an entire patient near the process of gas, that is developed will cause the fever to be produced much more readily than from healthy stools.
but the reason is that not because the
lymphoid cells contain any specific ele-
ment, but owing to their being alkaline
instead of being acid or alkaline.
Stools always the very decompose
or ferment much more quickly &
easily than ordinary sewage does. He
admits that enteric fever is in some way
communicable from the sick to the well.
As it is now pretty universally admitted,
but this is the way in which it
is communicable because the alkaline
stools are so prone to decompose. He
says that when an individual is attacked,
and then cases follows in succession
in the same house or district, there
is no proof that the spread of the disease
is caused by contagion. What gave me
luck in the first instance was just the
likelihood to have given rise to in all the
other cases. On the other hand he
shows that very rarely is the fever
communicated to workers or other de-
pendants upon the sick. When it is com-
municated it will nearly always be found
to have depended on the insanitary condi-
tions of the hospital such as bad usages.
It may be mentioned here in connection with the present remarks of Murchison that some time ago three of our nurses in the Repulse Hospital (two of the three were nursing in the fever ward) were at different times attacked by typhoid fever. Afterward the cause of this was clearly traced to the clothing or urine (now the hospital drains). Apart altogether when it is asserted that persons labouring under enteric fever occasionally transport it into healthy regions where it was before unknown, but where it then spreads on from a common centre, that the number of secondary cases here the disease is introduced into a new locality without spreading far. It should be noted in which it is not related to the essential fact of Murchison's doctrine is that typhoid fever can arise. It generally does arise in hospital without being transplanting typhoid at all, but it is contagious if it is so to a very limited extent, but is never propagated by a third person. The exciting cause, therefore, of this fever is a poisonous gas which is the product of the decomposition...
pices. The mode in which this poison gas is conveyed into the human body is either it is inhaled into the lungs with the air that is inspired or it is absorbed by water, and the poisonous gas is then devoured or is mixed with milk, thus the poison finds its way into the digestive tract. This is the universally accepted opinion. Cayley adds a third means by dressing for pounded meat. This is quite a possible means.

In illustration of Murchison's views, the following incident may be given. Some years ago typhoid fever broke out in a farm-house situated on the side of a hill not far from Boston. On the upper side of the dwelling-house was the stable at one end and the cow-house at the other, both being continuous with the dwelling-house. Thus forming a part of farm court-yard. The people had lived in this farm for at least three generations. Typhoid fever was unknown to them all that time. The animal manure collected in the court-yard by partition must have for long...
been undermining the dwelling-house. Country people, however, seem to think that the cause of the trouble, whether as comparatively harmless whether allowed to be compound or not. At the time of the publication of the fever there were nine occupants of the house. Of these five took the fever, of four escaped. The father, mother, and two of the sons escaped. The other two were above sixty years old, escaped to die a boy of the house-maid. The question was how did the fever arise. The first explanation given by the county health officer, was that it was carried by a boy from Chatham. The Booksellers family there were all ill at the same time. One of the sons was reading Scotty novels, which were sent to him from the Bookseller's. The second explanation was the day before the woman became ill, he had talked for an hour with a man who had ten miles of been at a funeral of a man who had died of this fever. But the man had after the funeral ride, were performed, one evening he changed his clothing, then next himself took the fever. The third explanation wa...
and it probably was the right one. The done in
1872 took the fever happened to be
in Perth a short time before he took
all. The only curiosity he went up to the
infirmary where he saw some men
working at a drain. It was a cesspool
of the sewage system. He said it was very
strong. Murchison probably would have
considered that the fever here arose
de novo, since that there was no fever
within a radius of ten miles round.
On the other hand Rudd holds that
typhoid fever cannot arise de novo. It is
a fever that always breeds true and
rises in multiple fits. Murchison produces
the theory that typhoid fever is caused by de-
composing sewage gas, from that doctrine
he still not depart. Rudd is just as much
led away with his theory that typhus fever
has a definite specific cause. They al-
ways definite specific characters. The specific
cause of this fever is almost entirely located in the col-
ony and aerinated fluids of the small intestines.
"Famine" says he. "The diseased intestine away
and it becomes impossible in a common
outward country, at least, to distinguish the
body of a case dead of typhoid fever.
from that of a man killed by many wounds
beside its position late away the body, but
leave the intestines, and by the marks
for it death from this cause is at once
distinguished from death from any other
cause. In an infected person those glands
enlarge, develop a yellowish-white dry
matter. This yellow matter is the jaundiced
jaundiced matter, whose presence he says
is as typical of the disease as the color of
a small pea. According to Budd the
jaundiced matter is thrown off in the stools
but it is not the contagious element.
It, however, contains the substance of
the true jaundiced Bacilli, the germ
of the disease. Thus Murchison and
Budd are both agreed as to the central
cause being contained in the aliment the
jaundiced Bacilli. They are also at one in
considering that fresh jaundiced stools are
inocuous, but for very different reasons.
Murchison thinks that fever is pro-
propagated by sewer-gas. The stools
develop in the particular poisonous
by the process Budd on the other
hand sewer is a mere secondary ef-
The real typhoid poison, he says, does not convey
the real typhoid poison into the human body.

"The germs of the disease contained in the
yellow emulsion of the bowels, are
however, what causes the disease, not the
yellow as at all. He does not consider
that the yellow emulsion itself is infectious
but that it requires to be broken up by
decomposition or fermentation to liberate
the characteristic bacilli.

Thus Murchison & C. consider that the
poisons in certain circumstances is contagious
that Murchison holds that this is not the
usual way of spreading it. Indeed he cannot
account for first cases except on
the theory that it normally has an inde-
pendent origin. Budd maintains on the
other hand that this poison is only reproduced in
the human body, and he accounts for first case
in the assumption that these poisons may be
lying latent in quite unlooked for places
where requiring the special conditions to free them.

Budd feels the body "like all other things in nature," he
says, "not inferior to germia cast loose upon the world
a myriad places for our best practices," he continues.

"Of all the two g. simple tapeworms
were by now sunk into tapeworms..."
one single life worm might infect the whole human race. Only a few seeds of a thistle find a soil to grow upon.

Thus every year, 100,000 human intestines are ridded of their immeasurable pain we have nothing to do with how these worms originally came into existence. All we know is that small pox, measles, fever are now bred from preceding cases; to this they trace. These germs may remain dormant for years. Then the fever break out again, as is shown by the recurrence of the fever borealis in the same houses. Budd considers it almost that people can inhale the infectious seeds of Murchison from the air or in a known state of impregnation. Should Murchison be the correct one, then the poison is conveyed by the air or drinking water, but former laws provide it may be spread by the hands, clothing, bedding. This is a summary of these two most important doctrines, it was absolutely necessary to announce them.
for the better understanding of what is one
some opinion of the reason of this process.
Munchausen's theory, though not too scientific to
Budd's has long held its ground, it
probably had it not been for the great
advantage made by science of late years
in the knowledge of the lower forms of
life, would not yet have been supplanted.
There is no reason why a poisonous
gas should not be developed from what
the men or even the poisoned air was
but in this nature, as unfit for
the body's use. Now in there any reason
way under certain conditions this gas
should always be the same gas. Gas
such always produce the same form
among effects upon particular organs.
In the same way by any ascent in
plains the stomach is may the
poison gas aspect the intestinal
flue. But the poison given in
sufficient quantity will poison any
one of the whole human race. Not
do with the poison of typhoid fever.
A small hole may produce a fatal
effect while a large may merely cause a
mild case of typhoid, in other cases
have no effect at all. In the second place, the poisonous gas of decomposition does not always produce the same symptoms. In the same household instances are constantly occurring where one member of the family is affected by simple malaria, another with leishmaniasis, I may be another with typhus, or simple malaria or typhus, while the remainder may be all down with real typical enteric fever. And yet, all these different forms of disease can arise from the same poisonous gas. It stands to reason that some other factor is working in the causation of the disease, even after allowing for the influence of predisposing. And, lastly, a factor or not capable of multiplication in a living body, a chemical compound of some other substances, a certain effect on the body where it is. But I must warn the local typhoid person after a death, not to ascribe more multiply to an alarming extent of fatal.
We are thus forced to the conclusion that there is a real specific element in the causation of enteric fever. As the typhoid bacillus has now been found to be present in most specific element in a real contagious disease, we do not know how to define 'infectious' theory altogether. For we hold that though it is necessary for the production of enteric fever, there must have been something somewhere at some time to cause the specific germs, yet the belief in which these germs are conveyed into the human body is only through the action of specific germs to cause a sort of compatibility which may be made between these two theories. The one is as necessary as the other, both are very important if we look at things from the preventive point of view. It is not so much that the yellow typhoid matter that has to be decomposed in order to render the water itself infective, or that sewage gas is necessary to carry these germs into the human body. We have thus seen that in the
causation of all infective diseases, two elements are necessary—that of predisposition and an outward agent. Thus, we have found to be the case with typhoid fever. But further, this outward agent—in typhoid fever we have seen is composed of two factors—the real specific form of the fever as it entered into the body is of little consequence as we have already seen how this typical typhoid failure first arose. The days however of spontaneous generation are long past as Pasteur has settled that question. We know that the world has been made according to fixed laws rather than forces in it. However, the laws here, are also fixed and neither can be added to nor detracted from. It is no more possible to conceive that a living species can arise now than that modern science may devise to exact compositions. A living body we can expect never to find that division a body might have to live. The species of typhoid fever is there, but it is sufficient that it produce itself to the end of the
yes, and it is consistent we must go a step further. Not only are these micro-organisms of a divided type, but they cannot be developed from any other. It was one line thought that Wilson for Sanderson had demonstrated the fact that non-tubercular bacilli could be grown from infected sputum in the camera or the lung of the body could produce real tuberculous matter in other words, that the tubercle bacilli could be evolved out of matter that did not originally contain. The results of Villeneuve Koubas have conclusively proved in producing what is called artificial tuberculous infections in mice and by infecting the animals subcutaneously with the tuberculous matter derived from human and bovine tuberculosi, it cannot be produced by any other means. That in fact as Haeckel, Gauff, or Huxley, can be produced only by matter derived from a tuberculous source. When has admirably refuted Buckley's statement that either the harmless hay bacilli by successive cultivations can be transformed into the pathogenic bacilli and their...
on one versa. So too he has clearly shown
that latter is wrong in his investigations
concerning the pignicid faucilles, that
and the pignicid of Plaumon has no
relating to each other as causes
affected. The opinions of Francis
that the spores of ordinary mould
permeating the fungus were capable
of assuming parasitic properties
by cultivation at the low temperatures
in alkaline media have been
proved to be incorrect. These
moulds are not ordinary moulds
at all but a distinct species of
aspergillius, the spores of which are
under all conditions of
growth are capable of producing the
normal parasitic properties. Indeed
we may conclude, as Klein says,
that shep definite onion, as dividing
although at a quite fastening and growing
in various substances, at the outside
world, have the power when finding
access into the body, of a suitable animal
for now it serve there also, and to induce
a definite pathological condition.
But this proves they have all virtues.
"More that do not process this flower cannot acquire it by any means whatever, just as there are species of plants which act as poisons to the animal body, and other species of plants which belonging to the same group of family and although very much alike to the others, have no such power. I cannot acquire such a power by any means, as there are micro-organisms which are pathogenic while others are quite harmless. The latter remain as they walk under what conditions for how long they grow. The exact part played by these pathogenic microorganisms in disease is still a moot point. Whether for instance they act directly on the tissues, or seem that all are capable of disintegrating organic combinations containing oxygen and the nourishing material on which they live or not must contain carbon and nitrogen or whether as Klein Ränke in the case with cholera the infectious agent is not the virus itself but is the product of the virus, especially as all these bacteria help to produce certain chemical products. That is a matter which does not
concern us, as it makes little difference which of the two is the case. The bacilli of typhoid fever multiply by thousands and they have been found in the affected parts of the intestine, in the mesenteric glands, and in the spleen. Probably they find their way into the digestive tract and pass on unharmed from there to the lower extremity of the ileum. They have a special affinity for Parts of the lymph follicles, becoming attached to them and set up the inflammatory changes in the same way as the cases of enteric ulcers which we have already dealt with. Coate says that these organisms appear to stand in definite relation to the duration of the disease, being present most abundantly at the beginning of the disease and at its height, before the sloughing of the intestines has occurred and diminishing or disappearing altogether as the disease becomes prolonged. This would seem to be a sufficient answer to Blein's objection that these bacilli cannot be considered as necessary and intimately connected.
with typhoid fever, because they are not constant; especially to be added, when we remember that in cases of typhoid fever that end fatally there constantly occur severe delirium and necrosis of the mucous membrane of the pharynx. Though the jaunty lave disappeared, yet it cannot be doubted that they have done their work or left a virus behind them. The objection is one that might rather be urged against the defective means, which we have not possessed for detecting these germs and watching how they conduct themselves when in the human body.

My much at least must be conceded that the pathology of typhoid fever is intimately bound up with the life history of these typhoid fever microorganisms. Our knowledge, however, concerning them is still very defective, but has been very much hampered by the fact that it has not been found possible to infect lower animals with them. Such facts as have been ascertained are of value. For instance we know that these organisms cannot live at a very high or very low temperature, and that they cannot be killed by some
healthy intestine to which they come. In other words, it is the link to connect the agent with the recipient. Murchison says that it has been argued that many cases of fever are independent of organic infirmities, and he is probably right in asserting that this objection has mainly arisen from allaying continued fever being regarded as one disease. A fever like typhoid which often runs its course without any very marked outward symptoms, with a prolonged incubation period from 20 to 28 days, often with no distinctive rash, no diarrhea, and often with an unstable temperature, the evolution of the disease to various irregularities, may often be mistaken for simple pyrexia, or vice versa. But not only is it likely that organic matter in process of decomposition forms the medium of conveyance of the germs into the human body, but it seems to be the only possible means. These typhoid germs might lie dormant for years under cause any harm to the human body, were it not for the presence of the fever. Indeed were it not for the case, were it possible that these germs
could be blown about and light on some water or on fecal matters as these pass from the human body, and without any decomposition being necessary, no one of the least thoughtful precautions would escape from the possible danger of fever infection by any amount of attention to hygienic measures, and that most scientific of doctrines would become the most unscientific of all. This, however, is not the way of working. Disease is not natural to life, but diseases laws are observed disease can be avoided.

We must next in order take up this second factor in the second element, the medium. The most important one is from a sanitary point of view. There are various ways in which the medium may be formed. The first way in which the gas is formed is in sewers and drains. Douglas Calbon says that yellow fever is traceable to noxious air which arises from the putrefying substances in sewers, and that the chief object of a perfect system of house drainage are in the immediate complete removal from the house of all foul and offensive matter. Directly it is produced.
prevention of any back current of foul air into the house through the pipes or drains which are used for removing the foul matter. Sewerage seems to acquire deleterious properties at least in drains by being pent up. It is therefore necessary to organise or aerate the gas by free ventilation in order to prevent such poisonous gases, carbon dioxide, ordure, plain sewer ventilation should be provided for all sewers at intervals not greater than 100 yards. The drains in Perth are not perfectly ventilated. It is reason to believe if they had been some serious accidents of suffocation might have been prevented. In the past, as Medical Officer of Health, I have had an opportunity of observing the extent of defective drainage may be chargeable for carrying disease. I have a record of about 100 cases of bilious fever, in searching for the cause of all these cases, I found no difficulty in establishing that the drains were at fault in about 73 cases.
The particular kind of defect I may be mentioned to have noticed during the Fenian crisis in Perk in 1883. It was a favourite hand for it. The houses there were not very numerous or a kind of speculation of either the owner, were very imperfect constructed on the street, were made of brick had material. Family after family was attacked. In particular, one of the name McLeod was constituted of twelve members. How are they to share it down all of the seven one after another! The trains were seen to travel after time after time always with no result. Nothing was found wrong. All in course a time in front of one of the warden's windows, smoke was found welling up from the ground. A thorough inspection was then made and the boot-jib was seen to be firmly plugged. A hole in the front outside the window mentioned. Such a state of matter being ascertainment caused a fuller investigation of all the trains there with the result—that the fire gradually
declined and then asked advice. Another instance to show that the question of house drainage often depends just as much on the workman as on the architect or engineer who designs it. I may be given. When I entered my own house here two years ago and had not been many weeks in it when I detected the smell of sewage gas as I brought in the tissue. An experienced plumber was called. He assured me that the smell was not from the wood, was not from the house, but had come from the outside through an opening in the wall. As I dug it out from the outside, it emerged from the house underneath. The wall was found, as large as to admit the pipe. This was put right, but still the smell continued. Then had a brickman's tarp put in. This acted well for some weeks, but then the smell returned. For the drain being examined from the house to the garden sewer, it was found that the house was not connected with...
The main drain at all, but emptied itself into
the ground beneath the street.

Another kind of drainage defect was
seen in Queen St., where the sewer was very
prevalent. This street is situated very
near the drain ends. The so-called "lead end"
is not in it. And the drains are not ventilated
in Pest. Thus it is here, as Liddon says a
sewer may become a chimney up which
the sewer gas flows.

Again another kind of drainage defect
which was prolific of sulphuric fume, was
seen in Sandy Hill where the house drains
underneath the houses from the back to join
the main drain in front.

The cause of fume in Bexford was found
to be a bell-trap in front of a window, not work-
ing properly, as these bell-traps very often do.
In a house in Bexford the drain
outside the house was found corroded on
the side and the house of a cast of cesspool
was formed. The drain was flushed, but the
water flowed off full bore. The smoke-test
showed that one of the bedrooms could be filled
with smoke from the drain. The young lady who slept
in that bedroom took typhoid. The father, daughter, the mother
malaise, at the other young lady suffered constantly from bad
health.
The family had only come to town from
the country shortly before. The most
distinct part of that town were but always the parts
most affected by the fever, but wherever the
people were, the fever was most
prevalent. The drains in some cases were
at fault from defective construction or
from want of tests or want of ventilating
or from being made of bad material.
Deterioration due to corrosion, from
imperfect workmanship, leading to choked
drains in all these cases. The only way for fatt
the person was the hunt of fever cues.
Whenever the person got hot. But cessation
of the fever-cues does not seem to be enough
to prevent the danger from fever. It is
beneficial to the growth of these to
forms of life. This condition is gained by
the ash-tet accommodation principle.
These pits were originally intended for
dry ashes, though their construction
is still the same. Their original use is perverted
of use, and all kinds are poured into
the cluding and cold sewage. In this,
considered that the sewage, as of many
1892 the chief of their union means
generating the typhoid fever poison. Budd has admirably shown that their action without any strain at all may under certain conditions be more prolific in propagating typhoid fever than typhus are. The account of the fulctitude of fever in the village of North Sondreli, in Devonshire, conclusively proves that this was the case there. "(Fulcrum, p. 7.)"

"Yes they keep out, keep all other typhus from the specific effect on the public health."

"The specific effect was now seen when the typhoid fever was added. Budd describes how the fever not only spread over this village, but was carried by the sick to distant parts, spreading from it to from a common center."

"Exactly the same thing occurred in Pest during our last epidemic situated in the New Town. Pest is this wide fair street, Clody St. St is a long street with a single row of houses on each side, what might be considered a small village. This street is inhabited by better class of workpeople of Pest."

It is true that this street is drained of most of the houses in it are supplied with water closets. In 1853 when there were no sewers for submarine in Perth this was one of its favourite bands. There is reason to believe that the drains were all healthy, as none required any alterations. But each house had an ashpit at a very short distance from the house at the foot of the small garden that was also attached. These ashpits were not covered in, the floors were uneven or not cemented, it was supplied at very different times. This was the reason that fever was so prevalent. Know that the sun's rays are excluded by covering, that freely ventilated and good cement of plinth认为空间不插缝隙 has also been disappeared. The legion of these the whole year round it was never taken away by the scavenger. Another instance may be seen of how ashpits can spread fever. At the street where there are no drains a policeman's family went
down with the fever. Had it all himself. His was traced to a foul accident that had not been apprehended for a very long time. My artful way cleared out & disinfect. If the fever did not spread further. Such are some of the commonest means by which the typhoid fever poison is prepared for elimination into the human body. In these cases the sewer-air must be inhaled. In other cases it finds its way into the digestive tract by being swallowed in the drinking water. The capacity of water to absorb sewer gas is enormous to the very great, and there are several ways in which the sewer-gas may get into the water. Salton says that it has been the practice to take the overflow from cisterns into the tail-flue from the water closet, with the water-trap between. He then states that when the water in the tail would absorb the gas, and when the water became warm from increase & temperature it would give off the gas into the house, when it cooled down at night it would go out. The gas again absorb more...
fewer on a large scale was seen in
Perth in the months of May and June.

The explanation must first be made. The inhabitants of Perth
get all their drinking water out of the
river Tay, after the water has been filtered
by a natural filler. In the middle of a
small island in the Tay is sunk a well-
called the filler-bed, which is 350 ft
long, 13 ft 2 in deep & 3 ft broad. From the North
end of the island, where the water first touches
it from which part the water runs
most freely into the filler-bed, to the filler-bed
is a distance of 118 feet, & on the sides
the shortest distance from water to filler
bed is 52 feet & greatest 113 feet. The fil-
tering substance is gravel & sand. On the
sides of the river near the town is the water-
house in which a sort of small reservoir
reservoir. This is filled by means of an engine
at the same time by engines with double delivery.
The filler-bed & the reservoir are connected with cast-iron pipes & these pipes
run through the water from the island to
the sides. The water from this is all the water
carried sewage of Perth flows into the
Tay at a small distance down the river.
from the position of the filler-bed. At full tide, the sewage is sent higher up the stream than the filler-bed. All the digested refuse from the manufacturer's also went into the sewer at the opposite of the filler-bed. There are no water-courses in Perth for storing water, but the water is either delivered directly from the water-house to the various houses, or on the highest levels to reservoirs, it then it descends by force of gravitation. In April of the year 1858 the workmen were repairing the pipe lying in the water, connecting the filler-bed with the reservoir of the water-house, and by some mistake or oversight on a Saturday night when they left their work, they left a hole in the pipe in the river. The consequence was that some of the river-water, as it flowed through the filter-bed, was sucked into the pipe, thence to the water-house reservoir, it finally delivered directly to the low levels of Perth from the high reservoirs to the highest levels. On Monday morning at least 5,000 of the inhabitants of Perth were prostrate with a very violent attack of diarrhoea, it is between a week since fortifying time after the accident happened, a regular epidemic of dysentery arose.
This was quite easily accounted for because there were sporadic cases of typhoid in the town at the time of the incident. During the months of May and June of the same year, at least 80 cases of typhoid fever were reported to the sanitary inspector. What was a striking proof of the unfiltered water being the cause of the illness was the fact that the hemorrhage followed the course of the water supply. First to be affected were the inhabitants in the lowest zone who were first attacked, followed by those in the upper.

The next point in connection with the quality of the water supply is, if sewage is diluted by a large volume of water, or carried far down a stream, will the poisonous effects of the decomposed organic matter be destroyed, or the specific effects removed? The first may take place, the second is not at all likely. Thus in the small village of Almond Bank, near Methven typhoid fever is endemic nearly all the year round. Through this village flows the river Almond, into which river the sewage of the village is deposited. The sewage is thus carried for a distance of four or five miles by the river before
it joins the Lea. But a little above the junction a small stream or "lade" is given off from the Almond. As the stream flows toward Berle the inhabitants of a cluster of cottages which a quarter of mile on a broad field that later their drinking-water put it. These cottages seem to be cleanly kept residences in a healthy country district. Yet it is notorious that almost every new-comer to them is likely to take typhoid fever. There is every reason for believing that the infection of the drinking-water is the cause of this, and that this infection is specific & got at The village of Almondbank.

It does not seem necessary to dwell upon the question of whether milk or just and meat areaten for the poison. Milk is known to be a common means of conveying it, but it is the water in the milk (however it gets there) that is the real vehicle. As to meat, de Mestrez writes, "Il paraît probable que d'autre aliment peuvent parfois transmettre la maladie." From the possibility of meat in a disease state causing disease in man by eating it, this has become a department in public hygiene. Dewey strongly holds that meat—
may be
the vehicle for the poison. One gives
instances where diseasedveal gave rise
to severe epidemics of the kind here in the
county of Zurich. He thinks that the
calves from which the meat came were
all before they were killed. Probably more
animals were ill of the fever of which
fever communicated it to these
people. This does not seem at all likely.

The meat was cooked. At any rate saying
that the disease cannot yet be produced in
the lower animals, we have been
able to study the affection in the lower
animals as one of these diseases, we are
not warranted in assuming that the
animal has had it because the epidemic
cause was just meat has been eaten.

As well known that in the case of cholera
eating infected meat may cause death
of those who have had diarrhoea during
an epidemic, yet are predisposed to
take on the infection. Thus if these ef-
demics were due to infected meat, the
pasteurization was not yet able to
by eaten. The infected meat & hence the
infectious source was also present, these
of some that were predisposed lost the fever.
But though the fever is not likely to be com-
communicated from the lower animals to
man any more than it is from man.

The lower animals were thus reason-
ably thought not to be conveyed by
putrid meat. Organic matter in decom-
pozition we have seen in the means
which the bacteria of typhoid are
conveyed. Besides the putrid gas of
putrid meat must be of the same nature.

That given the two factors—a
pre-disposed living human body, and
decomposed sewage gas—with the specif-
ic micro-organism in it as above described,
the resultant will be in all cases
a series of changes, usually denomi-
nated putrid fever. These changes as they
occur in the living body chiefly take place
in the lower end of the small intestine,
beginning at the ileocecal valve and pro-
ceeding backward. They always accom-
panied by symptoms some of which are at
least pretty constant. These changes reflect
back on the mesenteric glands, & the spleen.

Pierre Pecquet, & the abdominal glands.
nerves. The ileo-cecal valve first becomes inflamed. Then enlarge tuberculosis, after
though out. Broadbent concludes that
end of these processes take a week re-
spectively to be accomplished. Muckle
add a few of these that of irritation,
these changes have once or for some time. They are going
on the presentence there. Muckle
says that these glands begin to enlarge
at the very commencement of the disease.
This is very difficult to please. There are a number of the intestinal
that they are like glands in any of the
part of the body depending for their
enlargement. There is irritation by a terni-
al organ of the case in the bodily
inflammated glands is much worse
likely. The Muckle himself ad-
mits that so soon as the marked mat-
ial begins. The detached from the
intestinal glands. The mucous glands
usually decrease in size. Therefore
coffee. This is just what we find
on blood poisoning on in any outward
irritation. Remove the irritation. The
gland gradually become healthy.
in the next place the spleen becomes hypertrophized. The physiology of the spleen is by no means yet clear. It becomes enlarged in diseases where the red blood is destroyed & the white increased in number as in hemophiliac & meningitis poisoning. There is such an alteration of the blood in such a case. And it may be thought that the lymphoid organs first find their way into the blood & then these other changes occur after, especially as they seem to be inhaled by sewage gas into the lungs or absorbed from the stomach from tainted water. In that case the blood agents play the spleen would likely be the first to be attacked. However the change do not occur in the order of spleen & lymphoid glands. However, the spleen bears some resemblance to the lymphoid organs. When the function of the lymphoid organs is eliminated what can be credited or eliminated we might reasonably think that what was the case. These glands however absorb & don't secrete. They are the terminus of the lymphal system.
and act as suckers like the roots of a plant. We consider then that the positive ion, or proton, penetrates the system through it whether or not through it shall be covered or unaffected by the other changes depend upon these factors from specific alike. No doubt it seems strange that these ions should pass on the lowest land of light before attacking them in the first place. But then we have only to consider the functions of the alimentary canal. All substances were absorbed in the stomach that can be absorbed. What use is there for an intestinal canal at all? K. The stomach absorbs the most and digests the food. Then the intraduodenal duct of it could not. Then the intestines what the joining could not fit are to come to the lowest part of it where possible. What never could find an insensible wall the system in any. The jujus absorbed. Thus it would seem that the whole alimentary canal rebels against the absorption of these poisoners' time.
all the last Pages Palate is reached. From there the others above become more easily affected. My experience of these pathological changes is insufficiently very limited having only made two post mortems at real genuine disease. In one I found perforation of four small ulcers, but the perforating holes were not larger than would have admitted a fine drawing needle. The little cæsarian incisions which the mesentric glands were enlarged. The spleen was greatly enlarged. The blood was not examined. The intestines small flaps contained a large quantity of characteristic nigrid sero-erythro plasma, which does not represent the usual washable washing out into the intestine of the post mortem room. The tissues, without much degeneration. Especially as long after death several nerves of that institution, but attending one lived long with the wound not in the present room. The wound lay directly the tongue. The tissues subsequently were examined of sound condition. In other cases there were the typical ulcers near the ileocecal valve. The other Peyer's patches were very pro-


Immenst a long way back the bowel. But there was no perforation. The spleen, liver were considerably enlarged. and there were the same kind of jejunal jags in the bowels. The man had died of pneumonia which had set in during the course of the fever. The lungs had the ordinary yellowed consolidaion. The excretion. I wondered that there

were no kinds of solid or glands. Nor small intestines are absorbed glands. It likely it is through them that the contents of the intestines enters into the system. But they may also be the means of casting off the product. If these micro-organisms have an affinity for certain food or vice versa changes must set in. Place in the glands that the bile entering probably the cells are multiplying in them. Accordingly the glands work up into the intestines. These cheesy masses are thrown off with the stool, & in them. Tend to hold these are contained the specific forms. That this or more than likely may be inferred from what has already been said viz. That the forms are found in
only with the grooming process. Fosters finished the glands are found in fewer numbers or not at all. But while these changes are going on in the various glands, other changes are going on in the body generally. Contests are organized structures, living entities, and, like all living things, they are endowed with properties for their perpetuation and preservation. Dr. Indeed, in 1912, D. Russell Medical Officer of Health for Glasgow has remarked, 'The disease is a disease of disease.' The spread of these proteus are the things which constitute the disease. Accordingly, as these organisms are multiplying in the body, be it in the lungs, or in the blood, certain changes in the body are occurring. What an amount of disturbance may be caused to the system by the irritation caused by these lowly forms of life can be seen from the symptoms produced by the thriving parasites. But independent from mere irritation, chemical changes are brought about by the multiplication of organisms - the so-called symptoms of disease.
The basic product of the decay of organic matter. All chemical processes and combinations are accomplished with the evolution of heat. Hence in the fever there is always an increase of temperature. In this, as in many other diseases, the central nervous system is also involved, by the alteration of the blood, disturbing the regulatory apparatus. Not always is the case shown by rise of temperature being easily caused by the action of poison or other factors influencing the nervous system. Casye mentions an epidemic of typhoid fever that occurred in Paris in 1870, in which the temperature all through that was subnormal. But there he also it is remarkable that in the cases recorded of typhoid fever, the enlargement of the spleen was either absent or less marked than usual. The reason probably was the fever chemical change were not there. Casye further states that there are strong reasons for believing that all the phenomena of fever are due to high temperature, though his most advocates for the cold bath treatment and short fevers. He does not see why in more apyretic cases the epidemic was a mild one or not at all occurring.
The cold bath treatment. He admits that
the special fever in the fever, which 
also some time to do with the 
increase of temperature. It seems likely 
that the change or change that occurs in 
the first fever, later place in the order 
the fever is swallowed. Thus the 
system is nourished through the stomachs 
and the blood of the mesenteric glands, and it were 
be arrested in its progress here. 
There would be the opposite thing that 
occurring in the above part of the 
blood. And this is not the usual course 
for it generally then passes into the 
abdominal cavity and hence into the 
small where there must be a 
multiplication of the germs. This 
causes a rapid temperature of the 
body, which cools off the blood 
and again produces the feverish 
temperature. Of course it might be asked 
how could the lowering of the tempera-
ture be the result of the 
increase of temperature? Is the 
preceding theory? But the answer 
is simply that it is a law in chemistry.
That when chemical products are formed by the union of two different substances, heat must be evolved. Thus prevent the evolution of heat, prevent the chemical change. This is the explanation, or be it not.

The temperature in lymphoid fever is peculiar. Indeed it has long been considered to be a pathognomonic of the disease. For such a diagnosis.

In 73 cases of lymphoid fever that were treated in the Perin Demitram in 1877, the temperature was taken regularly every three hours 12 noon 3 p.m. 6 p.m. 9 p.m. for the whole 24 hours. Allowing for accidents of the administration of suppressive drugs, the conclusion we came to was that it was an established fact that the maximum temperature was gained at 6 a.m. No. The minimum temperature was reached by 9 a.m. Indeed it was found that the temperature generally gradually rose from 3 0'clock in the afternoon to 6 0'clock in the morning to 90. No doubt these were often consider
The undulations of temperature. But there was to be expected, for in the first place there are many things to account for such undulations, by error of diet, anything to affect the nervous system. And in the second place; Dr. Price has clearly shown that there is no fever so prone to relapses in which the relapse is so often overlooked as in typhoid. A relapse may take place at any time of the day, but it is the rule of the thing. At which temperature should be at 90° minima, which would bring it to its maximum. What the exact cause of these relapses is it is difficult to say. Probably, they are due to a fresh multiplication of the germs, and may be inferred from what takes place in relapses of intermittent fever. We know not more of what is going on in relapsing fever during the apoplectic interval than we know of the relapse of typhoid fever. It is most important, says Dr. Price, to note particularly the temperature on the fifth
day, &c., on the eight or ninth day, on
the fifteenth day, and on the 21st day of
the disease, as they are to a certain ex-
tent critical. The following case will illus-
trate the truth of these remarks.

Mr. Pearson learning George Small, general
merchant, about 21 years of age, & residing
at 3, Leonard Place, West Perth, broke typhoid
fever in May 1854, was attended by
Dr. Christie. The attack was a pretty
severe one. It commenced with con-
stitutional, but about 12th day, a druny
attack diarrhcea set in & continued
more or less to the end. "We got the
him" his people telling me for the 28th
day of his illness. Dr. Christie left
of attending. He was described as quite
dead for about a week, when he was
very hungry & ached generall, in
particular. The one day she at good
many oat cakes, after which he became
very ill again. But Dr. Christie himself
then had an attack of fever unloominous
was unable to attend, and Evans called
in instead. The first day of the delirium
was the 12th, & Dr. Evans binned him on the
13th. His symptoms of the evening 9 Heat
Day was nearly 102° F. On the 14th or third day of relieved it was 103.5° F. & diarrhea was frequent & copious & typical of dysentery. And on the 16th or fifth evening it was 106° F. The patient was very delirious. Tongue was dry & could not be moistened. Nosebleeds were frequent if voluntary. Fever was constant. Delirium tremens & delirium. Patient was dying. The nurse was ordered to pour water into him as much as he could breathe & the mouth. About 11 o'clock next morning his temperature had fallen to 103.5° F & he was somewhat better. In the evening the temperature did not rise above 104° F. The temperature however kept high never below 103° F up to the 15th of 20-9th. During this time the diarrhea continued & became troublesome. After the 20-9th the temperature fell to 101° F. But on the evening of the 20-9th it fell to 100° F. On the 21st the temperature came up to 105° F. There was some delirium. But he seemed to be very drowsy & fell asleep. Next morning the temperature had again fallen to 100° F. From this...
date onwards to July 3rd. The temperature gradually fell. July 4th was the 13th day of relapse. The temperature was 98.6°. I might not have seen my patient again had it not hap-
pened that very day I was sent for to see another member of the family, who was sick of the same disease. He was a strong but younger man than the man whose case of relapse had just been recorded. On him the fever ran a very mild course of about 14 days.
There was no relapse. The notes of my case of relapse were entered in my book before I had ever seen Dr. Hume, to whom all the facts of his attendance regarding the case of his mother's relapse, no doubt, were for him difficult in getting a true fuller temperature chart in cases of relapse than in many other cases, for the reason that the medical attendant may be very often in atten-
dence while the relapse begins, and not be likely to be alone and free. Where severe primary attack, very early does the
medical attendant see his patient but some days after the fever has commenced. Yet the fever may be said to be begun with the first rise of temperature & if so short, it is often unheeded. To make the above case of a relapse complete the young man got strongly taken when he had ever been before. The fever the young man got strongly taken when he had ever been before. He was in New Zealand. The cause of the fever was found to be a large gum of the brain. For it was said the gum of the brain situated in a very healthy locality. It was a gum of the brain situated in a very healthy locality. The material which made it was made of some kind of large case. It had formed around the brain. This was unaccounted for till the relapse had taken place & might have been as much the cause of the relapse as the cases of the brain. But though it may throw the inferences in error that this gum is the cause of the case. It does not seem to be of the same significance.
Murchison has noted diarrhea as rare as 93 out of 100 cases. It was not as one of the least symptoms in 90 cases, Murchison noted it in 38 of 100.
in primary attacks at least 3 or 4 weeks critical days. In those 200 cases of which I have
notes, the temperature generally continued more or less high for the first eleven or twelve days of the entire temperature
of above stated was generally higher than the morning. But notwithstanding one
that me may exclude typhoid if the temperature on any day between the
eleventh and fourteenth had fallen below 104.7°
day as often departed from in
those cases as it was found in
another symptom which often associated
with the typhoid condition of the eley-
time already mentioned is the presence
diarrhea at some time or other of its
Course. 61 of the 200 cases of which I
have notes, had typical & prominent
diarrhea, many of the others had di-
arrhea at some time or other in the
Course. That it is a necessary concomitant
typhoid fever will be taken not to be
the case if we only consider what the
Cause of it is, we have already seen that
the cause of the affection of the intestinal
vessels is the ventilation from the specific
action of the disease, add that when there
glands are undergoing their constant pathological changes. The adjoining mucous membrane of the intestine becomes inflamed so that a regular mucosa-enteritis is set up.

And in mucosa-enteritis, Hawesworth says, "The bowels are irregular, either constipated for several days or there may be diarrhoea." Again he adds, "The abdomen is somewhat enlarged, or considerably distended and tympanitic, or in the amount of tenderness." This is exactly what takes place in typhoid fever. Of course in the stools there is often yellow but what comes from the broken-down glands in addition. The colour of the stools is generally considered peculiar. Where there is diarrhoea the are lying, say the colour of yellow ochre, there is very offensive odour. Though stools of that kind are not common, form an important and the characteristics of the affection. They are not absolutely reliable. John Murdoch, a little in a bank here, became ill in 1873, and I was called to attend him. He lived in Craige, it seemed to be affected with "wound fever," for he had eaten of the 'syphilobour' peculiar to the disease.
and in particular he had the peculiar typhoid stools with diarrhoea. As he was very obstreperous delirious I spent time in the dispensary to the fever yard. I very reluctantly there agreed with me that it was a case of typhoid fever, the one day had been apoplectic shock, for which we could not account. The death some time after this. The post-mortem revealed an abscess in the brain which had burst. But the bowels were normal, excepting a little congestion of the mucous membrane. Certainly there was not the slightest appearance of typhoid blood again. The utilization of the bowels occasionally leads to haemorrhage. But in my 100 cases haemorrhage only occurred in 3.5. It is generally supposed that there is less tendency to haemorrhage in the younger patients. Typhoid fever occurred in 37 under fifteen years, of these 44 between ages 9 to 12, ten between twenty-five to forty, in 4 between forty and fifty, in 35 cases.
There was not above fifty cases which were treated by the chief pathological change caused by the gastric cause of the disease, with the various symptoms attendant on them. Many other symptoms are described as referable to this disease, but they are not nearly as constant as the peculiar physiognomy and progress of the disease contrasted with the full bladder of the young and robust subject. A scabby breathing is often present, and in the abdomen (in one of the cases under fifteen) was observed a white, hard, non-utile organ covered with a white fur. It then begins to erupt in the night, while the head and body headache and deafness, flushed emanation. Finally an inflammation is present from 10 to 14 days, required for the multiplication of the contagion.
The cause existed to produce the gene, the various changes which then took place in the body from the disease.

But a description of this disease would be incomplete without a consideration of the treatment of it, seeing that in this gene, the study of pathology of treatment are intimately connected, if the one helping to explain the other.

The treatment of tuberculosis must be studied from two points of view. In the one it has for its object the prevention of the disease altogether, and in the other it aims at the cure, either on the carrying the disease to a favorable termination.

In some of the acute specific diseases as scarlet fever, measles, not many people are aware how difficult it is to prevent the spread of such disease, because it is simply impossible to isolate all infected persons from the rest of mankind. If the views advanced in the former part of this paper be correct, the prevention of tubercle presents a marked contrast to that of such diseases. For not only is it possible to prevent first cases arising, but it is also possible to prevent the disease becoming epidemic. We will again be obliged to turn...
It has been theory that there are two factors necessary for the production of the deadly cause to the existence on the one hand of the specific typhoid germ and on the other of the decomposed fecal evacuations which latter form the medium for conveying the former. Therefore we assume until that the specific material of typhoid fever is a living entity.

The first means then for preventing the spread of this disease is to be sought for in killing this entity. It is well known that there certain conditions in which life cannot exist. These are in the highest forms of life, and that certain substances exist which can poison or destroy any of all living organized structure. The life of the micro-organism is based on reproduction. Hence to prevent typhoid fever arising or spreading we try to find the conditions which prevent the multiplication of these forms or the chemical substances that destroy them. E.g., Dr. Kingan that are certain temperatures at which the disease is no more passed. These lowest forms of life must then the heat, "heat," says Klebs, above 50 or 60°, arrest the growth of fever kills many organisms, even kills many organisms, which survive
even when exposed to the temperature of boiling water for several minutes. The same
writer adds that the presence of caustic acid, phenol, formaldehyde, and perchloride of mercury will prevent even
when in great dilution the growth of microorganisms. I have been in the habit of using chloroform blow, alcohol, carbolic
powder, and green copperas as disinfectant in Perke. But an error that
must not be overlooked is apt to occur.
Some of these substances may then
paralyze the micro-organisms. In
Friends by Tisser and Tissier's Case with Catholic acid. Matto To
day these substances may be used
when mixed with these substances
but when transferred to similar
line of multiplication again there is
a wide field open still for investi-
gation into the proper solutions of these
substances. Perchloride of mercury offers
fair to be a good disinfectant. The
best thing here is we seek to destroy
the germ of the disease by disinfectant.
But even though the destruction of these
elements could always be attained
to have the drums examined. The chief object is to fall down a perfect system of house drainage, are immeasurable and complete removed from the house of all foul and putrid material, directly it is produced. The presence of any back current of foul air into the house through the pipes or drains which are used for removing the foul matter, were these objects always accomplished would become a rare disease in towns.

The second way in which their median for the converse of the hygienic force is formed is by allowing fecal to the matter. Here it decomposed in ashes which winds up. They have been often observed to be a source of The case with the asphyxia of houseflies and beetles. If the frequent the way in country districts. These as

fumes exist. I used to think that the house of waste were freely exposed to the air you danger could arise from it however it were kept. Still however is now known not to be the case. All such places should be at a distance from houses, covered in some rain, and yet often due bedched floors lined with impervious material.
I had no reason to suspect any imminent danger.
frequently adopted, simplified, or washed out. The moistest part of the film will not be removed. By hard pressing, the line is to be laid down. Work a little common sense exercised as shown in the treatment around dwellings on admission into them of decomposed animal matter. Put particularly in the commonest way in which by good reason is propagated in my disinfecting distilled water. The various ways in which a chemical matter may find its way into potable water have already been detailed. But this brings us to the invention of all the chemical processes for the determination of perfectly pure water. It is well known that chemical analysis of water cannot be relied on. Pure water has already been referred to, but though the water has always been pronounced pure on analysis yet a suspicion always is attached that that analysis cannot be trusted. Mr. Frankland states that all the processes which have been proposed for the removal of impurities from water is not one which is sufficiently effective for rendering
The water which has been contaminated fit for domestic purposes. " After all" says Tesla, " water is the first requirement for existence; and unclean water is a fertile source of disease as unclean air.

Attention to all these points will easily prevent the existence of endemic fever. The prevention seems to be becoming as much a science as the cure of it. But intermediate between the preventive and curative methods there lies another means of protection at least in some diseases. It may be a store for typhoid fever we have seen that for the control of all infecting diseases this element is necessary, the predisposing element of contagious proper element. The preventive treatment already given had reference only to the protective one we now speak of has reference to the first element of small-pox is not by destroying the predisposing element by vaccination in malarial disease it is how ascertained that if a person begin taking and continue taking arsenic or prussic or other anti-malarial drugs, are can be prevented it seems as if the malarial fever could.
not grow in a system saturated with
the particular drug that is injurious to its
growth when it is in it. But they like
the curative treatment of lymphoid ceils
upon the assumption that the temperature
of the organism of the fever depends
upon the workings of the therapeutic ceils
for their cause. If febrin, antipyrin
and antiseptics taken internally prevent
the multiplication of the germs then
must prevent the attendant phenomenon
of fever. The temperature if they
can do this as need be some reason for
believing that they do. It seems likely that
a system that is saturated with such
substances there is any increase of danger,
the germs will not be able to find a
host for them. When they will be culminated
by reason of the case another great advance
will have been made in the domain
of preventive medicine. When these means
will prevent the disease have not been used
and the cause is there of procedure in
a fat subject, the result is obvious. When
it arises the next question is what
are we to do to get rid of it? These cause to
be three stages in the development
of another phase.
we must wait patiently till this is accomplished, mean, while carefully attending to the system by avoiding taking cold food or haw.

Bone, not steel, he wrote a panic.

I am inclined to say the process is very often in

The removal is not to be done in fact many, I prefer to begin at the

last stage of disease. This is the

so-called expectant method. It doth

and is very often successful. But the

success does not depend on the treat-

ment, but on the very nature of the disea-

se or affection which must either

fall or cure. There is no chronic

affection or tertian fever. There was

the many frequent relapse, but

once the period have ceased to muti-

late the affection is at an end.

At the present day, there is a

very large school that adopt this

plan of treatment. Which is found

treatment at all, at least of the

real disease, which never before

the treatment began. Then again

there is a second school, beginning with

Carrie standing in the glory of extension,
over the greater part of the continent of
Europe. The country in France is a great
body. The School for instance finds
out a symptom of the second stage, or
temperament of a very important symptom
of fatigues to treat. My symptom
alone. We have seen that this symp
ptom is a result of chemical change produced
in the multiplication of the germ, if we
also admit that I did not know of the
degeneration or loss of weakness
that follow. But in attacking this symp
tom we are not attacking the ci
del of the disease. No doubt if we
abstract heat it is formed we can
keep down the temperature. For the chemi
cal change produced by these germs
are unlimited. But the way we prevent
their actions when we are abstract
the heat: we are not. We told heat

The treatment of fever has clearly shown
is a mere physical process. That is
to say the temperature of the body
is lowered by the temperature of the
water in which the patient can
impress. The change is
not to develop any other active motifs.
on otherwise. It is not killing the venom
or preventing their multiplication.
We venture to assert that this prin-
ciple of treatment will have it de-
til the day of its thorough known-
and complete treatment is arrived.
We say nothing of the complications
of the treatment of the difficulty.
Putting it into use in private practice
like by the treatment of inflammation
indeed of nearly all acute or long-
lasting, used the by bleeding, when pain
on some other external symptoms was avoided
with the blood picture was at one time
universal, but is now fallen into complete
disease. But this means of treatment did not
and the disease but has not often
in a worse state than it is left alone.
In the mortality was as high with the
rather than any other way to treat,
in all of these will be the taking of the
cold bath as treatment for typhoid. But
bleeding was not an adhesion. It
will be supported for a time, but because
the treatment of a symptom not the
disease it will be found to be inefficient.
effect of untreated or urgent symptoms must be treated as they arise in any disease at every stage. And so must the pathological changes that result from the disease be likewise attended to. But the real treatment is to begin at the beginning. I shall prevent the disease, or prevent the multiplication of the virus in the body at all. But if we have more to watch the course of the disease than do anything else.

We have thus endeavored to show, first of all, that predisposition is a necessary element in the causation of infectious diseases. Secondly, that natural immunity causes her in particular specific microbes or poisons, which in order to take effect in the human body, must be hatched to be carried to it by decomposing or passing in sewage. Finally, we have studied pathological changes caused by these microorganisms in the human body, and we found that they were more easily cured when ended in the lymph glands of the small intestines. In this multiplication upon the same use.
6 Chemical changes in the tissues of body, as altering the blood, increase of temperature, diarrhœa. And lastly we discussed the treatment of this fever, if we came to the conclusion that the preventive treatment was far more safe than the curative, as being, at the present day, more effective.

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