The outbreak of Yellow Fever in January 1897-98, a consideration of the cause of its introduction and diffusion among the inhabitants. Some points of interest relating to Incubation and Incubation. The Symptoms, Signs, and Treatment.

The cause of the occurrence of Yellow Fever is doubtful, in so far as the direct introduction of the specific fever is concerned. Coincident with the outbreak of the disease, the conditions which have been long recognized as essential to the incubation and growth of this particular organism, or to the spread of the specific Fever, were easily obtained in and about Kingston. Immediately before and at the commencement of the outbreak, the prevailing temperature was very high and owing to the insufficient sanitary precautions, the soil was allowed to remain in a state of unhealthy moisture. Further, the accumulates masses of decayed, or partly decayed vegetable and animal
matter, were not removed before they
impregnated the atmosphere with
their poisonous fumes.
With reference to the direct entrance
of the fever, several theories have
been brought forward, which can
all be conveniently grouped under
their heads as follows:
1. It was who died from Cuba.
2. It was brought on from Mobile,
New Orleans, &c., as cases of yellow
fever had been reported at these places.
3. It was the direct result of the
cutting of the soil, previous to the introdution of a sewerage
system for the removal of refuse.
The first theory is strengthened by
the fact that the first case which
came under observation, was that
of a sailor, who died of the fever
in the hospital at Kingston.
This occurred on early in the 10th
July, 1897.
The second theory derives con-
sideration, from the fact that
the second case of yellow fever,
was reported to have been detected
via Port Antonio, (Parish of Portland)
and hence brought into Kingston. An explanation of the second theory is easily found, when we remember that Port Antonio is the seat of activity of the Boston Tea Company, a company which is in constant communication with the American ports mentioned, under the heading of the second theory. Moreover, the statement of the origon of the Fever in Port Antonio, must be accepted with reserve, as information regarding the previous circumstances of the patient is not forthcoming, and it is most improbable, that he landed in Kingston, and had travelled by rail across the island. Further, that a sailor should be struck down, may prove no more than, as a white man, and living as sailors generally do, he was more susceptible to the disease.

Again, there were few cases in the ships lying in the harbour, and the sea had been free from infection.

Pass now to an examination...
of the third theory.

At first sight the appearance of the various Bacilli from the soil does not attract much attention for the following reasons:

1. The first power which had the power among the residents in contrast to the floating population did not reside in that portion of the town. Here operations for laying down the various seeded were commenced, and were in progress, on the contrary, the first located itself in that quarter of the town which contained residences, where only persons possessing considerable income resided there, possessing in proportion to the rest of the town, houses and hostel of a higher degree of excellence in taste, grace and clean lines.

2. Cases of fever, after this occurred here and there, did not follow any distinct route, and finally settled in the western portion of the town, where the sewage operations commenced.

3. Cases were reported among miles
distant from Kingston, as for instance halfway there, Christiana (an inland village many miles from Kingston and has an elevation of 2000 miles above the sea level).

Whatever may be the importance attached to the above, on closely considering the matter, I perceive the fact that two conditions, the introduction and contumence of yellow fever in any locality. These briefly stated are the following:

(ii) The susceptibility of the residents in the community to that particular malignant disorder.

(ii) The sanitary condition of the localities themselves. How the outbreak requires the mutual co-operation of these two conditions, and it is in this respect that it differs from an epidemic such as that of yellow fever or dysentery, for these diseases depend alone upon the second condition, as was evidenced to have been actually furnished, at the inundation
of the laying down of the dyers in the West end of Kingston. Cases of dysentery appeared, and for a time followed the course of the streets which were nearly dry up. But in the case of yellow fever, where a certain immunity of the Black and Coloured races is an important factor, it would be expected, that even of the surrounding conditions were ever so insanitary, the disease would not be likely to break out in a locality which is occupied chiefly by these races. On the other hand, if a white man, who is a susceptible subject, were to enter the same locality, he would readily become infected. As a proof of this, I can bring forward a particular case, which I find entered in my note book. On the 17th November 1897, I was called to see a patient who was an employee of the Leningale Company. The patient was a Sranan by birth, and was given to intemperate use.
resided in a part of the town, from which no yellow fever cases had been reported. I ascertained that on the previous day the site he was perfectly well, but on the morning of the day in question, he had been ordered to proceed to the disembarking mouth of the river, to effect some necessary repairs. While engaged in this work, he was taken suddenly ill, and had to be conveyed home. When I saw him, he was under the influence of a most violent type of Yellow Fever. I sent him to the Hospital, where he died after being in residence two days.

Definite strengthening the argument, I might mention that, in the case of the East End of Staten Island, Half Way Town and the camps, the entrance of the disease in these places, was characterized by its attack on persons who had daily labor business in town, and were white men, above blood from the general knowledge, the presence of the disease, was a probable factor in causing it.
for the rational and prudent action of the Parishes. When the time to Christianity, we find
that the first case recognised there,
was easily traceable to Kingston; the patient, a coloured person, having
gone home infected. This patient
involved, and the disease soon
spread among the other inmates of
the house, in which the patient
resided.

Here are some points of interest in
connection with the spread of the
outbreak worthy of notice.

(a) Contrary to the generally accepted
rule in the diseases of Yellow Fever,
the outbreak was discovered in
the higher streets of the Town, some
distance from the waterfront, as
in the case of china town village,
Shoemaker's Hill, and Christianity
five and twelve miles respectively
from Sanderville, although lying
inland, and four removed from
the waterfront in the course of
suffered severely.
(b) The spread was without doubt
influenced by the embargo of the
local authorities, and the terrible
spectacle could be observed of a high class hotel, in the east end of Kingston,
having seven cases of Yellow Fever treated within its walls, and at the same time being opened for the reception and provision of guests.

(c) In Christiana, according to all accounts, the disease was maintained by the very insanitary condition of the market place.

The incommensurability of the impact has so often been quoted, that it was a matter of surprise, even to Jamaicans, to hear that such a number of black and coloured people, had suffered during the latter months of the outbreak, and this did not apply to those, who had come to the Yellow Fever districts from other parts of the country, but to residents of the locality. It is possible, that the depressing influence of the Dysenteric Disease, which preceded the Yellow Fever in the west end of Kingston, was the
means of diminishing the annual intestinal resistance to the
contagious and virulent, and to make the spread of the disease in that
particular locality an easy matter.

La Pêche gives the period of incubation as between twelve
hours and several months. Four
two cases occurred in the Duchy
of Cornwall, in Kingston, which, although
the period of incubation was not
so protracted observed that it may
however, be very prolonged.

(i) J. J. was admitted on Sept. 30th
1877. She was sent from Robin's Hall,
in miles from Christchurch, stopping
at Kendal and Sandridge stations
or "Lock-up." The patient showed
symptoms of the fever on the
19th Oct. 1877.

(ii) E. S. was admitted on the day
before J. J. She had been sent
from Brough station, which
is about six miles from Christchurch,
and had stopped at Brough town
Lock-up. In this case the fever was
diagnosed on the 22nd Oct. '77.
two cases occurring in the sepulchre, actually that of a man who was committed to the institution on the 22nd October 1897, and showed symptoms of the fever on the 27th of the same month, and two others, who had been in water from 1880 and 1889, respectively, were attacked in the former case on the 29th October, and in the latter on the 3rd December 1897.
Three cases clearly demonstrate the fact, that the fever was introduced into the establishment under consideration, and without any doubt from Christianity, as no cases had been reported from the establishment.

At no time did the outbreak in Kingston assume any alarming proportions. The annexed table will show, that up to the 21st December, there were in all 131 cases, and 49 deaths, giving the mortality at 37.4 per cent.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Place</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kingston</td>
<td>85</td>
<td>31</td>
</tr>
<tr>
<td>2</td>
<td>Post Royal</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>St. Andrew</td>
<td>32</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>St. Paul</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Secret</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>St. Thomas</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>St. Catherine</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>St. James</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>131</td>
<td>49</td>
</tr>
</tbody>
</table>

To render the table more complete one must add, that up to the 17th Feb. 1825, there were 37 deaths in Kingston.

The enormity of cases calling for any personal treatment was done, one
of which I despair as an atavistic
form of the fever.

Of these 9 patients two died.
I cannot even begin to speak of the symptoms
and signs of Yellow Fever.
The symptoms are more severe in the
sickliest men, and they are more pro-
rompic if he has lately arrived
from a temperate region, or even if
he should have come recently from
some colder part of the country.
The patient feels an oppression starting
over him; he is debilitated, chilly,
alternating with sensations of
heat attack his head and limbs. The
complaint of severe pains in the
head, back and joints. There is
"depression" over the region of the
Stomach. This fact may almost
be considered a characteristic sign
of the disease. In some of the cases
that I have seen has it ever been
absent, although the degree of
intensity has been variable. Some
patients describe it as a "fulness",
some confuse it with a feeling of
pain in that region, and a sensation
of wind moving about in the stomach.
while others say, that nausea, pain, and other unusual symptoms, are so strangely combined that, it is most difficult to describe it.

The patient's face is flushed, his eyes are red, and he moves restlessly from side to side upon the bed, rest- without declining the foot; he had stated a minute before, that he had no life in his body. The pulse may be strong, 80 or 90 beats per minute, taut and full, or it may be small, quicker and easily compressible.

The patient generally complains of constipation. The body temperature, which is very marked in that case, is very high and is evident not only to the patient himself, but also to the examining hand. The examining

The urine. The organ will be found to be moist and covered with a white fur. At an early

stage the patient makes many attempts to vomit, being eventually successful, he discharges freely from the mouth any liquid or solid

and administered. He soon comes to the aid of Enemis is attended by
The expectoration, at first of a clay-looking emulsious, as thin as any bile present in the stomach. As the vomiting becomes more frequent, the matter expelled becomes tinged with blood. Eruptions of gas constantly escape without any apparent effort on the part of the patient. As the disease seems fixed, the stomach may become very sensitive to pressure, and at the same time the vomited matters become darker, this condition being produced by the presence of emulsion, which in appearance is not unlike the sediment of freshly drawn coffee.

On examining the urine, the presence of albumen may or may not be detected; sometimes the patient loses all control over the sphincters of the bladder, and retchens;

the patient now begins to feel "yellow" delirium or coma sets in, the patient becomes very fretful and fond of food, indeed, that the digestion cannot be curtailed, and the stomach becomes dilated, and death ensues.
In the event of the patient surviving the first stage, the second stage or stage of Remission, which lasts only for a short time at no time more than twelve hours, proceed with the following characteristics: Absence of the Blake spot, delirium and coma, Diminution of the sensibilities of the stomach to pressure, the pulse becomes less bounding, and the skin cool and moist. All disturbance of the intellect, which usually accompanies the first stage, slowly subsides, and consciousness returns. The temperature now falls, never to return, but either to a few points above or below 98° which came under my immediate notice, and which saw the whole course. The temperature became as low as 99°7 and 99°6 respectively, in both cases. The pulse at this temperature was so fast, that the beats could be counted only with extreme difficulty. At this period one of two conditions will result. The patient will either pass on to the third stage of the disease
or he may become enervated. The remaining for the third stage will depend upon the escapes made by the body upon the tonics. If there are malarial injuries, then the second stage of stage of Nervous is that, and the temperature rises continually and rapidly. The temperature may be very high, whilst the surface of the patient's body may be very cool to the touch. The patient generally becomes yellow, if he has not become so already, and the yellow is especially marked in the conjunctiva. "Black vomit" ceases up without any apparent effort, the heart begins to fail, producing an un perceptible and intermittent pulse. The urine is highly albuminised, besides which there occur retention or even suppression. Hemorrhage may appear from the gums and other mucous surfaces, and in women from the vagina. Brown "stools" cover the tongue and teeth, and respiration is laboured. The last moments of the patient are usually indicated by suffocating
which immediately precedes the Coma, under the influence of which the patient dies. In very bad cases, an odour peculiar to itself rises from the body. [N.B. The temperature may even fall after the third stage and recovery take place.]

With regard to the convulsant stage, if the patient, by virtue of his constitution and the attention he has received through the first two stages, has been able to pass through the ordeal without great injury to his heart, kidneys, stomach or brain, then the improvement which we noticed towards the end of the second stage will continue, with the temperature slowly, but surely, falling to normal, and a gradual ebb of all other symptoms and their final disappearance.

It is well to remark that the patient passes into this condition very slowly, and the re-activeness of the stomach, towards all articles of food, difficult of digestion continues for some time, although the desire for food is strong.
Further this may be extensive formation of boils.

Now, although the disease presents a definite cycle, one or more of the symptoms may be absent.

For instance, I remember seeing a man who was stated to have felt a "little feverish" the day before, and although being "perfectly well" in the morning of the day on which I saw him, yet at 11 P.M. I found him in a comatose condition and ejecting feebly the characteristic "Black Vomit" on examination. I found only one other eye that my attention - not even a depression - of urine.

Again, the symptoms may be very marked, when in the Nature of the disease and the suddeny cause. This is known as the "atrophy" form. The following case is in connection, and this form is of interest.

The first case I attended was that of a woman, an American, who died. On the day after her death, her brother came to
consult me. I observed the following:
Temperature 100° F, the face flushed,
alternating sensations of heat and cold: a vomit of yellow fluid and
pains over the region of the stomach.
I ordered him immediately at the foot
of the hills—a more elevated, and
consequently cooler situation—and
prescribed. The next day all the
symptoms had abated, and as
time passed on, I found that they
did not return.
As this patient never vomited once,
during the whole course of the
illness, but there was a rise
in his temperature in the second
stage, due to pyogenic organisms,
and a subsequent fall on the
escape of fever.
In another case, the chart showed
that the pulse record, that never
varied from the commencement of
the disease to complete convalescence:
In yet another case, a patient passed
through the complete cycle without
the slightest tinge of yellow.
I now append an account of the cases.

In the case of an American female who had

come to Jamaica for the benefit of

her health.

History: Patient had extreme cardiac

disease, and was under treatment

for it. In America she was a rheumatic

subject.

Tuesday 5th Sept. 1897: Patient complains

of pain in the back and joints,

oppression over upper chest and

across head. The hands and feet are cold.

Temperature 103°7. 2 grains of urina.

Monday 6th: Pain in back and limbs still severe.

The face is flushed. Slight head ache. Still present.

Temperature 105°7. 2 grains.

Tuesday 7th: The pains continue. It is more

becomes faint and vomiting begins.

The patient now loses control over the

thunder and motion

Temperature 103°7. 2 grains.

Wednesday 8th: Patient complains for pain

in the cardiac region. The pulse is quick.

The stomach distends. The pains in the

back and limbs disappear towards

the evening. The vomiting ceases.

Temperature 103°7.

Thursday 9th: Hamorrage occurs in the
On the 8th of October, the patient delirium and vomiting. On examination no organic lesion discoverable. Pulse 120. Temperature 105° F.

Saturday 9th. Still delirious. Impossibility to take place on the entrance of food, liquid or solids into the stomach.

Temperature 106° F.


Temperature 102°. Pulse 98.
Sunday 1st P.M. Delirium begins to subside.

Temperature 101.2°. Pulse 92, weak and fluttering.

(To Dr.) The delirium, thirst and sweat exist. His senses, but
the eye is ashen. He is sensitive to pressure and the movements of

Patient.

Temperature 101.2°. Pulse 96.

Monday 2nd A.M. The delirium returns, in a diminished form. Swallowing
from sweat and nausea. The

throb were revived. There was

strength is present. The tongue is covered with a yellow coat, as is

very red and the lips.

Temperature 104.1°. Pulse 108.

Monday 2nd P.M. Temperature evening. Pulse 126.

Patient comatose.

Death occurred at 6 A.M.

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15th a.m. (6.30) Do vomit, no delirium.

Temperature 102°. Pulse 80, full and bounding.

1st a.m. (3:00) Face flushed. The skin hot.

Frontal headache. Depression 21st December
The inquiry was continued, and it was found that he had vomited six times during the day.
The matted thorax was being yellow and tinged with blood.

Temperature 102.0° F. Pulse 100.
12th Oct. A.M. (8.0). There had been no vomiting during the night, but he had defecated once. There is soot all over the body, while in the cranial region it is of a "dull" character.

Temperature 99.6° F. Pulse 82.
13th A.M. (2.30). Between 8 o'clock and 9.00 p.m. there had been four black stools.

Temperature 102.2° F. Pulse 96, full bounding.
14th A.M. (9.0). The urine is acid, and slightly albuminuric.

Temperature 101.2° F. Pulse easily compressible.
11.5 P.M. (14.20). The tongue was smooth since the previous night.

Temperature 102.0° F. Pulse 88, weak.
12th Oct. A.M. (9.0) Temperature 100.4° F. Pulse 82.
18. 97.4°. . weak 98. 4°. . 96.
17. 98. 4°. . 96.
20. 98. 4°. . 96.

The result was that the patient had a long, but favourable period of convalescence.
The above case, as in No. III. The period of convalescence was long and unmarked by any peculiarity of interest.

V. C. J., East London, a relative of M. D. (vide Case I)
22nd A.M. (5.0). The tongue was foul. Pain was present in the back and over the region of the stomach, but there was no Eczema.

Temperature 102° F. Pulse 102.
23rd P.M. (5.30). Settles, involuntary excretions tend to the bowels, the urine acid, but more albuminous, now absent.
The patient complained of headache.

Temperature 100° 7. Pulse 96.

23^\text{rd} P.M. The stomach is more dilated.

Temperature 107. 3. 7. Pulse 82.

24^\text{th} Temperature 100. 2. Pulse 96

25^\text{th} Temperature 100°. Pulse 84.

26^\text{th} A.M. 7. 100°. " 82

[At 12 o'clock the temperature was 102°. This rise was due to an ecchymosis, which was fully opened]

26^\text{th} P.M. (7.0). Temperature 102° 7. Pulse 100.

27° Temperature 98.7. " 92

28° Temperature 98.4. " 92.

In this case the patient recovered.

Important to a consideration of the treatment of the disease. This will fall under two heads: hygiene and medical.

(a) Hygienic measures.

The primary conditions requisite in every case are: 1st. The complete isolation of the patient, and 2nd. The removal from damp places, and 3rd. The efficient attention of a trained nurse, or nurses. Further, the room selected for the patient should allow of the free passage of the air, to keep
ed cool. At the same time the sunlight should or, as accounts to that out, all carpets, curtains, other flammable articles of clothing are to be removed from the room. Although the organism does not appear to exist in the newly voided discharges, these should be disinfected and got rid of as soon as possible. Then the patient is convalescent, the walls of the sick-room are to be washed with a solution of chlorate of lime, and every thing that was in the room during the patient's illness, must be burnt.

(b) Medicinal Agents.

The investigations of Canavalli will no doubt place the treatment of yellow fever on a sound basis, but during the outbreak, the following line of treatment was followed. How, as in the majority of cases, constipation is always present at the commencement of an attack, and, as at the same time, the 1st stage of the disease is generally accompanied by certain symptoms of general inflammation, therefore the relieving of the congestion caused
be our first care, and this is especially necessary in the case of those organs, e.g. the brain and the stomach which from the nature of their structure are more prone to injury, even in a short space of time. In the administration of a cathartic care must be exercised, one which restricts the stomach by its bulk should not be employed. Thus it is that Colomel is used in doses of 10 to 30 grs., and experience has clearly demonstrated, that this was a successful drug in cases which have occurred in Jamaica. It relieves the constipation, and very often, calms the patient for a time, even though violent delirium is present. On the other hand, it is doubtful, if the continued exhibition of this drug in large or smaller doses produces any other good results.

The condition of the "Primary Vice," however, requires continued attention, and the bowels may be kept open by the use of enemata of both cold and hot water to which is added a teaspoonful...
of the patient.

The hot bath has been used in Jamaica
from time immemorial in the treatment
of this fever, and while it may have
little effect in inducing perspiration,
it must no doubt do a certain
amount of good in producing a
relaxed condition, from the intense
body heat. However, the use of
this hot bath is restricted, for it
can only be used in the first stage,
for after this stage the patient becomes
so ill that complete rest is imperative.

Again, as very often happens, that the
use of the hot-bath produces no
action whatever on the skin, and
yet the intense body heat is kept up,
in these cases, the free use of a strong
wet cloth with cold water is of great service.
The cold water not only relieves
it to a considerable extent, the suffering
of the patient, but the disappearance
of heat is very manifest to the
physician's touch, in any case,
and is to be kept constantly applied
to the head.

With regard to Antipyretics, we have
the Choice between the Coal Tar
derivatives, quinine and strychnine, both with regard to the 12 mentioned, their exhibition appeared to produce no good effect; on the contrary, in many cases they may do harm, as to a certain extent they affect the heart injuriously, which organ is already affected by the paroxysms of the disease, as in the case of the second—quinine—its administration in small doses produces no effect on the temperature, whether it be administered by the stomach or by subcutaneous injection, and in the former case it may increase the jaundice irritation, and as in the case of the coal. The derivatives, however, weaken the heart's action.

The most useful agent is the third, strychnine. It exerts a beneficial influence on the temperature, by promoting capillary circulation. It eburne the tendency to vomit and strengthens the heart in the later stages of the disease.

A few words more as to the sedatives to be administered to relieve the irritability of the stomach.
Carbolic acid was given without any good results, as it has been recommended, and was administered to the patient under many changes, often in champagne, thymol, and carbolic acid had failed to produce the desired effect. The vomiting was almost immediately checked by the injection hypodermically of 10 drams, and shortly afterwards the patient became comatose. The drug which gives the best results is the Bicarbonate of Soda. It certainly diminishes the vomiting, although the manner in which it acts is not yet understood. It may act in one of three ways.

1. It may prevent nausea by reducing the acidity of the contents of the stomach.
2. By direct action on the walls of the stomach.
3. By direct action on the toxins circulating in the blood.

However, this may be, my experience certainly confirms the statement of Struempf, who used the drug together with the Naphthol of Mercury, "that it renders the high
and much less to, or even alkaline. It prevents haematomenes and dyspnoea of nerves. The following prescription was the one to use to exhibit the drug.

Soda Bicarb. Gr. vii
Hydarg. Soln. Gr. iv
Aqua Distill. Z. ii

First Solution. Sq. 3

To be taken every hour.

I ought also mention that water charged with Carthonic acid gas, is sometimes acceptable to patients, but the majority prefer that German table water viz: "Sauerbrunnen", which contains besides its natural Carbonic acid gas some artificial acid.

Furthermore, if the vomiting is severe, it is a good plan to apply a blister to the region of the stomach.

To prevent fermentative changes in the stomach, I suggest calcareous Salts or carbals of Soda has been suggested and used, but as an antiseptic, the exhibition of the Redoxide of Mercury produces the best results.

As Proceed Stimulants, Morphine in the second stage, when the whole
circulatory system is much depressed, and dyspnoea during convalescence are of service. It is well to remember that digitalis and digitalis given by the mouth or hypodermically have a tendency to produce vomiting, and therefore it is not advisable to administer either, at any stage of the disease.

I now conclude this article with a few suggestions as to diet.

In many cases, vomiting is the most distressing symptom, for it seems to nothing to remain in the stomach, not even crusts of ice. In such cases, only metallic feeding is possible. In the case of a patient who is able to take food, the diet is limited to small quantities of Brandi's extract of meat, champagne, which is indispensable. The majority of patients rejecting everything else, and sometimes milk, and these are to be given thoroughly iced. The action of champagne is known fast, by its direct action on the nerves of the stomach.
it immediately stimulates the heart's action, and thus promotes capillary circulation, and after absorption into the blood, it acts short the life of growing tissues, or causes it to mature very slowly.

References:

Henry R. Strode.