On the Relation of Pyrexia & Fever
& the Salicylic Acid as an Antipyretic Remedy.

By Alex. Thom. M.D. (St. And.)
M.B. & C.M. (Edin.).
On the Relation of Pyrexia & Germs, & on Salicylic Acid as an Antipyretic Agent

But a few months have elapsed since the sympathies of the whole civilized world were excited by the illness of a man, who, by his indomitable perseverance had placed himself at the head of political affairs in his own country. He was struggling against one form of blood poisoning which induces pyrexia, and which, his Medical attendants feared, would bring about a fatal issue. When that event did happen it was from what might be called an accident, and the course of the disease only showed how powerfully a healthy organism can resist the action of the poison.

Only a few years since our own Royal Household was thrown into mourning by the death of one of its members, who as well as her child succumbed to the effects of another and most insidious poison which also...
Induces Pyrexia.

Yet again, some ten years ago or more, and the whole country was alarmed by the alarming illness of the heir to the throne, caused by yet another distinct poison, the poison of which to induce Pyrexia every one will admit. And soon this year we find that the same poison had been receiving a prejudicial influence on the recovery after accomplishment of another Royal personage.

Was any justification needed for instituting an inquiry into the relationship which exists between Pyrexia and organic blood poisons, and into the ground we have for pursuing any one particular line of treatment, the above examples may suffice. Such an inquiry can never fail to be of interest to those, who are in the daily habit of treating such diseases, and are not too well aware of their dangerous character.

It is my intention then, in this paper, to offer a few remarks on the relation of Pyrexia to organic life, and to inquire whether in other diseases than those hitherto generally attributed to them, organic poisons in the
blood may not play an important part in the production of the pyrexial state. I hope, also, to be able to adduce evidence that, in suitable cases, it is justifiable & advantageous to treat from, partly at least, by such antipyretic remedies as are known to be antiseptic.

Before considering these blood-purifying or germicidal, however, I shall draw attention to a few facts which are known in regard to the process of fever generally, but only so far as they bear on the subject in hand; and first, let us understand what we mean by the term Pyrexia. I think we must come to the conclusion that Pyrexia in its strict and proper acceptance is merely a symptom. In no text-book do we find it spoken of as a separate disease. Once upon a time it might have been considered so. We can only define it as a state of the system in which the temperature is above the normal; and we may add that it is either as: accompanied or preceded or followed by accelerated heart action, increased tissue waste & disorder of function. I would particularly notice that whatever relation the
acceleration of the heart's action may have to the elevation of temperature, the latter is not the cause of the increased tissue waste. Taking the secretion of Nitrogen in the urine as a measure of the tissue waste, Dr. Singer has found that the increase of urea precedes the rise of temperature in the paroxysms of intermittent fever. So then we have in fever, disordered nutrition causing increased secretion of Nitrogen, followed by elevation of temperature and disturbance of function. Such is their relation to one another in point of time. The question is—Can we, hypothetically, assign to them their relation as cause and effect, or point to any other agency which accounts for their occurrence?

As regards the source of the extra nitrogen secreted, I cannot do better than refer to an able paper by Dr. Burdon Sanderson in the Practitioner for 1876. He there points out that there are two possible sources of the albumen, viz.: 1st. the albumen of the blood, i.e. lymph + serum, and, 2nd. that of the tissues including the blood corpuscles. Now in fever the secretion of Potash salts in the urine is increased
out of all proportion to the soda salts; the albumen, therefore, which serves as the source of urea is not derived from the liquor sanquisnius (for the liquor sanquisnius abounds in soda salts but contains very little potassium) but rather from the blood corpuscles, or muscles, or both. Another circumstance, which points to the blood corpuscles as muscular tissue as the chief seat of disintegration in this, is the increased discharge of colouring matter. This colouring matter is no doubt derived ultimately from the haemoglobin. Consequently the breaking up of the haemoglobin is a part of the process, and as it is the carrier of oxygen to the tissues, the destruction of it must impair every function of organic life. I would add that probably the fact that it is the carrier of oxygen, is the explanation of why it is disintegrated.

We may also note that in from there is an increased production of carbonic acid, but whether this is merely due to the high temperature or is independent of that, sufficient proof is wanting. I shall again refer to the carbonic acid when speaking of the
therapeutic action of a drug.

Another point to be noticed in this connection is, that pyrexia may result from one of two conditions, viz., 1st an increased production of heat or thermo-gensis, and 2nd diminished discharge of heat. As far as the ordinary febrile process is concerned, I think the evidence is in favour of the former in the first instance. No doubt there are circumstances in which both these factors exist such as in diphtheria or consumption. Here we have the high internal temperature producing the radiation of heat to such an extent that, if any trifling circumstance slightly raise the internal temperature, this latter goes on increasing until the nerve centres are paralysed and inexcusable results. And this reminds me of the influence of the nervous system upon temperature. It is believed that it can at itself cause an increase of temperature both locally and generally; but its chief action seems to be that of a regulator, tending to preserve the balance between thermo-gensis and heat discharge. When the spinal cord is divided below the origin of the phrenic nerves, the function of respiration
and the other vital processes are continued, and life is sustained, but the power of preserving the balance of temperature is lost, and the animal is at the mercy of external circumstances, becoming hyperpyrexial in a slightly overheated room, or going to the other extreme if the room be at ordinary temperature unless means be taken to prevent the excessive discharge of heat.

Keeping in view the foregoing facts we may next inquire, whether there is evidence that the Special State is ever brought about by the presence of germs within the body. I shall not attempt to exhaust the evidence that might be adduced, but shall shortly consider what proof we have from (1) Antiseptic Surgery, (2) Anthrax (3) The Vaccine Virus and (4) The Specific Contagious Ferms, including their treatment by antipyretic remedies.

In case objection might be taken to my use of the term "micro-organism" as applied to a body which possesses no visible special organs, I may here mention that I use the term as a matter of convenience & for want of a better. It is to be understood in its
widest possible acceptance, and to include bacteria, micrococci, and also those still
smaller forms which may be in evidence, but
which have never yet been seen and which may
be the antecedents in some instances of larger bodies.

Let then, a consideration of the triumphs
which have been achieved in the domain of
surgery, since the perfection of his system by
Professor Lister, will answer the question, whether
gums can cause pyæmia, most emphatically
in the affirmative. For Surgeons will nowaday
deny that the mere contact of the atmosphere
with a breach of cutaneous surface, whether
produced by accident or by the knife, is
sufficient to give rise to pyæmia. By the
careful use of means to prevent the access
to wounds of ordinary polluted germ-bearing
air, we can eliminate from operations
the danger of their being followed by any
remarkable rise of temperature. In proof of
this fact, I shall mention in detail the ten
operations which followed operation in a few
of the more serious cases on which I have
operated within the last three years, and
shall compare those in which Listerian curi
<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. D.</td>
<td>32</td>
<td>Septic</td>
</tr>
<tr>
<td>Mr. D.</td>
<td>30</td>
<td>Puerperal Fever</td>
</tr>
</tbody>
</table>

**Temperature Fahrenheit's Scale:**

- 106°
- 105°
- 104°
- 103°
- 102°
- 101°
- 100°
- 99°
- 98°
- 97°
- 96°
- 95°
- 94°

**Pulse Rate:**
- Day 1: 100 bpm
- Day 2: 98 bpm
- Day 3: 95 bpm
- Day 4: 92 bpm
- Day 5: 90 bpm
- Day 6: 88 bpm
- Day 7: 85 bpm
- Day 8: 82 bpm

**Respirations:**
- Day 1: 20 respirations per minute
- Day 2: 18 respirations per minute
- Day 3: 16 respirations per minute
- Day 4: 14 respirations per minute
- Day 5: 12 respirations per minute
- Day 6: 10 respirations per minute
- Day 7: 8 respirations per minute
- Day 8: 6 respirations per minute

**Motions:**
- Day 1: Soft, frequent
- Day 2: Normal
- Day 3: Soft, infrequent
- Day 4: Normal
- Day 5: Soft, infrequent
- Day 6: Normal
- Day 7: Soft, infrequent
- Day 8: Normal

**Urine:**
- Day 1: 500 ml
- Day 2: 450 ml
- Day 3: 400 ml
- Day 4: 350 ml
- Day 5: 300 ml
- Day 6: 250 ml
- Day 7: 200 ml
- Day 8: 150 ml

**Oxygen Concentration:**
- Day 1: 98%
- Day 2: 96%
- Day 3: 94%
- Day 4: 92%
- Day 5: 90%
- Day 6: 88%
- Day 7: 86%
- Day 8: 84%

**Reaction:**
- Day 1: Positive
- Day 2: Positive
- Day 3: Positive
- Day 4: Positive
- Day 5: Positive
- Day 6: Positive
- Day 7: Positive
- Day 8: Positive

**Chlorides:**
- Day 1: 100 mEq/L
- Day 2: 98 mEq/L
- Day 3: 96 mEq/L
- Day 4: 94 mEq/L
- Day 5: 92 mEq/L
- Day 6: 90 mEq/L
- Day 7: 88 mEq/L
- Day 8: 86 mEq/L

**Albumin:**
- Day 1: 3.0 g/dL
- Day 2: 2.8 g/dL
- Day 3: 2.6 g/dL
- Day 4: 2.4 g/dL
- Day 5: 2.2 g/dL
- Day 6: 2.0 g/dL
- Day 7: 1.8 g/dL
- Day 8: 1.6 g/dL

**Day of Discharge:**
- Day 1: 1
- Day 2: 2
- Day 3: 3
- Day 4: 4
- Day 5: 5
- Day 6: 6
- Day 7: 7
- Day 8: 8
Case No. 4. Septic.
May 1879.

Case No. 6. Septic.
June 1881.

Temperature Fahrenheit's Scale.

98°  99°  100°  101°  102°  103°  104°  105°  106°

Pulse

Resp.

Motions

Urine, O.T.

Sp. Gr.

Reaction

Chlorides

Albumen

Day of Dis.

Oper. 1 2 3 4 5 6 7 8 9 Per. 1 2 3 4 5 6 7

Excision of Elbow joint.
Septic.

Excision of Intestine.
Mamma.
Septic.
Name: Case V  
Age:  
Disease: Septic

Temperature:  
- May 1880

Pulse & Resp:  
- Excision of elbows joint
- Septic

Motions:  
- Urine, Ozs.
- Sp. Gr.
- Reaction
- Chlorides
- Albumen

Day of Dis: May 1881
carried out with those in which it was not.
I append the temperature chart of each case
in order to show the marked difference between
the temperature curves of the septic and aseptic
cases.

**Case I. Excision of the Entire Mamma.** Primary
antiseptics were used (i.e., Carbolic lotion + oil) but
not the spray. Next day the temperature was
100.8°F. On the second 101.3°F. 3rd 100.6°F. 4th
on the 4th 100.7°F.

**Case II. Excision of Carcinomatons glands in:
Diaphragm. Deep incisions. The spray was
used. The temperature were on the evening
of the operation day 98.8°F. Next day 99°F.
on the 2nd day 98.6°F.

**Case III. Excision of the Entire Mamma
with the spray.** Next day the temperature was
99°F. On the second 98.8°F. On the third 98.6°F.

**Case IV. Excision of the Elbow joint without
the spray.** The temperature on the day after
the operation was 102.4°F. On the second day
102°F. On the 3rd 101.6°F. 4th 100°F.

**Case V.** Also excision of the Elbow joint
without the spray. Temperature kept day 102.7°F
2nd 102°F. 3rd 102.4°F. 4th 100.8°F.
Case VII

A. M.
May 1881
Appendicitis
Appendicitis

Syring Apethetisation at ankle joint preceded by tarsi of tarmos & followed by suppuration. Aphetamine for 13 days & appeared Aphetamine.
Case VI. Amputation below the knee in a big and very muscular man. The flaps were consequently very large. The spray was used the temperature barely reached 99°F.

Case VII. Syme's amputation at the ankle joint. Two months before the operation I opened an abscess over the tarsus bone under the spray. The temperature rose to 99°F. A week before the amputation I removed under the spray a large portion of the carious tarsus, in the hope that the foot might be saved. The temperature rose to 99°F. A week later I amputated using the spray. Next day the temperature was 99.2°F. It fell to 98.6°F on the second day and did not rise again as long as Listerian was continued.

But, during the night of the fifth day the bandage had got loosen and the wound was uncovered. The spray was therefore discontinued on the morning of the sixth day the temperature rose to 100.5°F. Next day 101°F. It continued to rise to 104°F. Coincidently with an attack of myalgia, it gave rise to a succession of abscesses. It however made a good recovery, and is now able to walk on an
Case Vii. Septic.

D.M. Jan. 1879

Excision of Fatty Tumor

Septic Sepsis
Case VIII. Excision of fatty tumour without the spray. Next day the temperature was 100.6°F on the 2nd, 100.7°F on the 3rd, 99.8°F on the 4th, 102°F. This case also was followed by dyspepsia but ultimately did well.

Examination of these statistics shows, that in most instances in which the spray was neither not used or discontinued the average temperature on the day following operation was 101.3°F whereas of four in which it was used the average was 99.05°F i.e. fully two degrees lower. On the second day the advantage of the spray is seen more apparent the average temperature showing a fall of 2.85° in favour of the aseptic cases.

The conditions under which the operations were performed were very similar as regards hygienic arrangements, with the exception of the last (excision of tumour followed by cryoscopla). And I proceeded a spray at the time when I operated, if I may be allowed to judge from my subsequent experience I think the cryoscopla would not have supervened.
We must therefore conclude that by prophylactic measures, preventing the absorption of something (presumably germs) from the atmosphere, the temperature can be kept near to the normal, and also that the absorption of something from the atmosphere is able to cause Pyrexia. There is no doubt that this something is germs for — if the pus of septic cases be examined microscopically, bacteria + micrococci will be found in great abundance; while, in septic cases which are dressed sufficiently often, not even micrococci can be discovered in the pus (Antiseptic Surgery by Watson Clapham). Also from the pus of septic cases we can rear bacteria + other organisms in nutritive fluids, whereas pus from aseptic cases gives barren results. In the month of February of this year I happened to have two cases of abscess, both of which were acute in the first instance but chronic at the time when I was called. The first was that of a lad aged nineteen years, who had an abscess in connection with a partially ankylosed hip joint. I opened it aseptically & evacuated about 3 ounces of pus. The temperature never
rose to 99°F. I have frequently examined the pus, both on this occasion and about a year or a half ago when a much larger abscess was opened in the same region, with the same precautions, but can find no bacteria. Also I have added some of the pus to an inunction of meat extracted from the atmosphere, rather than the lapse of a week have formed it free from contamination. The abscess is still discharging, but the patient is in good health and able to move about, the antiseptic dressings being kept in situ by an elastic bandage applied over the gauge bandage.

My second case is that of a young woman aged twenty years. After being found, for some time complaining of pain in her back, an abscess had burst about ½ inches to the left of the spine of the last lumbar vertebra. Examination showed a large abscess cavity which was discharging freely. Her temperature was 103°F. It now varies between 100°F and 103.5°F or 104°F. The abscess is still discharging, the patient much emaciated. There is no difficulty in finding bacteria in the pus if the dressings are left
on for twenty-four hours; and an injection of
meat to which the pus has been added becomes
putrid though protected from the air.

The contrast between these two cases is
marked and requires no comment.

2nd. Anthrax. The careful study which has
within the last few years been made of
what is now known as Wool-cooters' disease
or Anthrax from, has proved the depen-
dence of Pyrexia, as well as characteristic
febrile symptoms, upon a specific organism
known as Bacillus Anthracis. To Dr. Bell
of Bradford we are indebted for the
careful working out of the symptomatology
of this form, and for showing the relation
which exists between the Anthrax Fever
without any local cutaneous manifesta-
tion, and the true or Ecteral Anthrax.

In the latter or Ecteral Anthrax, we have
a characteristic local malignant pestilence
caused by direct inoculation of the
virus from the wool or hair of sheep
or goats which have been the subjects of
the same specific disease. This local
manifestation may or may not be followed
by constitutional infection and its accom-
pangryPyrexia. In the case of Internal
Anthrax, we have in the first instance a
general septicaemia comparable to the
fever which follows the Malignant Pustule
and this may have, as an accompaniment
or result, pyretical and other affections of
the skin and its appendages. Now it
both forms the Malariæ Morsis is the same
as the Bacillus Anthracis which belongs
to the group of Filamentous Bacteria. This
organism is to be found in the blood or
internal organs of those suffering from or
who have died of the Fever. Moreover,
irritation of healthy animals with
a small quantity of virus derived from
one of the Pustules produces a train of
similar symptoms due to the multiplication
of the Bacilli which may be found in
large numbers in almost every organ of
the body.

A detailed history of this Fever is contained
in the Report by Mr. John Spear to the Local
Government Board, of which an account is to be
found in the Practitioner for December 1881.
3rd. The Vaccine Virus. The inoculation of the Vaccine Virus is followed by results quite comparable to those just mentioned. After absorption of a very small quantity of the specific germs there is for some days no apparent change; but when these have multiplied to a sufficient extent they give rise to a febrile condition, accompanied by a peculiar condition of the original seat of infection, in which the pus at a certain stage can be shown to contain Bacteria, and which is capable of reproducing similar symptoms in others.

4th. The Specific Bacterial Fevers.

Most of us will admit that, in the case of the specific fevers, the pyrexial state is brought about by the presence in the blood of an organic poison, and that in the case of some of them at least its organic and living nature has been proved. No other theory, than the germ theory, is capable of explaining the symptoms of the specific fevers. In each one of them the periods of incubation, invasion and advance are definite and well marked.
During incubation the organisms are multiplying in the blood and tissues, growing up the palatum most suited to each, but are not in sufficient numbers to give rise to the symptoms of Pyrexia. That they are not reactive however is shown by the increased amount of nitrogen secreted in the urine during this stage. Throughout the stages of Invasion and Advance we have Pyrexia and other symptoms of the febrile state brought about by the rapid development of the organisms and oxygenation and disintegration of these by the tissues, the special symptoms varying with the different types of the poison.

Another fact which admits of no explanation except on the germ theory is, that the poison is capable of multiplying reproducing its specific effects to a practically unlimited extent.

Finally, it is sufficient in this connection to mention that the micro-organisms of these diseases viz.: - the Epirillum or Re. Lepis from Typhoid Fever, Scharl-Pox and Diphtheria
In his work entitled "The Germ Theory of Disease," Dr. Macalister makes a powerful defence of that theory as applied to the specific forms. A further, though perhaps indirect, proof of the organic nature of the poison in these forms is afforded by the results of their treatment by remedies, which we know from actual experience to be antiseptic, and which showed an antipyretic effect when administered to a febrile patient. It was my fortune some two years ago to have under my care a large number of patients suffering from Typhoid Fever. In the course of the outbreak, I had the opportunity of making trial of various antipyretics as they are called. (Here I would note that I do not at present refer to Hyperpyrexia, to the consideration of which I shall return.) The therapeutic agent, which I found most generally serviceable and to be relied upon, is Salicylic Acid or one of its salts. That of Soda was the one which I then generally employed. It is my belief that its antipyretic action is due to the fact that it is a true antiseptic, and that it either kills, or at least prevents the
### Case Report

**Name:** J.B.  
**Age:** 18  
**Disease:** Typhoid Fever  
**Date:** July 1880

<table>
<thead>
<tr>
<th>Day of Das</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse (m)</td>
<td>120</td>
<td>130</td>
<td>100</td>
<td>110</td>
<td>96</td>
<td>96</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Resp. (m)</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Motions</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Urine, OZs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sp Gr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albumen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TEMPERATURE FAHRENHEIT'S SCALE:**  

development of the germs or micro-organisms to which the symptoms are due, and that its action on minute organisms outside the body confirms this belief. I may mention that I found Salicyl of no value as an antipyretic agent in Typhoid Fever. Bismuthate of Soda is good but not so powerful as Salicylate of Soda. Sometimes I found it preferable where there was a tendency to vomiting, especially in the case of children. In the Lancet 1882 Carbolic acid is vaunted as an antipyretic in this disease, but I fancy its more dangerous character will render it a less favourite remedy, where large doses are required. I have not made trial of the Sulpho Carbuates which do not seem to have justified the expectations once attached to them.

The antipyretic power of Salicylate of Soda is well shown in the following case of Typhoid Fever.

Case 7: A lad of 18 was laid up with Typhoid Fever, a fortnight after he had been exposed to infection in a house, where a patient long lying ill of the same. I first saw him after he had been ill for eight or nine
days. He complained much of headache, had pain in the abdomen and was perspiring freely. Tongue much furred, bowels very loose and instituted characteristic. Pulse large. Temperature 103.8°F. Pulse 120 at 2 o'clock afternoon. Next day about the same hour (10th day of illness) the temperature was 104°F. The pulse 130 or more. Bowels still loose; headache continues. I ordered one drachm of Salicylate of Soda, one half to be given on the following day at four, the other at five o'clock in the afternoon. On that day (11th) the temperature was 99.5°F. In the evening, the pulse 100 or more. The pulse continued large for ten days or more and the other symptoms also remained, though in a minor degree, but the temperature never rose much above 99°F. and the patient made a good recovery.

Case II: A lad of 14 had been ill for a week. I found the temperature 103.8°F, 104°F, 104.5°F on three successive days about two o'clock noon. I then ordered 1/3 of Salicylate of Soda to be given in the hour's time, 1/3 at each dose. Next day the temperature was 99.6, and it never rose again, though
Name: P.C. (Nov. 1579)  Age: 30  Disease: Typhoid Fever

<table>
<thead>
<tr>
<th>Date</th>
<th>Temperature</th>
<th>Pulse</th>
<th>Resp</th>
<th>Motions</th>
<th>Urine ozs.</th>
<th>Sp Gr</th>
<th>Reaction</th>
<th>Chlorides</th>
<th>Albumen</th>
<th>Day of Dis.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>106°</td>
<td>88</td>
<td></td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>105°</td>
<td>107</td>
<td>100</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>104°</td>
<td>100</td>
<td>100</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>105°</td>
<td>99</td>
<td>94</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>104°</td>
<td>92</td>
<td>92</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>105°</td>
<td>96</td>
<td>96</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>103°</td>
<td>90</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>104°</td>
<td>84</td>
<td>84</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>106°</td>
<td>88</td>
<td>88</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>105°</td>
<td>84</td>
<td>84</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>104°</td>
<td>84</td>
<td>84</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>103°</td>
<td>84</td>
<td>84</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>102°</td>
<td>84</td>
<td>84</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>101°</td>
<td>84</td>
<td>84</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>100°</td>
<td>84</td>
<td>84</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

MACLACHLAN & STEWART, PUBLISHERS, EDINBURGH
The other symptoms continued for some days.

Case 3. A man about to be ill for three or four days ( viz. confined to bed for that time). When first I saw him ( 6th day of fever) his temperature was 104.5°F. Next day it was 106°F. I prescribed 1/2 of salicylate of soda, which he was to take in the course of an hour, beginning at 7:30 a.m. When I visited him in the morning his temperature was 102.8°F. Next day he got no salicylate and about the same hour the thermometer stood at 104.9°F. On the 9th day after he took 3/4 of salicylate in the course of an hour as formerly and with this result that his temperature fell to 107.8°F. I continued in this way for a day or two, giving the remedy only on alternate days. The accompanying chart shows well the temperature curve. On those days on which he took the salicylate, he always expressed himself as being much better than on the other days and wished to have it every day. He made a good recovery.

In other cases, by the administration of the salicylates at the proper time, I have brought
it about, that the evening temperature was lower than that of the morning, with the result of making the patient much more comfortable. (See Temp. Chart.)

From the similar and even more bene:}

ficial results which follow the use of the Salicylates in Acute Rheumatism, I was quite prepared to accept the theory of Dr. Macleay that in this disease also we have to deal with a blood poison of or:}

ganic nature, though, I cannot say I am yet satisfied as to its neardomatic origin, or rather, my present experience is not such as to justify me in coming to a definite conclusion. In a recent number of the Lancet it is stated that organisms have been discovered in the blood of acute Rheumatism. I will remember the first case in which I used Salicylic Acid. A lad about nineteen years of age was lying in bed literally unable to move hand or foot, every large joint being affected. He could not even speak. His temperature was over 106° F. No cardiac murmurs could be heard. I ordered 20 grains of Salicylic Acid
with acetate of potash every two or three hours. The next day I found him free from pain and could hardly believe my eyes when I saw the thermometer standing at 99.5°F. He had a relapse due to his own carelessness, but the disease yielded to the same remedy as speedily as on the former occasion, and with no heart affection.

The power of Salicylic acid to cure rheumatic fever, or, in 1840, to reduce temperature is now such an acknowledged fact, that I shall mention only one more case in this connection, as selecting it as typical of over twenty cases of the same disease treated in the same way.

A lad of 19 was laid up as a result of exposure to cold after dancing. I saw him on the 3rd day. Almost all the large joints were swollen and tender and he could not move himself. Palpitation of the heart, however, was the chief complaint. Perspiration profuse, urine loaded, thirst excessive. Pericardial and diaphragmatic murmurs were both recognisable.
Temperature 104.8° F. Pulse 130 or more. I ordered 25 grains of Salicylate of Soda every two hours for a period of eight hours, and after that every three hours; also mustard over the heart. Within thirty-six hours the pain was entirely gone from the heart and joints. His temperature 99° F. and his pulse 90. He made a good recovery, the heart affection of course remaining.

In cases of erysipelas it has been demonstrated by Beth, Lysomaky and others, that micro-organisms are present in great numbers in the inflamed skin. (Report of Medical Officer of Privy Council New Series No. 111). Though I do not trust to Salicylic acid alone in the treatment of this disease I have found it valuable where the Pyrexia was considerable. Its use being always followed by reduction of temperature, generally by alleviation of the other symptoms. In the case of a lady who had extensive erysipelas of the face following on Diphtheria, when the temperature was 102° F. I gave 25 grains of
Salicylate of Soda at 3 p.m. At 4 p.m. the thermometer stood at 100° F. and next day at 99.5° F. The patient expressed herself as being much more comfortable, though the local heat, redness and swelling were not appreciably diminished.

I shall mention only one more case in this connection illustrative of the antipyretic action of Salicylate of Soda, viz: one of Periperal Septicaemia, as it is called. I mention it for two reasons, first because this is a disease in which the Pyrexia is without doubt due to the presence of micrococci or other organisms in the blood, and second, because in this case the antipyretic action was very marked. A married woman of 25 or thereabouts, four days after her second confinement, began to show symptoms of Pyrexia. The labour was rather tedious but otherwise natural enough. I was not aware of any tear, either in the skin of the perineum or in the mucous membrane. She became delirious and afterwards comatose though she could be roused, the temperature rising to 104.5° F. in spite of
frequent intermitl douches of solutions of Car. 
bonic acid and permanganate of potash. 
When the temperature was 104.5°F, I gave 
one drachm of Salicylate of Soda, with the 
result of next day finding the temperature 
98.6°F in the forenoon and 99.8°F at 9 
p.m. The patient herself volunteered the 
information that she was better. Next day 
the temperature was 99.6°F. The Salicylate 
was not repeated however until two days 
after, when the thermometer stood at 100.0°F 
at 10 a.m. and 100.8°F at 8 p.m. I then 
gave it in 25 grain doses every three, and 
afterwards, every four hours for three or 
four days, and she made a good re- 
covcry, the temperature never rising above 
99°F.

The foregoing and numerous other 
episodes prove that Salicylic Acid is a power 
ful therapeutic agent, and that it is perhaps 
the most potent antipyretic medicine we 
know of. I believe, moreover, that this anti 
pyretic action is due to its power of killing 
or at least preventing the development of 
the small organisms to which we are
bound to give a place, in a consideration of the rationale of the specific fevers. That it is antiseptic we shall afterwards prove. Let us first consider what the process is, and then how the remedy acts. I suppose the following may be taken as a brief, though very rough, account of the germ theory of fevers. The organic poison enters the blood, either because there is more of it than the healthy blood and tissues can withstand, or because the blood or tissues of the patient are in too weak, or too unhealthy, a state to throw it off, and offer a sufficiently good resisting. The organisms there find sapubulum which enables them not only to live but also to reproduce their kind as long as that sapubulum exists. Being albuminoid compounds, in order to do so they must have a supply of nitrogen. Water and oxygen also are used up and the consumption of the latter heat is evolved. The oxygen is withdrawn from the haemoglobin of the corpuscles which also yield albumen, and as they, as well as the muscular tissues, are
broken up, as is shown by the amount of colouring matter and potash salts secreted. The organisms themselves die, are disintegrated in a similar manner to their debris also secreted. While all this is going on the functions of the various systems are much interfered with, some of them 50% are in abeyance for a time. The processes of organic chemistry in a living organism are so very complicated, that we cannot even guess at the other changes which take place in the blood and tissues, or what course the oxidation actually follows. This we do know that the oxidation and other chemical processes proceed, and consequently we must assume that they in some way cause the rise of temperature. They may do so by the heat actually evolved in the process, or the organisms themselves or their products (which, being in the blood, circulate in the brain) may excite or paralyse sensory centres. I believe, that in the first instance, before the heat evolved by the life and development of the organisms is excessive, the nervous system has said.
sufficient vigour to preserve the normal tempera-
ture, the increased thermogenic tissue being
balanced by increased heat discharge. But
as the organisms increase in number, the
nerve cells themselves are so robbed of
their nourishment by the immediate con-
tact of these living bodies, that they are
no longer able to exercise their functions.
Hence we find nervous symptoms so common
in fever & hence also, I believe, we have
Hyperpyrexia if the process go a step
further.

In the present state of our knowledge,
I think it is waste of time to theorise further.

We shall now consider more particularly,
but briefly, the Therapeutic Action of Salicylic
Acid. First, however, we shall merely glance
at two other antipyrhetic agents, cold and
quinine, both of which have had precedence
of Salicylic Acid in point of time.

The external application of cold water,
either in the form of a bath, gradually
cooled down to considerably below the nor-
mal temperature of the body, or of cold wet
sheets or packs, is now acknowledged to be
a powerful and safe mode of reducing temperature. I think that it acts in three ways. 1st. It actually abstracts heat. 2nd. It dilates the cutaneous vessels (by reaction) and 3rd. It acts as a powerful tonic on the nervous system. I consider this last a most important factor, and that in consequence of this poison the application of cold is particularly indicated in cases of Hyperpyrexia.

As regards quinine, it has so long been in use as an antipyretic, that I need hardly do more than mention its name. Every one knows that it is a strong antiseptic. Putrefiable mixtures can be kept for a long time without showing any signs of putrefaction if a solution of quinine be added. It proves fatal to the lower organisms. This will deny that its power to cure ague depends on its paralyzing influence over the organic cause of that disease, and without doubt its antipyretic effect in other diseases is due to a similar action. It is also a nervous tonic, and may be suitably given in Peyeria as an adjuvant to the treatment.
by cold or by Salieghi acid. It can be given in large doses, remains for many hours in the circulation; “does not enter into combination or undergo decomposition within the organism, so as to become a thing chemically indifferent with respect to the ferment upon which it is desired to have it act.” (Bing in filtri von. Practic. 1836 p. 434.)

In the periodical just alluded to Prof. Bing of Bonn has also given an admirable account of the therapeutic action of Salieghi acid as a Filtri von. He shows that when Salieghi of soda is administered, the Carbonic acid, which I have already pointed out as being in excess in the blood of fever, possesses the power of setting free the Salieghi acid by combining with the soda. So that, theoretically, we do more good by prescribing the soda salt than the pure acid. I often asked myself whether we would not act more scientifically still by using the potash salt, because by so doing we would help to replace the potash lost by secretion. Also the potash forms a more soluble salt than soda with boric acid.
Know forty in excess. Latterly, I have invariably used Salicylate of Potash in the treatment of acute rhematism, and have been perfectly pleased with the result. I believe it is very much in consequence of the presence of Potash in their composition, that Bland's pills are so efficacious in the treatment of Anaemia, that salt being necessary to the formation of the red corpuscles which contain the haemoglobin and carry the oxygen.

As regards its action outside the body, we know that Gallic acid is a powerful anti-
septic, and may be employed, often with advan-
tage, instead of Carbolic Acid. One advan-
tage which it possesses is, that it is much less irritating to the tissues, and is particularly useful in Listerian surgery for deep dressings which are intended to be left undisturbed for any length of time. It there prevents the formation of that peculiarly smelling substance to be found where Carbolic acid dressings have been left undisturbed for a time, but in which its bacteria can be discerned. Possibly it prevents the development in weakened tissue of some organisms which may feed
their way through the blood to the seat of operation, or, as Wattam Cheyne points out, it may have a more powerful influence than Carbonic acid over the smaller microsocii, while the latter is more destructive to the bacteria.

Putrefiable mixtures such as urine, diluted with water and exposed to the air under go putrefaction much less readily when treated with Salicylic acid. Salicylate of Soda alone retards putrefaction, while a mixture of Salicylate of Soda solution of Carbonic acid act much more powerfully. I have found that by adding to an infusion of meat an equal quantity of solution of Salicylate of Soda (20 grains to the ounce of water) it may be kept in Winter for nearly a fortnight without putrefaction, and have been unable to discover any bacteria at the end of that time, though the smell of the mixture was not quite pleasant.

I have also found that the addition of solution of the same strength to putrid urine stops the motion of the bacteria. Also if a little putrid pus be put under a cover glass
on a glass slide and placed under a high power of the microscope, the rod shaped bacteria may easily be seen in perpetual motion. If a drop of salicylate of soda solution be placed on the slide close to the cover glass, the latter slightly tilted up to allow the fluid to pass below it, in a short time the bacteria will be found to have become invisible.

Such being the action of salicylic acid outside the body, have we any reason to suppose that it is different within the organism? I think not. It has been proved by actual experiment (Practitioner 1879, p. 184) that it has no power to lower the normal temperature of the healthy human body. The acid is only to a very small extent changed in the blood or tissues when given in antipyretic doses. Most of it is secreted unaltered in the urine and that very rapidly. In one case I discovered it in the urine within half an hour of its administration in full antipyretic dose.

The concluding paragraphs of Professor Bing's article are so much to the point, I fear to dwell directly on what is to follow in this paper and on any arguments therein contained.
that I cannot do better than here introduce them intact.

"The view that the salicylate of Soda exerts its antipyretic power through the medium of the heart or the respiration, seems to me to be quite tenable. It is an easy matter to show that dozens of poisons, which are absolutely powerless against fever, possess the property of causing a depression in both the circulatory respiratory systems. The temperature of the body can be influenced by these poisons, particularly if the action of one of them is acute, as far as to bring about collapse. In fact, I scarcely know how one would proceed in order to test actually the diminution of temperature with such powerful agents as these. With salicylic acid, however, or its salt exhibited in such doses as are commonly given with good effect, there can be no talk of collapse, except in cases where a spontaneous or sudden decline of temperature coincides with the reduction effected by the drug."

Soval expressly asserts that an action of salicylic acid upon the pulse or respiration is both found, as tried in Feinschreiber's clinic for antipyretic purpose, was almost entirely absent. \* x x x x x
Salicylic acid possesses in all outward respects a resemblance to quinine. It combats the Malarial poisoning (Sinaïd, Bues) — although less surely and effectually than quinine — during the period of apyrexia. Where, as is well known, neither the pulse nor respiration necessarily need present the slightest abnormality. In its, like quinine, a powerful antiseptic, which can be introduced into the organism in large quantities, circulates there for a considerable length of time, and is quinoid off again — at least partially — in an unaltered condition. Even the ringing in the ears and the slight deafness characteristic of Chinchonism are not wanting in connection with the medication with salicylic acid. A complete agreement between its behaviour and that of quinine toward certain disease-producing agencies, known, or must be confessed, only by their effects, does not exist. This we have already seen in speaking of Intermitent Fever. Acute articular rheumatism, a disease in which quinine avails so little to salicylic acid so much, furnishes a second converse example. Considering these chemical dissimilarity of the two substances it is not to be expected that there should exist a similarity
between their modes of action or more than the general points involved. This general re-
semblance is, however, unquestionably present, and as we shall have to seek an explanation
of the manner in which their therapeutic action is exerted in the same channels."

Before quitting the therapeutic action of Salicylic acid, I would like to point out that in
my experience its value is not confined to the period of acute rheumatism. The fol-
lowing case illustrates this. A young woman
of about 27 had been ill for two days with
pain in her joints, and on the third day, when
I saw her first, was confined to bed with pain
and swelling in several joints & a temperature
of 103.5° F. Under treatment by Salicylate of
Potash the temperature returned to the
normal within 48 hours. She continued to
take the remedy three times daily for a few
days & then stopped it. In two days time
pain returned to one knee, one shoulder &
three elbow joints, but the temperature was
normal. The pain yielded in 24 hours &
26 grains of Salicylate of Potash every four
hours. A similar attack occurred in a
few days on discontinuing the medicine, but yielded again in a similar manner. The drug was continued for ten days, gradually decreasing doses, three times daily, but the pain did not return.

This further action is no proof, as many believe, that its antipyretic action is not due to its antiseptic power; for no one will deny that it is quite possible for a drug to have more than one therapeutical action; and while Salicylic acid is capable of reducing temperature in almost all cases of pyrexia, that power is far more marked in Acute Rheumatism than in any other disease. It has in this disease a curative, as well as a remedial effect. I believe it acts directly on the products of the febrile action as well as on the cause of it.

I may also remark that much as Salicin is favored by Dr. Haack as a remedy in Acute Rheumatism, it has not, in my hands, given nearly such satisfactory results as the Salicylate of Soda & Potash. The following case similar to several others treated in the same way illustrates this.
A young man of 25 had been suffering for a few days from pains in his wrists, and had to take to bed in consequence of general weakness and weakness, with pain and swelling in one ankle, both knees, both wrists, one elbow, one shoulder. I found his temperature 104.5° F, and ordered 20 grains of Salicyl every two hours for four doses, & after that every three hours. Next day, the pain was somewhat relieved, but the temperature was 103.2° F. I continued the Salicyl for two days longer, the temperatures being 102.6° and 102.4° F respectively on these days. As he still complained of pain I ordered Salicylate of Soda in 25-grain doses every three hours instead of the Salicyl. Next day the temperature was 98.8° F. The pain was gone from the joints, but one wrist was much swollen and stiff and the hand powerless. I continued the Salicylate four times daily, the got quite well, the wrist returning to normal. In about ten days he had a relapse, due to getting a chill while at work, but soon recovered fully.
Treatment with the Salicylates.

We have now to consider the subject of pyrexia arising under other conditions than those already mentioned.

Recent investigations, and particularly those of Professor Lister, have led me to believe that in all cases of pyrexia, microorganisms in the blood, or tissues, or both, play an important part.

Roch was the first to show that the blood of acute abscesses teems with micrococci. Lister and Osler (who has lately been working in the same field) confirm this. But the case of chronic abscesses is different. When these are opened under precautions so as to exclude atmospheric contact, no microorganisms can be discovered in the pus. The explanation of this difference is not, I think, far to seek. It is possible for these organisms or their germs to gain access to the blood, and through the blood to reach the site of the abscess in two distinct ways, either per

naturales or immuturales, if I might so
Express it, i.e. filter through the lungs along with air, or through the stomach and bowels along with food on the one hand, or through a breach of surface in the skin or mucous membrane on the other. Both these modes of entrance have been illustrated by cases already mentioned. In the case of acute abscesses where there is no breach of cutaneous or mucous surface, we are bound to accept the only other alternative, that they have entered by the lungs or primary vein, and consequently must have been circulating for a time at least in the blood.

The explanation which I would offer of the presence of micrococci in acute and of their absence in chronic abscesses is this—that when we have in any part of the body an acute inflammation of sufficient intensity or size to throw any considerable quantity of inflammatory products into the blood, these products bring about such a state of the blood as renders possible the life and growth of micro-organisms. In chronic abscesses we have not the same
Elaboration of inflammatory products, and, consequently, a more natural condition of the blood; or, if organisms were once present they have died after all the putrefactive recovery for their existence has been used up. In fact, these, like all other organisms require a proper niche in which to live, grow, and reproduce their kind; while healthy blood and tissues do not afford a favorable niche but offer great resistance to the existence of organisms.

Now I think this view is confirmed by some investigations made by Professor Lister, laid before the International Medical Congress in London in August last and published in the Lancet for November 10th and 26th of last year. In the course of experiments conducted in order to find whether organized or unorganized blood clots had the power of resisting putrefactive changes, when fluid containing bacteria was introduced into their substance, he found that the blood itself as a whole, and even the serum has the power of resisting the development of bacteria.
and the process of putrefaction in a wonderful degree. When water containing bacilli is added to healthy blood, provided the atmosphere be excluded, putrefaction will not occur; it has power to resist development where the bacteria are not too numerous. It is only when the blood or serum has received more bacteria than it can cope with that putrefaction occurs. Now this is exactly what happens in the case of infectious diseases, and other febrile disorders already mentioned. Every one who is exposed to the materials morti of Typhoid Fever does not suffer from the disease. This taking it or not depends mainly on two factors—the state of his body and the amount or concentration of the poison. A healthy person may frequently, even in one day, come in contact with disease-causing poison, and may even receive it into his blood, and yet as often suffer no inconvenience but throw off the infection as it is called. Still, even in the case of
a person in the most robust health, were thus to happen too often, the living blood and tissues would be so infected that at last they would be conquered. Or, if the same person had been subjected to labour of any kind which would even for a time depress his vital powers, and if added to this his supply of food had been in:

Sufficient, placed in the same circum:
stances as regards infection, his chances of throwing it off would be very much diminished. On the other hand, we con:
stantly see from the strongest knocked
down, as it were by one blow, by the very
intensity and concentration of the poison.

Again, circumstances may bring it about
that the blood offers a very favorable
or very unfavorable index for the life
and development of organisms. As regard
the latter condition we know that vac:

\[\text{Citation brings about such a state of}
the system that small pox is not so easily
contracted, and if contracted its virulence
is much diminished, the development of
the vaccine virus having used up wholly

or partially the patulum exist, the Varicela poison requires in order to exist. In a
similar manner one attack of many in:
fection does not grant as a rule ini:
munity from a second attack, the par:
ticular patulum not being reproduced
in sufficient quantity. Another example of
an unfavorable state of the blood to the
reception of a poison is to be found in
what often happens in the pathological
theatre. After one has for a time
breathed the atmosphere of such a
place, and been frequently engaged in
manipulating comparatively recent mortid
specimens, his blood seems to be filled
of that which would feed a poison; and
though he scratch or even cut himself
accidentally while engaged in handling
such matter, very often no evil consequence
result. Whereas, should any one, say, fresh
from the Country, meet with such an accident
a more or less severe attack of blood
poisoning would likely supervene.
On the other hand a very favourable
result is often afforded. For example, we
know that women during the Puerperium are very susceptible to the poison of some specific fevers and erysipelas. It would appear that their blood has in it that which affords good nourishment to the poison, or is wanting in that which would help to resist it.

A very remarkable proof of the truth of my statement is to be found in Mr. Spears' account of the wood-borers' disease as reported in the Practitioner for December 1831, p. 479. "It has long been known that whereas herbivorous animals suffer from this disease (antiaris) in an epidemic form, and are most readily inoculated with the virus, omnivorous, and to a still greater degree carnivorous animals, are with difficulty infected; and the recent experiments of Professor Trous of Munich, by which it was shown that rats fed on flesh resisted inoculation, while the same animals placed on a vegetable diet quickly succumbed, will probably be accepted, pro tempore, as indicating that the relative immunity of the Carnivora is not inherent.
to the genus, but is determined by the nature of their food. As regards the disease in the human subject, Mr. Spear, who, guided by the observations above referred to, instituted minute inquiries into the alimentation of the soloil-containers, and especially of those who had suffered from the acute disease, brings forward some curious facts calculated to support the hypothesis that in their case the ingestion of a quantity of vegetable food may bear some determining relation to the full activity and development of the infection. By such a hypothesis the facts might be explained, the otherwise inexplicable incidence, in fully developed attacks of the commence-ment of urgent symptoms upon the Sunday or other special holiday—a coincidence long observed, so that it had become proverbial amongst the sailors. And as to those who suffered, in nearly every case where in-formation was obtainable, the develop-ment of urgent symptoms was found to quickly supervene upon the ingestion of an unusual quantity of vegetable food in some
form or other — in the form of onions, lettuce, cabbage, fruit, or the copious draughts of herb-decoctions with which the patient is accustomed to treat a supposed "cold." In the progress of other cases, after remission of the symptoms, a relapse seemed to follow the eating of vegetable food — a coincidence specially remarked upon in three cases, in all of which the patients were supposed to be recovering, and came down stairs eating fruit — in one case cabbage also, twenty-four hours before the fatal termination of their illnesses. While these considerations were weighing with Mr. Spear, information reached him from Constantinople that there — where the external form of authority at least is well known, so that it engages the attention of a special class of doctors — the eating of vegetables or fruit during the progress of an attack is regarded as "especially dangerous." "It is conceivable," he concludes, "that certain alimentary sub-
estances may bring about in the body such chemical or morphological change..."
as will render its fluids a richer field for
the "proliferation of disease germs"."

We all know that we are surrounded
by germs, which, under suitable circumstances,
will rise to fermentation and putrefaction;
and the number of different species is
so great that one cannot even guess at
the ultimate number. Even tap water
contains I doubt not—many hundred
varieties. Take, say, a dozen glasses of
milk and add to each a small quanti-
ty of ordinary tap water and in all
most every glass the microscope will
reveal a different form of bacterium (bacteria).
Now, as we are constantly exposed to the
attacks of these micro-organisms, of the
existence of which we are aware, and no
doubt of numbers less than small to
be demonstrated by our present methods,
and that even in such ordinary processes
as breathing and drinking what we con-
sider good pure air and water; and, as we
are frequently exposed to what we know to be
impure air or water, we may have some idea
of the power of the living body to resist injury.
Such is the case in health, but let us consider what is the state of matters when there is a deviation from healthy processes, when the system generally is in an infected condition, and there is a deficient elimination of deleterious matters from the blood. Take as an example the case of a person who has contracted acute pleurisy from exposure to cold. A certain relation exists between the nerves in the skin and the tissues immediately adjacent or functionally connected with it. The amount of energy which can exist between the two is within certain limits a constant quantity. Well, from the diminution of energy in the integumentary nerves by the action of the cold, the corresponding nerves in the pleura are so energized, probably through the nerve centres reflexly, that their function to control the vital action and promote nutrition is subverted, and if this is long enough continued, pain and the other symptoms of inflammation result. The arrangement of nutrition and other change,

---
in the tissue's ger or rise to the presence in the
blood of more waste products than the
organs of excretion are in the habit of
being called upon to get rid of, and
if these accumulate in the blood we
get I maquié, that condition of the
blood which renders possible the life of
immunizable micro-organisms; and to
these I would attribute many of the
symptoms which we call from. In the
presence of such organisms I would at:
tribute the depressing febrile effect of an
ordinary catale or cold in the head, or
influenza as it is fashionable to call it.
There is, I think, no doubt that true
influenza is a more serious disease and
due to specific organisms (Papers by Dr.
J. Anderson of Edinburgh (in the Glasgow
Medical Journal) on Influenza.)

The fact that these organisms have never
been found in the blood is no proof of their
non existence. They are, if present, undoubtedly
extremely small; but, as our instruments are
perfected, and modes of investigation li:
proved, smaller and yet smaller organisms
Date: April 1880.

Day of Disease.

Temp. F.

Name: J.S.  Occupation:  Residence:

Age: 17  Disease: Pneumonia  Termination: May

Operation:
- 20 gm. Salic. sel. 2 cm. for 24 hours.
are being discovered. Some time ago the ordinary bacteria found in septic pus were supposed to be the ultimate limit, and now it is not so very difficult to demonstrate the much smaller micrococci.

Both quinine & the application of cold & early have long been used to reduce the fever in such diseases as Pneumonia; and just as Salicylic Acid is antipyretic in the febrile conditions already illustrated, so here it specific, its beneficial effects, as the following case will show.

A lad of 14 suffering from inflammation of the base of the left lung with some degree of pleurisy with effusion (as was diagnosed at the time but made quite certain after the pneumonia cleared up) had been ill for three days before I saw him. On this day:

Temperature 105.2° F. I ordered Salicylate of Soda to 20 grain dose every two hours for six doses at eight that evening & two hours after that every three hours. In two days his temperature reached 99.5° and as it fell the delirium which was present from the first vanished. The fever
true showed a constant tendency to rise for
ten days, but was kept down by the judicious
use of the same drug. He made a good
recovery & ultimately got rid of the effusion.
I was called to see a lad of 16 who
had been seized, 24 hours previously, with
pain in his right side some little time
after exposure to cold draught. When per-
scoping firmly, I found the physical
beginning of a pretty diffuse pleurisy well
marked. The temperature was 103.5° F.

After 20 grn. doses of Salicylate of Soda,
every 3 hours and one dose of 25 minims
of Solution of the Muriate of Morphia to
alleviate the pain & cough, I found the tem-
perature had fallen during 24 hours to
100.2° F. Next day it was 99.6° F. & the pain
was gone. He had no sickness. But as the
pulse continued bounding & the cough trouble
began on the third day I prescribed the
minims of Aromatic Wine, and 20 minims
of Camphorated Tobacco & opium every
3 hours with the result of finding all
the symptoms improved. He complained
however of sickness after the aromatic.
A woman of about sixty years of age was suffering from inflammation of the bowels. I treated her mainly with opium internally and the pain was thereby in great part removed without her being to any extent under the influence of the drug, her temperature continuing high (104.6°F.) I gave her 20 grain doses of salicylate of bismuth with ten grains of bismuth subnitrate every three hours. In twenty-four hours I found the temperature 99.6°F and discontinued the salicylate but continued the bismuth. The bowels got somewhat more loose under the use of the salicylate but the pain was not increased. She still required morphin however, though the temperature did not again rise.

In such a disease as pleurisy I do not give the place to terms as the cause of the disorder, but merely look upon them as an accompaniment, their existence being rendered possible by the local inflammation. If we combat these successfully we relieve our patients of much discomfort and of the dangers to which high temperatures
asures may lead. It has not been proved that the great good derived from Antimony is not due to an antiseptic action.

Though I have pointed out that Salicylic acid has the power of reducing temperature in inflammatory, as in other febrile conditions, I do not mean that I consider it advisable in every case to administer it. All that I intend is, to prove its antipyretic power, and having done so, I would now ask this question viz.: Having that we have every reason to believe that the antipyretic action of Salicylic acid is but the result of its antiseptic or antisyphilitic power in diseases where the pyrexia is due to minute organisms, is it too much to assume that in other diseases, such as pneumonia & pleurisy, its therapeutic action is the same?

For the following reasons I think such an assumption is not unwarrantable.

1. It is a feasible theory & can account for the symptoms.

2. We have seen that micro-organisms are capable of producing pyrexia.
3. These diseases (pneumonia etc.) are quite comparable to cases of acute abscess
which we know that organisms exist.

4. Healthy living blood offers no satis-
factory nidus to these organisms, for the
life and development of which special
pabulum is required, and it is reason-
able to suppose that acute inflammatory
diseases supply such a pabulum.

5. In all these disorders (specific fevers
and inflammations alike) an antipyretic
effect can be produced by therapeutic me-

dium which are known to be anti-
septic.

It now remains for me to merely men-
tion a sequel which not infrequently
results from Pyrexia vi et Hyperpyrexia. When
this occurs another factor has to be con-
sidered. I do not believe that the pre-

dence of organisms is of itself the cause
of this condition, but that their power of

elevating the temperature ceases at some
point about or a little over 105° F. Indeed
our explanation of the remission or Relapsing
Fever is that when the temperature reaches that point it, kills the greater number of the organisms. Hyperpyrexia appears to be due to the loss of the controlling influence of the nervous system, the nerve centres being paralysed. The body is then much in the same state as that of an animal with its spinal cord divided below the origin of the phrenic nerves, and is at the mercy of circumstances. So remedy such a condition, salicylic acid is useless. Quinine alone is also of no avail. The therapeutic agent to which recourse ought to be had is the external application of cold. Sunstroke may be cited as an example of hyperpyrexia produced by paralysis of nerve centres by excessive heat, and here the treatment by cold has given most satisfactory results. By this means heat is actually abstracted, and a powerful stimulus is also given to the nerve centres. The value of this method is admirably shown by Dr. Wilson Fox in his paper on two cases of hyperpyrexia so treated successfully. Dr. William Russell also in the Birmingham Medical Review reports a case
<table>
<thead>
<tr>
<th>Date</th>
<th>Fever (°F)</th>
<th>Pulse</th>
<th>Respiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 1560</td>
<td>108°</td>
<td>128/80</td>
<td>15/140</td>
</tr>
<tr>
<td>8</td>
<td>107°</td>
<td>115/70</td>
<td>13/110</td>
</tr>
<tr>
<td>9</td>
<td>103°</td>
<td>15/10</td>
<td>2/1</td>
</tr>
<tr>
<td>10</td>
<td>104°</td>
<td>13/10</td>
<td>2/1</td>
</tr>
<tr>
<td>11</td>
<td>105°</td>
<td>12/10</td>
<td>2/1</td>
</tr>
</tbody>
</table>

**Died.**

Name: A. S.

Occupation: Typhoid Fever Compli.

Residence: 212 Plano. postmane.
Date 5th Jan, 1849

<table>
<thead>
<tr>
<th>Day</th>
<th>Disease</th>
<th>Temp. (°F)</th>
</tr>
</thead>
</table>

Motion:

- 1
- 1
- 3
- 1
- 3
- 3
- 4

Pulse:

- 100
- 110
- 80
- 90
- 85
- 95
- 105
- 95
- 105
- 105
- 105
- 105
- 105
- 105
- 105
- 105
- 105
- 105
- 105
- 105

Respirations:

- 20
- 25
- 20
- 25
- 30
- 30
- 30
- 30
- 30
- 30
- 30
- 30
- 30
- 30
- 30
- 30
- 30
- 30
- 30
- 30

Name: P. M.
Occupation: Dr, in.
Residence:

Age: 20

Disease: Syphilitic Fever.
Removal:
where such treatment, though unsuccessful as regards life, was followed by good results as regards temperature. It is a good plan to help the tonic action of the cold by repeated doses of Quinine. Salicylic acid unfortunately produces no such tonic action.

I append the temperature charts of three cases illustration of the remarks just made. Two of these ended fatally, from Hyperpyrexia, and show the inability of Salicylic acid to reduce temperature after a certain point has been reached. In the 3rd a heroic dose of Salicylate of Soda reduced the temperature which rose again next day but was again combatted by cold foment and quinine.

Case 1. A married woman, of 35 or thereabout, had been ill for a week or more with Typhoid symptoms when she was seized with pain in her side, cough, and expectoration of rusty sputum. Physical examination revealed Pneumonia consolidation of the base of the right lung. Antimony caused such nausea vomiting that I had to discontinue it after two hours. When the temperature rose 105.5° F. I ordered ½ of Salicylate of Soda, which
reduced it to 102° F. When it rose again I gave 10 grains of quinine, ordered cold suds to the head and sponging to the body generally. Notwithstanding this the temperature rose to 106° F. when I gave 87° Salicylate of Soda. In spite of this the temperature rose to 107° F. soon after which she died.

Case ii. A young man, aged 20, suffered from a very typical attack of Typhoid Fever. For a time the high temperature was combated successfully by Salicylate of Soda. But at last it failed. (See Temp. Chart xvii) The Hyperpyrexia and fatal issue were, I believe, in great part due to the large quantities of strong milk with which the patient was supplied, contrary to my orders & unknown to me till after his decease.

Case iii. A thin, weakly little boy of 5 years had been ill of Typhoid Fever for more than ten days, and had been kept alive mainly by stimulants. His temperature rose to 105.5° F. (See Temp. Chart xviii) and his case seemed almost hopeless. With some misgivings I ordered 20 grains of Salicylate of Soda, but at the same time doubled the amount of stimulants, and had the satisfaction of finding the temperature in the evening 99° F. 40
consumed a wonderful amount of brandy. Next day the thermometer rose again to 104° and 104.5°F.
As he was very weak, I preferred trying the effect of cold infusion and 5 grains of quinine sulphate, to more of the salicylate. The temperature fell to normal, and next day it was below normal and never rose high again.

If I might judge from the prostration which followed the reduction of temperature by the salicylate of soda, I would say that the subsequent rise so easily reduced by cold, was due to paralysis of the nerve centres. The large quantity of salicylate (large considering the age of the child) had evidently proved fatal to the organisms, but I should hesitate before a second time ordering such a heroic dose.

     Ayl. Thom. M. A., M.B. & C. M.

Greeff. April 29th, 1882.