An Epidemic Of Enteric Fever; a Thesis for the Purpose of Graduating M.D.

by

Henry Robert Oswald, M.B. & C.M. Edin. Univ. (1875)

March 25th, 1881.

London, S.E.

To The Senatus Academicus of The University Of Edinburgh.
An Epidemic Of Enteric Fever.

To undertake the publication of a Thesis on Typhoid Fever, a subject on which has been concentrated the conspicuous ability of specialists, the acute observation of numerous medical men, would at the present time be an attempt of considerable timidity on the part of any person, but almost unwarrantable in one, like myself, busily engaged in the general practice of his profession. I feel therefore that it will be advisable to confine myself in the following pages to a concise description of an epidemic which occurred in a town where I was living. Indeed Enteric Fever appears, from the mortality it causes, to be the scourge of the British Isles and is rendered a question of sufficient importance to be worthy of careful study & reiterated consideration. An apology for my task then is hardly necessary, for no matter how frequent, exhaustive, or excellent similar accounts may be, it is only by an accumulation of records and of comparisons thus afforded that medical science can hope to reach a climax of accuracy in etiology, diagnosis, or of efficiency in treatment. It is not often given to an individual largely to aid the advance of medical knowledge by his single endeavour. The sanitary benefit of mankind has been attained by slow steps & gradual enlightenment, rarely by the sudden blaze of a great discovery. It is just possible intellects as profound as that of Sir Isaac Newton have existed amongst the disciples of Archimedes.
but the material operated on by the former was governed by exact mathematical laws — his machine though complex changed little comparatively in its action. Who can assert the same of that intricate, varied and ever varying organism, that sublime combination of a mortal body with an immortal soul, the human being? And who, remembering this, will reproach the devotees of science if their knowledge seem too often the mere acquisitions of a watchful empiricism?

It was in January of the year 1849, while I was engaged in medical practice at Redhill in the county of Surrey, that several people, patients of different medical men, were seized, within a short time of each other, with symptoms of so indefinable a nature that nobody liked to commit himself to an instant diagnosis regarding them. Each physician or surgeon I chanced to meet did not fail to inquire whether I had visited any peculiarly suspicious cases of disease. Redhill had enjoyed so good a reputation for salubrity that we reluctantly arrived at the conclusion this was the beginning of an epidemic of Enteric Fever which we beheld. Such was the fact, in a few days sufficed to banish doubts and to confirm first impressions. The Medical Officer of Health for the district, Mr. G. L. Jacob, was immediately communicated with. To his unflagging and intelligent zeal, as well as to the investigations of Dr. Thorne Thorne, was due the complete exposure of the cause of this untoward event.
All sorts of reasons had been suggested; imported infection, milk, drainage, water. The last was conclusively proved to be the chief, may the only factor in the origin of the outbreak.

Caterham is a small town containing 2,800 inhabitants, situated on chalk hills at the head of a valley, and is eight miles distant from Redhill. At Caterham are the wells of the Caterham Water-Works Company, which supply water to it, to Redhill, & to two separate villages called Betchingley & Nutfield. Enteric Fever broke out almost simultaneously in all these places, and was strictly limited to houses which drew their water from the above source. According to Dr. Thorne there was no history of the recent existence of Enteric Fever amongst the people at Caterham, & the origin of the disease here, he thinks, could not have been owing to drainage, for the majority of the houses affected drained their excrement into separate cesspools, no common system of sewers having been formed; nor to milk, for it was taken by these dwellings from five or more quite independent dairies. The outbreak at Redhill commenced nearly on the

The facts narrated at this part of my history were well known to everybody in Redhill at the period to which they relate, but it is necessary to say that I have refreshed my memory concerning them from Dr. Thorne's able Report to the Local Government Board on this Epidemic.
same day as at Caterham, and like it the milk supply was derived from so many different places, that it was certain milk could not be held responsible for the result. The drainage too had never been complained of, and no case of typhoid fever was known to have occurred for a year and a half previously.

At Betchingley & Nutfield there were few cases but I do not propose to enter into details respecting what happened beyond the range of my personal observation, except to state certain facts which came to light touching the direct cause of the epidemic, of which I have since read in print. It will be enough to note that the first case at Nutfield was reported a week, v at Betchingley a fortnight, after those at Redhill. It is possible greater alarm would have discovered an earlier invasion of these two neighbourhoods. In my case a good reason for the delay will presently be pointed out.

During the year 1878 the Caterham Water-Works Company, whose water had hitherto been justly prized for its purity, began to sink a third well as an addition to two already in use. The latter were of great depth reaching through different geological strata, with a diameter of some feet for a distance of 163 yards, and connected by three adits in the chalk stratum. The water was pumped up from them into tanks whence the supply was derived by gravitation. The third well was bored 90 feet away from the others. In the latter part of 1879 in beginning
of 1879 the company were fashioning an adit between one of the old wells and the new at a depth of 433 feet, measuring 6 feet by four in calibre. Several workmen were employed in its construction, some below, some at the surface. It was at this period the first complaints about the water arose, but they were occasioned by its turbidity, which was merely the effect of boring through the chalk. Most of this chalky water found its way into the old wells through a fissure discovered in this stratum, and in itself was harmless. Turbidity was but the shadow of a coming event.

Dr. Thorne and Jacob heard that one of the workmen alluded to had been ailing and had left work some time in January. From him they elicited the following pregnant story:—J.K., aged 32 years, was employed by the company in the construction of the new adit, to which he descended every day; part of his labour being to attach by a rope the buckets in which excavated chalk was raised to the mouth of the well and to receive them again filled with bricks and cement required for the work in progress. While thus diurnally occupied he became unwell about January 5th 1879. His symptoms were loss of appetite, pains in the limbs, giddiness, alternate heat and shivering, cramps in the abdomen, and diarrhoea. A regulation existed that workmen should relieve themselves before proceeding to their subterranean labour; but, notwithstanding
compliance with the rule, J. H.'s diarrhoea was so frequent, so severe, & so sudden in its approach, that he was obliged to evacuate several times while in the adit. Purging was a main symptom of his disease, & was so urgent it happened before he left home and when he returned there, as well as in the adit. The abrine discharges were very copious. Now was J. H. suffering from typhoid fever, and did he contaminate the drinking water? Dr. Thorne saw the man on February 9th when he had the “aspect of one who had recently suffered from some acute disease; he was still very weak & it was obvious that he had greatly lost flesh.” He adds, “I have now no hesitation in taking it as a fact that a man ill of enteric fever from January 5th to the end of the month was occupied during the first fortnight of that period at work in the well of the Catterham Waterworks Company. The fact was not inferred from any consequences of it, but simply from what was seen & heard of the particular individual.” Such is the testimony of a gentleman skilled in sifting such matters. J. H. denied ever having relieved himself without using the bucket as a stool, but admitted that in its elevation the contents, or portions of them, often fell into the water below. When the buckets were emptied above, they were re-filled with building material and lowered again. Thus from January 5th to January 19th or 20th the drinking water distributed to Redhill & other places was receiving in greater
or less quantity the excrement of a man suffering from Enteric Fever. I have shown how the water in the new well percolated through a fissure to the old well, J. K. was undoubtedly the "fons et origo maligni." Where he acquired the evil is uncertain; but opportunities for contracting it had presented themselves by his acknowledged visit to Broydon, where this fever is almost endemic.

Having demonstrated, I hope lucidly, the cause, I shall now produce a few statistics bearing on the incubative stage of the epidemic. The first cases noticed were at Caterham on January 13th at Redhill on January 27th. It is essential to recollect in connection with J. K. viz., Jan. 5th when his diarrhoea began, & Jan. 20th when he retired altogether from his occupation. Caterham & Redhill, it will then be seen, were invaded exactly a fortnight after the former date. At Betchingley the first reported case was on February 2nd, a fortnight after J. K. withdrew from work; and at Nutfield on Jan. 25th, a week after his resignation. It may be said with regard to Nutfield & Betchingley that they afford weak grounds for drawing an inference respecting incubation, so that any statement based on facts relating to Redhill & Caterham must be modified by what is known about these outlying villages. It chanced, however, that, owing to the severe frost and to the Company's operations, the water-supply of Nutfield & Betchingley was much interfered with.
Here again I must quote a pertinent opinion uttered by Dr. Thorne, with which I entirely agree. He says, in view of recent investigations into the intimate pathology of the infectious fevers the contagion of interie fever itself must be probably regarded as particulate, and when contained in water it must probably be viewed as held in mechanical suspension, rather than distributed throughout it after the manner of a chemical solution. Under these circumstances its distribution throughout a large body of water would probably be not wholly regular in its passage into and through mains receiving the water might not be uniform either in point of time or in the direction taken. I think these reasons sufficiently account for the phenomena mentioned.

Everyone is aware that typhoid symptoms are insidious, not immediately recognised, the patient himself being so little disturbed he cannot always tell precisely when they began. Yet allowing for a degree of uncertainty on this score I deem the above mentioned dates remarkable. They show a tendency to run in fortinights. Further distinct evidence exists in reference to Red Hill, confirming this peculiarity, which I shall here present in the form of a table.

† For this table of statistics I am indebted to the courtesy and kindness of Mr. E. L. Jacob, to whose exertions was in great part due the prevention of a wider distribution of the fever.
A Table Showing The Dates Of Attacks Of Enteric Fever In Redhill, in the Borough Of Reigate.

<table>
<thead>
<tr>
<th>Month</th>
<th>Houses Invaded</th>
<th>Persons Attacked</th>
<th>Month</th>
<th>Houses Invaded</th>
<th>Persons Attacked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 20</td>
<td>2</td>
<td>2</td>
<td>March</td>
<td>155</td>
<td>224</td>
</tr>
<tr>
<td>21</td>
<td>3</td>
<td>3</td>
<td>April</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>7</td>
<td>5</td>
<td>May</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>23</td>
<td>6</td>
<td>13</td>
<td></td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>24</td>
<td>12</td>
<td>14</td>
<td></td>
<td>151</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>5</td>
<td>2</td>
<td></td>
<td>154</td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td>2</td>
<td>17</td>
<td></td>
<td>153</td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>12</td>
<td>19</td>
<td></td>
<td>152</td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>1</td>
<td></td>
<td>151</td>
<td>1</td>
</tr>
<tr>
<td>29</td>
<td>6</td>
<td>1</td>
<td></td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>30</td>
<td>2</td>
<td>1</td>
<td></td>
<td>149</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>10</td>
<td>1</td>
<td></td>
<td>148</td>
<td>1</td>
</tr>
<tr>
<td>Feb. 1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>147</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>1</td>
<td></td>
<td>146</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>1</td>
<td></td>
<td>145</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>1</td>
<td></td>
<td>144</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>1</td>
<td></td>
<td>143</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>1</td>
<td></td>
<td>142</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>1</td>
<td></td>
<td>141</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>1</td>
<td></td>
<td>140</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>1</td>
<td></td>
<td>139</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>1</td>
<td></td>
<td>138</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>1</td>
<td></td>
<td>137</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>1</td>
<td></td>
<td>136</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>2</td>
<td>1</td>
<td></td>
<td>135</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>2</td>
<td>1</td>
<td></td>
<td>134</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>1</td>
<td></td>
<td>133</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>1</td>
<td></td>
<td>132</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>1</td>
<td></td>
<td>131</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>1</td>
<td></td>
<td>130</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>1</td>
<td></td>
<td>129</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>1</td>
<td></td>
<td>128</td>
<td>1</td>
</tr>
<tr>
<td>Unknown Feb. 28</td>
<td>1</td>
<td>11</td>
<td>May 1</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

Total: 164 224
The foregoing Table illustrates at a glance the order and succession of houses invaded and people attacked. Opposite those dates where no houses but only people are numbered in the list, the reader must understand that on these days patients living in houses already invaded were struck, and that no cases occurred in other houses: in other words that such cases were the results of infection or contagion of a secondary kind, not necessarily due to the primary poison in the drinking water.

It will be observed that two houses, the first victims, were invaded exactly a fortnight after Jan. 5th, the date of J. H.'s preliminary contamination of the well. Fresh houses were assailed till Feb. 20th, uninterruptedly day after day. Then there was an abrupt cessation with reference to dwellings till March 1st, from which day till the end of the epidemic only nine new dwellings were tainted, in comparison to one hundred or fifty previously. It is also worthy of notice that from Jan. 31st to Feb. 3rd by far the largest number both of houses & inmates were attacked, larger than on any other four consecutive days of the epidemic; and this period corresponds with the first appearance of the disease at Bletchingly, possibly proving that the aggressive power of the poison had at this time reached the acme of its strength.

On the 8th February the Mayor caused the town to be posted with placards warning the inhabitants about the condition of the water, and it
may fairly be taken for granted they discontinued its use immediately. Nor was confidence in it restored for many a day; and indeed I have heard men and women declare they would never again drink the Company's supply. Meanwhile water was drawn from wells of attested purity and distributed to the people by means of water-carts. I have called attention to Feb. 26th as a day on which there was an abrupt temporary termination in the invasion of fresh houes; for this date is about a fortnight later than the day on which the water was generally deemed by the advice of the Mayor. Another curious fact proved by this Table is that, though I.H. left the well on Jan. 26th, the water should have retained its poisonous ingredients till Feb. 8th, as evinced by new cases occurring for a fortnight after Feb. 8th. It is truly impossible to say how long the neighbourhood might have been thus poisoned had not the Mayor opportunely interposed, and therefore I cannot point out how long the activity of typhoid poison might have continued after the source of that poison, viz. I.H., was entirely removed. All I can assert is, it remained in the water for nearly three weeks though its virulence diminished gradually towards the close of that period. Statistics must always be viewed with caution, but I think mine prove the incubative stage of typhoid poison in this epidemic to have lasted in general about a fortnight.
The total number of cases of Enteric Fever at Redhill
was over three hundred, including those at Barkwood Asylum for Idiots, where there were thirty-six sufferers whom I have not included in the Statistical Table. The supply of water here was cut off by order of the medical superintendent on 9th Feb., and the last case reported began to sicken on Feb. 21st,—a fortnight afterwards. The establishment was thenceforward limited in obtaining water to local springs.

Of the total number of people prostrated I attended 86, and saw besides a few more occasionally in consultation with other medical men. In consequence of the great number of patients of whom I had charge, because there was no hospital where they could be received, all my cases were treated at their homes. Some of these were very poor, and extremely defective from a sanitary point of view. There was a grand want of intelligent nursing, a deficiency in the amount of cubic space in the sick-chamber, an absence of proper ventilation. Remembering these points, & the manifold duties of a general practitioner, no one can be surprised that little time was available for more carefully & scientifically noting the fever in each individual.

The majority of persons who first ailed were women and children, that is, habitual water-drinkers. Others were subsequently overcome of an adult age, & of both sexes; but they were secondary, & directly exposed to contagion in existence.
The general symptoms in this epidemic differed in few respects or in none from what one usually observes in cases of Enteric Fever. There were the common presymptomatic signs of malaise, lassitude, headache, slight shivering, pains in the back or limbs, & loss of appetite. The tongue became coated, & a feeling of sickness was experienced, often followed by vomiting. Then might be observed the hectic flush of the cheeks, brilliant & dilated pupils, heat of the skin & increased foulness of the tongue. At the expected time appeared faint rose-coloured spots, small, & protruding a little above the level of the surrounding skin, disappearing on pressure, revealing themselves in crops, sometimes extensively. They were present in almost every patient. Constipation was as common as diarrhoea, the motions being of the typical ochre colour. Pain in the abdomen was to be apprehended; an apprehension it satisfied too often, though haemorrhage from the bowels was rarer than might have been hoped. Yet in a few instances it was copious, in more it amounted to a mere tinge of blood on the surface of hard faces. Cholestasis occurred frequently but not violently. Sore throats, parotitis, bronchial catarrh, bronchitis, hypostatic pneumonia, congestion of the lungs, all supervened in various invalids. Marked loss of flesh accompanied the fever, once or twice serious muscular changes were recorded, ending in lameness in two instances, which did not however come under any treatment.
Some medical men could not find the gradations of temperature described by Wünnderlich, but doubtless complications, especially of the respiratory organs, disturbed the normal course of the mercury and altered its register. Imagine temperature was seldom regularly taken. Time did not permit the attempt under the circumstances in which most of us were placed. As weeks fled symptoms underwent the usual changes & in the great majority of cases resulted in convalescence, which was later in such as suffered from severe nervous disorder. The low muttering as well as more active delirium, subsultus tendinum, partial unconsciousness, wakefulness, in their turn passed under my notice. Recovery took place by lysis, & when quite well many who had encountered the attack looked plumper & healthier than they did prior to the complaint. The parents of children occasionally called my attention to the dulness exhibited by children their offspring months after the epidemic was completely stamped out; a slowness in learning their lessons, a lack of ability to concentrate the mind on their task, and comparative weakness of memory. The Ambulatory character of Enteric Fever was peculiar to some who were never laid up throughout, and who, like the progenitor of their malady, partially occupied themselves with business as long as they could, or if opportunity were present.
Relapses were common and terminated fatally in a few cases, caused perhaps by injudicious or impatient dietary. Happily the type of the exanthem imitated J.K.'s fever and was mild as a whole. The mortality was three per cent, exclusive of the deaths at Earlswood Asylum, where amongst feeble and demented people it reached fourteen per cent. The causes of death were simple asthenia due to the exhaustion consequent on diarrhoea or nervous excitement, or on repeated relapses. Peritonitis, with or without perforation, confirmed grave prognoses and put an end to several unfortunate beings. Convalescents who had endured constipation were heard to complain of abdominal pain and occasioned anxiety on their account. Nothing of serious moment, however, came of these alarms, so far as my knowledge carries me.

The ordinary methods of treatment were as a rule tried—local isolation of patients when possible, strict disinfection of stools to water-closets, flushing of drains. To facilitate this fraction of treatment the municipal authority provided, on application or production of a medical certificate, all those houses with carbolic acid whose inmates were attacked; and this they did free of expense to the recipients. Linen was ordered to be soaked in weak solutions of antiseptic agents a day or two before being
washed, & sheets wet with antiseptic solutions were suspended about the doors of sick-rooms. Unnecessary or worn out articles of clothing, rags, & other things used by the patient, were burnt. Hair cut from the head was similarly destroyed.

The diet was of course chiefly milk, beef tea, mutton broth or chicken broth. Broths were not allowed when diarrhoea existed, because it is increased by them. Calves-foot jelly was a pleasant addition to the food, given light sponge-cake in small pieces a day. When there were no exaggerated intestinal symptoms liquid milk was occasionally refused by children as their appetites failed. To overcome their distaste recourse was had to a most useful experiment. A large bowl was filled with a mixture of pounded ice & salt in the middle of which was deposited a cup containing milk. After being allowed to remain stationary for a sufficient length of time the cup was gently moved round in the mixture so as to bring every part of its outer side into contact with the ice & salt. The milk was thus frozen, & being broken into lumps was freely & gratefully sucked by the youthful sufferers. An agreeable, refreshing, easily manufactured article of food was by this means administered to patients who absolutely declined to swallow fluid milk. It had the advantage too of being easily made by the dullest nurse after a single
demonstration. The dietary of Enteric Fever is so narrow that the least variety is a point gained in combating the poison, for it is highly important to prevent depression from self-starvation. The enemy must be anticipated and hindered in the formation of adventitious alliances. It is already too strong. Stimulants were often required, such as brandy or champagne, sometimes at an early period. I am aware it is best not to prescribe alcohol till a late stage, or to defer giving it till convalescence has set in, and though in retrospect I can think of cases in which it was taken perhaps rather superfluously, I cannot bring to mind an instance of mischief done by its administration. It was specially ordered for excitement of the nervous system, high temperature, the resulting waste of tissue and subsequent weakness. Diarrhoea was treated with opiates, astringents, and the other remedies recommended for it. As a symptom it was not particularly troublesome in the majority of cases, but constipation on the contrary was eminently obstructive. Most of the local practitioners feared to give aperients, the number of patients rendering it a matter of impossibility to keep the necessary watch over the action of such drugs. Castor Oil was sometimes tried in small doses, and enemata of warm water seemed to be of great service. The utmost care and gentleness was always exercised in the ap-
plication of fluxes. In rough hands the
remedy would have been much worse than
any constipation. Warm poultices relieved
abdominal pain, and, when sprinkled with
a few drops of turpentine, flatulence
Vomiting was overcome by small doses of
Hydrocyanic Acid well diluted, or by ice.
Haemorrhage from the bowels seldom called
for interference. Gallie Acid, however, was
beneficially prescribed for internal use when
necessity arose.
Quinine, the staple drug for highly feverish
conditions, was sometimes advantageous,
sometimes of little effect. One of the medical
officers of the Darlington Asylum informed
one that unless his patients swallowed
quinine in large doses, which required
repetition, a diminution of temperature
was not successfully attained.
As a tonic, Bark and Acid appeared to
be largely employed. Perhaps more of this
medicine was drunk by sufferers than of
any other kind. I believe I was the only
practitioner who put faith in internal
antiseptic remedies; at any rate my
patients were alone in taking them. A
little sulphurous acid may have been
prescribed on a few occasions, but I know
nobody but myself who bestowed himself
of the sulpho-carbolates, to which I shall
not be beguiled enough to ascribe a charm,
sincerely though I trust in their efficacy.
their power, if not of destroying, at least of subduing the malignant influence of typhoid poison in the blood.

With few exceptions ferruginous preparations were avoided until convalescence had far advanced, from fear of irritating the unexpectedly tender alimentary canal, and of causing a relapse by again elevating the temperature.

Sponging with cold water when the patient was hot, parched, or restless, recommended itself to the judgment of all. Temporary alleviation of distress was thus obtained, if weakness forbade sponging of the whole body, quiet ablation of hands, face and neck, was acceptable. Baths were not resorted to.

I must now refer to some cases which came exclusively under my own care. These were 86 in number, and in analysing them I find in the list 74 children from 3 yrs. to 15 yrs. of age; 6 adult females; 6 adult males. The preponderance of young people attacked was overwhelming, the majority of them under 10 yrs. of age. Two males and two females whom I have termed adult were, as a fact, not quite 21 yrs. old, yet so nearly approached the legal limit that I have so classified them for the sake of simplicity above the rank of childhood. Except one woman of middle age all my adult patients were less than forty years old. Thus my experience was
like that of the rest, the poison assailed those accustomed to drink water, namely the youthful portion of the population, more widely than adults, who might be supposed to partake very small quantities of it.

I was resident in a house where a girl and two of her brothers were prostrated by the fever, and were subjected to my immediate attention.

C. K., a boy aged 12 yrs, spent Christmas at home & returned to school in Hertfordshire about the last week of January, 1879, before the alarm of an epidemic had arisen. On the day of his departure he looked pale, was not in his usual spirits, & once suddenly omitted while standing over the fire. He had been stuffing himself with sweetmeats, therefore these signs were attributed to blitheness & did not retard his journey. Nothing more was heard of him till a fortnight later when the schoolmaster wrote to say C. K. had never been quite well since the vacation, had lost his appetite, did not care to join his playmates in their sports, but was not forced to remain in bed. The epidemic had meanwhile been recognised as Antonic Fever, so the boy's father at once brought him home. In the transit he walked quite a mile & a half, and on arrival it was plain he had caught the common malady. This was clearly an
Ambulatory case, it would probably have remained so to the end had not stricter measures been adopted. The tongue was covered with a white coat, there was disinclination to eat, sickness, & headache. His stools were of a light yellow colour, the bowels being constipated though not excessively. On the abdomen, chest & shoulders were seen numerous punctular rose-coloured spots of the typhoid sort. Their number was remarkably large, as also the extent of surface they occupied. No complications occurred. Temperature was registered night & morning, below is a chart of it for the last week, i.e. from the day he came home till the fever heat ceased.

<table>
<thead>
<tr>
<th>Date</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-15-16-17-18-19-20-21</td>
<td></td>
</tr>
</tbody>
</table>
Diphtheria evidently took place by lysis, and the temperature chart is typical of what occurs during the third week when no complications exist. Beyond confinement to bed, restriction to liquid diet, the administration of sulpho-carbolic acid, soon discontinued, and disinfection of stools, little was done in the way of treatment. A good recovery was effected. Solid food in the shape of fat bacon was apparently digested with ease when allowed. This was of course not till a proper time had elapsed. At Easter he was again sent to school looking fat and healthy, though a month before his appearance was attenuated.

A. H. aged 10 yrs, sister of C. H., was more severely attacked than her brother, inasmuch as hers was a lingering case in comparison. The characteristic spots showed themselves in moderate numbers. There was a slight cough, but what was of deeper moment was her constipation, for on one occasion no motion occurred for five days. Throughout, there was an absence of diarrhoea, the stools being pale, hard, at times tinged with blood, & small in amount. Much distaste for food was felt, and milk quickly palled. Intestinal pain was complained of though not severely. Considerable wasting followed the fever, the muscles being extremely weak, without, however, undergoing the changes described by Jenner. The temperature may be observed in the succeeding
This child's ailment commenced about Jan. 25th. The thermometer was not called into requisition till Feb. 2nd, as she had made no complaints & was therefore not laid up. During the first three days, temperature was recorded. The mercury rose more than two degrees from morning till evening and declined one & a half in the night. The maximum was reached on the evening of Feb. 4th and continued the same on the following morning, which may be reckoned as being about the beginning of the second week of the disease. It was then 103.6° Fahr., a height it only once again approached viz. on the evening of Feb. 9th 103.5° from which date, as will be seen, a gradual fall proceeded, the thermometer always registering the highest figures in the evening. Ex-
kept on two mornings when they were nearly equal. On Feb. 22d the mercury rose again as if pointing to a relapse, but the alarm was false. Its whole \textit{\&} in its general aspect \textit{\&} its temperature is a fair specimen of that of Intermittent Fever, rising characteristically in the first week, irregular or stationary in the second, \textit{\&} falling slowly but surely in the third, till, towards the fourth week, it is depressed even below the normal.

Little internal treatment was attempted in the shape of drugs. Sulpho-carbolute of Soda gave way to small doses of Quinine, \textit{\&} thereafter to Barked \textit{\&} Acid. Half drachm doses of Castor Oil relieved some of the constipation. Shaving with cold water succeeded in momentarily decreasing the temperature. In other details the same treatment was followed as in other cases. The mental faculties of this girl were impaired for months, a fact impressed on one by her mother who was in the habit of superintending the learning of lessons at home. Thoughts strayed more easily from the subject matter, \textit{\&} memory was less acute than formerly, a sequela which prevailed when every sign of typhoid was defunct. Notwithstanding her lingering recovery, it was thoroughly satisfactory, in a physical sense, for like \textit{\&} once solid food could be eaten without risk, it was so assimilated as to render her more adipose, yet not exuberantly, than when in a previously healthy condition. Her brain was never
precocious, \\n
By it was my opinion she would regain her pristine mental vigour.

A third brother, E. H., became ill about Feb. 12th. He was only six years of age, of a nervous, irritable temperament, and, if he could be classified under a diathesis, I should have ranged him under the tubercular division. His case was more serious than either of the two just described; whose symptoms were aggravated or multiplied in him. The prognosis was once grave. The tongue at first thinly furred was soon overspread with a dense white coat and finally turned to a dry brown colour. The throat was sore and clogged with a white secretion or exudation, which it was impossible to examine from the great prostration of the patient. The lips and teeth became spotted with sores, and pharyngitis occurred now and again. Appetite failed; the bowels primarily confined, afterwards relaxed to the extent of three or four dejections daily or on alternate days; an eruption revealed itself over the abdomen; the urine was highly coloured; the faeces pale yellow. A burning dry skin, headache, feverishness, vacuity of facial expression, incoherence, sub-sultus, tendinitis, delirium, disclosed the great disturbance of the nervous system: a rapid, irregular pulse and hurried respiratory movements exposed the efforts at tissue repair by the circulation. Cough led to the examination of the lungs, which were affected by a low form of hypostatic pneumonia, and to add to his misfortunes his temperature was persistently exalted.

† And somewhat under the Atheromatous.
This record is peculiar, as does not resemble the common course of temperature in the typhoid state, inasmuch as it shows the fever heat to have been more intense frequently in the evening than in the morning; nor can one observe the ascent one is taught to expect. For a week the index was propelled to between 103° and 104° Fahrenheit, and for nine successive days it ranged from 102 to 104°, on the fourth morning after which it had fallen of Fahrenheit, thus bearing some likeness to a defervescence by crisis. No relapse followed. The pulse and respiration were quick, but the breathing in addition was so irregular it became difficult to report it accurately. Besides the usual precautions, treatment was adapted to the symptoms. Frozen milk was substituted for fluid, and alcohol administered at an
early stage in the form of brandy, or champagne. This was absolutely necessary, because of the prostration of the patient owing to exalted temperature & pulmonary complication. Quinine dissolved in dilute Nitro-Hydrochloric acid was given every two hours, but was discontinued after fair trial since it produced a too diminutive & not sufficiently permanent depression of temperature. Cold sponging was partially beneficial. The head was shaved & ice-bags applied in order to lessen the local heat of the pericranium as well as to quiet headache & nervous irritation. The mouth had to be cleaned out with lotions of Chlorate of Potash & Acid; & when the teeth, lips or tongue are parched & foul with sores this wash may be recommended. Dilute acetic acid is also grateful similarly applied by means of a sponge.

I am sorry to say Sulpho-bicarbonate of Soda was not persevered with in this instance, as a consultation ended by over-ruling the preparation in favour of better known remedies. A small dose of Opiate appeared to help resolution by causing sleep & so soothing the worn out brain & nerves; at any rate shortly after its trial the child looked much better, muttering & incoherence ceased, the expression became intelligent, temperature fell. Finally, notwithstanding tissues consumed almost to a skeleton, an excellent recovery was established.

The above three cases occurred in comfortable homes, & may be taken to be good specimens of the
epidemic amongst the well-to-do classes.

I attended a boy who lived in a dirty uncomfortable home. His attack had been ambulatory for some time before medical advice was sought. It seemed a marvel how he got well.

For nursing he had to depend on two young sisters as neglected & miserable in their habits as himself. Mother they had none. Of a wayward disposition & frequently unwatched, he pleased himself as to diet or opportunity—had even descended to the kitchen from his bedroom to eat a fish still frying at the fire. As, my other patients whose history I have just detailed, were all directly infected by the contaminated water, but now I must briefly mention the symptoms of some secondary cases.

This lad's sister, A. A. was one of his nurses. At the ripe age of 13 yrs, it may be believed she could not comprehend the danger to which she or her sister, aged 9 yrs, who also assisted at nurse, were exposed. It was by no means certain that stools were regularly disinfected. The sickroom was most offensive, the bed linen & mattress filthy, stained with wine or faces. In arranging the bed or in emptying stools, these girls must, as a physical corollary, have touched the vehicle itself of typhoid matter, & doubtless with their unclean ideas, seldom washed their hands after such performances even before snatching their scanty & humble meals. They must have inhaled air, too, scented by septic stools; for it is my firm impression carbolic acid, though
provided, was disregarded as often as it was used. It is possible, may be probable, that they took the disease from their brother; when the above circumstances are considered.

The elder of the two sickened first, but could not inform us as to the date of her first symptoms. I did not always see her on my visits to the brother, whom I frequently found alone. The younger girl was attacked later. In each case I could only make an approximate guess at the day when the fever commenced, but the witnesses were totally unreliable, and little trust can be placed on the supposed days of disease noted in the accompanying temperature charts.

The symptoms pursued the usual train in both patients. In Ann, constipation alternated with diarrhea; in Alice, the bowels were loose: in both there was marked constipation after defecation.

Name: Annie Argent  Age: 15  Disease: Enteric Fever  Occupation: —
I have here inserted the temperature of both sisters. The fever of the former was calculated to have commenced in the first week of March, that of the latter in the second. Having obtained the services of a skilled nurse, I could rely on the use she made of the thermometer under my direction. It manifests the morning remission and nightly exacerbation very distinctly, as well as the decline by lysis in the third week. No relapse occurred in either patient. Ann A.'s temperature once reached the alarming height of 104.5°Fahr., but was depressed to 100° next morning, as may be noticed by reference to the chart on the preceding page. Both she & her sister exhibited for five nights a register above 103°. Yet they must be classed as mild cases, typical of the general character of the epidemic in so far as they ended in cure and
were free from perplexing or undoubtedly hazardous signs. The pulse was indeed rapid or the breathing quick, but the age of the girls must be remembered, for, even in health, respiration is then faster than with adults. Slight epistaxis happened to the younger, Alice, and distaste for milk & broth was shown by both. Sulph's Carbolate of Soda was tried, and then Cinchona Flava with Dilute Muratic Acid. Strict preventive methods were adopted, the old mattress being burnt, Carbolic Acid rapidly poured into the stools, isolation maintained, with the result of confining the fever in this dwelling to those already attacked as described, though there were several more inmates, children & adult. With most of the children I found diet a point of difficulty. The monotonous feeding during typhoid fever is one of its most embarrassing conditions, and, as milk must remain an article of surpassing necessity in the limited "menue", I was only too happy when the little patients could be coaxed into eating it in a frozen state. Intestinal haemorrhage was rarely dangerous. I had one patient, however, a young boy aged 18 yrs, from whose bowels great quantities of blood were passed, leaving him weak and anaemic. Gallic Acid, given internally by mouth proved an astrigent powerful enough to overcome the discharge. A woman, P. who had previously suffered from obscure cerebral mischief and still
experienced its consequences at the time of her seizure by enteric affliction, endured a protracted convalescence. The poison aggravated latent brain symptoms and these reacted on the fever. For a lengthened period the smallest movement of her head caused giddiness, sickness, & vomiting, so that she was unable to lie on her side. A supine—perfectly helpless position was alone tolerable. By slow degrees a semi-recumbent posture was assumed, and at last the woman could sit upright. Afterwards by cautious practice I was enabled to leave her bed, but a hasty jerk of the head was enough to revive uneasiness, and she never got completely rid of the effects of this lesion, except for which, I am persuaded, her recovery would have been sooner accomplished. A policeman, a big strong man, requested my attendance, during which he assured me he had dined occasionally on mutton-chops! I solemnly warned him to desist from such childish & suicidal indulgence of appetite. No fatality or complication followed this venture. A lad whom I treated insisted on rising each day, & would not stay in bed at all, or alter his usual habits in this respect. This was a true case of Ambulatory fever, all the symptoms being modified almost to negation. His brother, on the contrary, was undergoing a very grave attack at the same time & place; active noisy delirium being an urgent sign,
and more potent than in any case I saw. Out of 86 patients I lost three—rather under 3½ per cent.

One was a girl about five years old, the daughter of a poor woman living in a close, narrow street. Defervescence had begun and I was congratulating myself on another success, when a relapse took place. I suspected her mother of giving solid food, an accusation she denied. Symptoms of peritonitis supervened and terminated fatally. No post-mortem examination was allowed, but there were grounds for believing that perforation was the direct cause of the fatality.

The next was an overgrown, delicate girl aged twelve years, whose death was occasioned by persistent and copious diarrhea along with asthenia. The attempt to check it with drugs was futile, so obstinate did it seem.

Lastly, a woman of forty years of age, the mother of a family, succumbed. Here was a secondary case. Here again acute appendisising pain, tympanities, & collapse, pointed to peritonitis as the ostensible agent in the result. In the absence of a post-mortem inquiry I could not gauge the reason for this inflammation; whether it were due to perforation of the gut, to rupture of glands, or to extension.

In addition to the above, I saw in consul-
tation a young woman, the patient of a friend, who also died of peritonitis. In connection with her case I may relate a fact illustrative of the cause of the epidemic. She was engaged to be married to a man who was on a visit at her home for a single day, at the time when the drinking-water was receiving J.H.'s typhoid virus at its source. He imbibed water & recollected doing so. About a fortnight later he was staying at the same house & was then overtaken by symptoms of enteric disease. He had passed the interval between his two visits at Tunbridge Wells where no typhoid existed, and clearer proof of the vehicle of the poison could, therefore, scarcely be evinced. His bride elect performed the part of nurse, and there are strong reasons for supposing that she could not restrain demonstrations of affection which manifested themselves in kissing. Of course it cannot be flatly affirmed to have originated her complaint, but I am ignorant of any other cause for it, unless she acted carelessly in reference to the water-supply — heedlessness of which no testimony was forthcoming. Opium, warm poultices, hot bottles, fomentations & perfect rest, turned out unavailing. The male patient got over his com-
plaint.
I do not know that post-mortem examinations were held by anybody; the chief object of which would have been to elucidate the immediate cause of death—not to confirm diagnosis. Of this, assurance was made doubly sure, as the foregoing pages have attempted to show. Yet had such an inquiry been permitted, it would have been physically impossible to have taken advantage of the agreement, because the number of people ill from various causes was out of all proportion to that of their medical advisers. Attendance on the living debarred us from paying heed to the dead.

I am afraid the mildness of this epidemic furnishes little that is new to the subject of Enteric Fever. It may aid in ratifying opinions based on grounds sometimes more debatable. The manner in which its origin was traced out banished all notions of a physiological cause, and I conscientiously maintain, notwithstanding the ingenious arguments of a most talented special observer—the late Dr. Lushington—that most cases of Enteric disease of a typhoid nature might be proved to originate, not "de novo," not from the putrefaction of healthy animal excretions or tissues, but by contagion or infection arising from a specific poison, contained chiefly in faecal evacuations. A discussion on
The remote etiology of Enteric Fever is almost impracticable now. It is certain types of disease alter while the world grows older, and perhaps the onalady under consideration formerly presented symptoms widely different, or was altogether non-existent. At any rate it was not defined and separated as a distinct continued fever, a want of classification not wholly to be ascribed to imperfect medical knowledge or education: for surely a febrile disorder, involving so huge a fraction of the population as it does at the present day, would have excited sufficient attention in previous times, had it been met with in like ratio, to have acquired a recognised name and position amongst the exanthemata. Absence of observation on one side raises suspicion of non-entity on the other. At least I believe its magnitude in modern days to be an indirect result of the advance of civilisation. Its primary remote etiology may have been putrefaction, since history repeats itself, the same sort of cause may produce even now similar effects. But these effects are infinitesimal compared with the effects of contact with, and infection from, the poison bred and excreted by animal tissues where it has already been acquired. An incomparable majority of cases now-a-days
have a specific birth, as innumerable reports have incontestably proved. But I am not bigoted enough to deny the possibility of the pyrogenic theory, though I deem its importance utterly inferior, in accounting for epidemics of a typhoid character, to the established fact of a specific poison. The mass of humanity augments co-extensively with the corruption of matter, so that while more noxious germs are generated they find an ever-increasing body of recipients on whom to fix. Civilisation, which is responsible in part for the growth of population, is therefore partly responsible for the scepticism destroying its offspring.

Whatever others' creed may be I have little doubt that typhoid germs, after their discharge from the parent body, are capable of multiplying. To refer once more to the Table at page 9, it has been pointed out how J. K. was removed from the well on January 20th, and how fresh patients were prostrated by drinking contaminated water till February 20th, though imbibition generally ceased after the warning of Feb. 8th; that is to say, a month after J. K. stopped pouring virus into this medium, it was still manifesting its power for evil. Now the latent stage is stated on high authority to be a week or ten days,—in this epidemic it was at furthest
a fortnight in duration. Nearly countless gallons of water were must have been pumped through the wells in this month and have mixed with the discharges of the preceding fortnight, without being able to wash them away. Was the quantity of typhoid matter thus emitted large enough to have operated, under the circumstances, for a whole month later? Incubation does not last more than fourteen days, so the question of incubation is irrelevant: the amount of feces was as nothing to the amount of water. I conclude for these reasons that the germs, once evacuated, themselves began to multiply in their kind. It would be otherwise strange to account for the invasion of four widely separated districts and the attack on several hundred people. Without speedy procreation the original germs would have been swept away by the constant flow of millions of gallons of water, and the progress of the invasion quickly stopped. It was only hindered by cutting off the well. But on February 8th, twelve days after which there was a sudden pause in the advance; else it might have proceeded indefinitely. Had the weather been warm, instead of being intensely cold, these virulent organisms might have spread faster, as happens with all germs. They must be regarded in truth as searching as they
are insidious.
The latent period, before active symptoms appear, varies from a week to a fortnight. Here it occupied the more dilatory space, and I would suggest that with large dilution, a low temperature of the atmosphere, & a mild original source of fever—like that of J.K.—the signs are longer in being reproduced by other victims of the disease, than with opposite conditions. The mildness, too, of the archetype seems to bear some connection with the qualities of its product, for my reader is aware how subdued were the symptoms in J.K., and that many cases at Redhill were ambulatory; few very dangerous; the mortality low. Take it, then, that the virulence of an epidemic is materially diminished in its approach by such a complexion of affairs. It is more doubtful whether its course may likewise be modified; nor whether it imitates generally the symptoms shown by the model on which it was founded. Certainly J.K.'s was a mild illness, and as certainly there were numerous cases in Redhill equally mild, but there were also many of a severe type. Yet in the result, the fatality and recovery, the distinguishing feature of this invasion was non-malignant—the average percentage of deaths from Puerperal fever being as a rule much higher. And, consequently, though I
cannot arbitrarily formulate the axiom, that the peculiarities of a limited epidemic of enteric fever are invariably identical with those exhibited by the disease in the chief or direct author of it; briefly, that the character of typhoid ericks is always uniform in cause & effect; I nevertheless believe it may casually evince this tendency.

I have seen it maintained that the symptoms of an epidemic become less virulent the longer it lasts, but I question whether they would do so but were no means employed to combat the evil, were it allowed to pursue its course unchecked by medical science and art. Within certain bounds, epidemics will possibly wear themselves out when not interfered with, but at such a sacrifice of human life those bounds may be almost considered no bounds at all. And my experience of the time of which I write scarcely accords with the above statement. Relapses were common, and secondary cases were quite as serious as primary. Some of these relapses were probably due to careless or premature indulgence of appetite in spite of repeated warnings. Such perversity, however, was exceptional, not regular, not diffused; neither refutes my observation, nor corroborates that quoted. The recuperative, assimilative power of
youth was instanced by the remarkable manner in which many children formed healthy or abundant adipose tissue after an exhausting fever. This they did on being allowed solid food.

I have spoken of mental obtuseness as a sequela of enteric fever, but further experience is required to determine its nature, to prove though it is "post hoc" whether it is "propter hoc" in addition, whether bluntness be due to passive causes or to active agency. I suspect an active poison to have had something to do with the matter, affecting the very centres of intellect, producing microscopic, or even more minute changes, if they be possible, in cerebral nerve cells.

Symptoms were not so peculiar that they require especial comment, or at least any further notice than they have attracted. Perhaps the course of temperature bears testimony to the fact that where morning remissions are slight or where the record remains high during the second week, there the disease will be severe enough to guard us in prognosis. It is a difficult thing to catch a person suffering from typhoid at the onset. Notwithstanding the inability expressed by some to find the normal run of typhoid temperature, who can doubt the fact that it is marked by peculiarities entirely its own? Should there be cavillers
on this point I would remind them
of the difficulty just alluded to, and of
the accompaniments which complicate,
modify or intensify, all symptoms.
A single case closely watched was sufficient
to settle once and for all doubts in my
mind concerning the prognostic value of
the typhoid eruption. T.K. had an eminent
profuse rash, referred to in the remarks about
him, and his symptoms were of the tamest
description. On the other hand, patients
with very few spots about them exhibited
merely the modified signs of an ambulatory
attack. So that it is justifiable to conclude
that the quantity or quality of the rash
of Eiterie Fever can be of use as a mark
of diagnosis alone, and bears no relation to
the gravity of its course. Nor could I
discover any connection between it and the
blood-heat, except what is well known, viz.,
that spots appear usually for the first time
when pyrexia has mounted to its higher
degree at the end of five or six days, or
of a longer period. While on the subject of
pyrexia I may mention a peculiarity displayed
in the temperature charts I have inserted.
When the thermometer fell lower nocturnally
than cratutinally, it was inclined to fall
still lower on the following morning, so as
to render the morning temperature the
most depressed in a series of days; the
mercury rising again the same evening. In
prognosis it is said that we should be cautious if the morning temperature should be higher than the evening, but it would be also useful to observe whether the evening temperature be not followed by one still less feverish next morning with a normal exacerbation on the same evening. Should such be the case I think prognosis may be rather more hopeful. In some of these charts the temperature is seen, as is not uncommon, to after defervescence to remain below the normal for a short time.

One mark of diagnosis dwelt on by many authors is gurgling in the iliac fossa, heard by kneading the abdomen in that region on the right side. Now it strikes me this sound is not of such diagnostic importance as to warrant us in eliciting it, especially if other symptoms are well defined. To act thus is to satisfy purposeless and dangerous curiosity, and to breed a habit of superfluous meddling, which in rough hands may be decidedly inimical to the patient. Every student is installed with a proper awe in directing treatment aimed at ulcerated or disorganised intestine; he is warned to deal tenderly with it. But with unwitting self-contradiction, he will, according to his nature, more or less rudely pull, flush, depress upon bowel which for all he knows — because he is now only
making a diagnosis — may be in an advanced stage of ulceration, wanting but a step to complete perforation and to bring about a fatal issue. It would be well in my opinion to abolish the plan in practice. Besides, I cannot regard surging as peculiar to the typhoid state, and believe it can be accidentally produced without the coexistence of intestinal lesion.

In the treatment of constipation medical practitioners often refuse to prescribe laxatives, preferring to remain expectant and to support a policy of "masterly inactivity." Yet is their caution carried to extremes. Castor oil, in doses of half a drachm to one drachm, may relieve without a shadow of injury supervening. It is doubtless necessary first to judge of the condition of the intestinal glands and mucous membrane, to ascertain the day of disease, the history of hemorrhage, the strength of the sufferer. When on occasion for alarm or these points exist, laxatives are advantageous, or, if they are objectionable, enemata of tepid water become necessary. In fact we are driven to choose between two evils: and what man would prefer the greater? — the evil of allowing faces, replete with deadly poison, to lie for days in contact with a delicate or denuded mucous
membrane? Which would cause most mischief— the mechanical irritation caused by hard and feces rubbing against the walls of disorganised bowel, blocking the passage of motions gases which they help to evolve, or whose mechanical distending power is both painful and dangerous; solid feces, in the expulsion of which great straining of the attenuated intestine must be exerted: or the on moderate and natural peristaltic action due to a mild laxative or enema? Enemata have this advantage, too, that they wash out the ulcers, just as a syringe does a surgical wound; and to argue by analogy, is it hoping too much to expect a similar curative, healing stimulus to be thus excited? Of course the utmost care and gentleness should be exercised in pumping anything into the bowels, nor should the quantity of injection fluid be large. I recollect a case of enteric fever I had under treatment in hospital two years ago, previous to my Redhill experience. Constipation was one of the symptoms; for which I prescribed two drachms of Oleum Ricini. One dose was enough to rid him of accumulated excrementitious products, and to produce two, sometimes three, easy motions on successive days, without administering more oil. At last

†In the summer of 1878. The above sentence was first penned in 1880.
my patient also had chills (no other
intestinal symptoms). He was fair,
and of high fever, with temperature
at 109½. He had a past history of
pleurisy, chiefly in the right upper
part of the lung, and passed the
examination before death.

The chills, however, another
alternative, was to those who have
the symptoms of internal and
external injury, in the acute stage.
feasible, justifiable means.

To diminish fever heat the advantage of cold sponging has been universally recognized, and its benefits were exemplified in numerous instances which came under my notice. Sponging was accomplished in the usual manner, by uncovering only a part of the body at a time, in order to avoid exposing the individual to undue risks; but where prostration is great the patient cannot sustain even the small amount of disturbance necessary to effect the purpose. Then the attempt must be limited to sponging the face, neck, hands, and arms. It must be acknowledged, however, that the diminution of temperature is not universal, and sometimes only temporary. To keep it down the process must be frequently repeated, or it will prove an ephemeral luxury.

Dr. Bayley has insisted, in his able lectures, on the efficiency of the cold bath when intestinal predominate over pulmonary lesions. His remarks apply admirably to hospital practice, which ensures prompt attention to every detail. In private practice there would be a liability to indiscriminate use of cold bathing, especially during an extensive epidemic. This plan also requires constant repetition by Dr. Bayley's own showing, making it still more impracticable; and, after all, treatment of
all sorts, to be of general benefit, must be chiefly available in private practice. It is true the objection of continued repetition can be urged against the whole class of anti-hyptensives, against quinine, alcohol, sweating, & baths alike. The two former are less heroic measures than the latter. They may be resorted to if the others are contra-indicated on account of weakness. Alcohol is prescribed by the majority at a late period. While concurring in the advisability of giving it then, I can still conceive the probability of good arising from an earlier administration of it, if with high fever there be asthenic delirium, trembling hands, fumbling & picking at bed clothes, and pneumonia or other lung disease. Impairment at nerve centres is just as possible as deterioration of muscular tissues: if the poison lead to exacerbation of temperature resulting in waste, why should it not affect both? To obviate such waste and to support strength, to increase the force of the circulation, and to anticipate that irritability of the brain which is a consequence of impoverished blood-supply — since the blood becomes deteriorated by the heart too weak to propel it in sufficient quantity to the ultimate capillaries.
its state being doubly detrimental. I say there are some of the indications which necessitate alcohol at an early stage of enteric fever. Each rule has an exception. In this proposition so many exceptions may be suggested with reason, I can only add that common sense must ever be the tribunal of final judgment before carrying out any method of treatment. The shade of diversity in symptoms may alter it. Blind persistence in one groove will surely be disastrous; and common sense will help to point the way to the numerous tributary grooves. I doubt whether any kind of therapeutic treatment has caused such wide divergence of opinion amongst scientific men as the alcoholic. In this, as in most things, it will probably be found that men who avoid extremes are those whose judgment is most reliable and whose practice is most successful. Yet it must be confessed that the advocates of total abstinence have a strong fact in their favour in the deleterious stuff so extensively sold under the names of "brandy," "whiskey," "gin," "port wine," or "sherry." Only well-to-do people, not always these, can afford to buy or calculate on obtaining genuine brands. The majority are too careless, when they are not too poor, to trouble themselves about the quality of their purchase, so long as the
article is becomingly described by a label. Stimulants, which are apt to poison healthy persons, will be doubly apt to injure the sick. As medical men know full well, when alcohol is ordered in a case of disease it frequently happens none is kept in the house. If the patient's friends are not in a good position they apply, in their anxiety to carry out injunctions speedily, at the retail bar of the nearest public house, and undoubtedly bear away some raw, freshly distilled spirit, or adulterated wine. Publicans are probably not the only sinners in this respect, and it is quite likely that other vendors of alcohol drive a thriving trade in spurious & base articles. To my mind, therefore, the commercial aspect of the alcoholic controversy affords grave reasons for exercising extreme caution in prescribing stimulants for the sick; but I cannot go so far as some physicians who abjure them altogether, for my own experience, though limited, has taught me how beneficial they may prove, whether in fevers or in many other complaints of suffering humanity, if prescribed at the right time and if chosen with critical care. Certainly our knowledge of the action of alcohol is not exact as could be wished. Physiology & Pathology will in time shed more light on the subject. Meanwhile Clinical Medicine need not be driven to despair and
abide the use of certain means on account of its common abuse. Of the benefit of alcohol in some cases of pneumonia I am firmly persuaded, and scarcely less so of its necessity in Enteric Fever. Of the indications in Enteric Fever requiring alcohol I have already spoken, but above all it must be remembered that here we have to deal with a specific poison invading all parts of the body, though topical consequences are mainly exhibited by the intestines. The terrible wasting and exhaustion, so gradual yet so sure, caused by this poison, absolutely necessitates the administration of something more than liquid or semi-liquid food of the ordinary kind. If there existed any solid substance which would take the place of alcohol without its usual risks, it would be impossible to allow it on account of the condition of the alimentary canal. We are therefore driven to alcohol in many cases simply to support the tide of life which seems to be ebbing away from the remorseless invasion of specific poison, and to encourage a flow till that poison is eliminated or destroyed. I have frequently spoken of specific poison while treating of stimulants, and before closing this thesis I wish to allude briefly to it. I hope I shall always be ranged on the side of those who take a moderate view of all theories in medicine, and I
who keep their minds in a receptive state, ready to learn and profit by new opinions. I have already explained that I did not disbelieve the possible truth of a pythogenic origin of Enteric Fever, & remarkable histories have been related in the medical journals of outbreaks in some colonies, for which it would be difficult to account except by an acceptance of the pythogenic theory. Still my inclination is not has been towards a specific origin of this fever, a belief which has no longer to rely for support on deductions from theory alone, but can call to its aid the method of induction from facts. Professor Klebs of Prague has published an account of post-mortem inquiries held on the bodies of twenty-four patients who died from Enteric Fever. In the course of these examinations he discovered the presence of a specific poison in the shape of organisms, whose length in general was eighty micrometers and thickness half a micrometer. Their form was rod-like. They existed in the mucous membrane of the intestine, in the parenchymata of the liver, in the mesenteric ganglia, in the foci of lobular pneumonia, in the cartilages.
of the larynx, in the six cater, and in other organs which had most suffered from the disease.
It appears that these microbes have been found in the bodies of other persons who have died of Enteric Fever since Professor Flebs' necropsy, and, what is of the utmost importance, they are said to be always absent from the bodies, especially from the intestines, of all who have died from any other disease than typhoid.
Here is proof, than which stronger could scarce be expected, in support of the specific theory. One experimental step would perhaps double our assurance, i.e., the inoculation or poisoning of some animal (say a monkey) by these very germs. If typhoid symptoms followed, the subject might be deemed cleared up for ever. The suggestion however is somewhat hyper-critical, and the thanks of scientific men are due to Professor Flebs for his painstaking observations, which completely establish the fact of a specific origin of Enteric Fever. At the same time I do not now deny the possibility of a pyogenic cause of Enteric Fever. Who would be so bold as to say it was never due to a pyogenic cause? My induction though favouring the opposite theory is still, like everything human, an imperfect induction. Yet admitting the bare possibility of the truth
of the pyrogenic theory, I can confidently insist on the specific origin of the outbreak, the history of which I have related in the foregoing pages. When I remember how clearly & steadily that epidemic was traced to its source, as many another epidemic of enteric fever has been traced, & when I apply to the hard indestructible logic of such facts, the equally admirable facts discovered by Klebs, the conclusion to which I am forced respecting the specific agent in enteric fever - leaves no room in my mind for scepticism on the matter. The induction may be imperfect, but it is sufficiently perfect to work upon. To extend the argument I should have to proceed by analogy. The burden of disproving the specific fact (no longer theory) rests with the sceptics. Having the facts discovered by Klebs & my personal knowledge of the Red Hill epidemic at my back - there are other epidemics doubtless which would serve as well - I might affirm, by analogy, all outbursts of enteric fever have a similar, that is, a specific origin. If it can be shown that there are exception let the origin of these be proved & demonstrated as solidly as the rule. Credence will not be placed in bare statement otherwise unsupported. Even when established they will after all be exceptions merely. But it is idle
to dilate further on exceptions, until they are known to be such. The knowledge of the existence of a specific agent in enteric fever opens up a great future for the strife against this plague. Treatment, preventive, palliative, curative, may all be modified thereby. The earnest wish of all must be that the hands of the medical profession may be strengthened; and is it hoping too much that they shall be strengthened? For is not knowledge power?

I must now conclude my thesis, which has expanded rather more than I at first intended to allow it to do. My intention was to have confined myself chiefly to a description of the Red Hill Epidemic. Having commenced by inquiring into its cause, I proceeded to treat of its incubative stage, & then to describe in a general manner the symptoms & treatment thereof. After entering into details about some of my own patients, I was next led to offer a few remarks on what appeared to me to be noteworthy points of the epidemic; to touch especially on the question of a specific agent in enteric fever; and finally to draw what lessons according to my capacity I could from the events of which I was a witness.

Henry Robert Oswald
M.B. E.M. Edin.Univ.
Appendix.

I have observed in the medical journals an account of the antiseptic treatment of typhoid fever. The remedies used and recommended were Iodine & Carbolic Acid.

I wish to say that my notion of antiseptic treatment was not borrowed from this source, for my cases occurred long before the above particular method was published. My remarks on the subject were also written before the Iodine & Carbolic Acid treatment came under my notice. The principle, however, is the same, & I am glad to see that it is making progress. As long as the principle is recognised, it matters little how we proceed to act upon it, whether by Carbolic Acid & Iodine, sulpho-carbulates, permanganates, or by the use of other drugs of antiseptic properties. The best will assert itself in time. Meanwhile I shall continue to use Sulpho-carbulates.

Let me add that at the present moment I have a patient, convalescent from an attack of enteric fever, whose medical treatment throughout has been confined to sulpho-carbulate of soda, with an occasional dose of quinine at bedtime. For a day or two he also took compound & of camphor on account of a cough, but that was all. The only urgent symptom was a little delirium, and this was partial.

It is now perhaps the proper time and place
to fulfil the conditions prescribed by the regulations of the Edinburgh University Calendar in reference to thesis for graduation. Therefore I hereby declare and affirm that this thesis, submitted by me to the Senatus Academicus to the end that I may obtain the degree of M.D., is entirely my own composition.

Henry Robert Oswald, M.D.

216 Camberwell New Road.

London, S.C.

April 25th 1881.
A fairly good Thesis is too massive, containing an enormous amount of data, leading to some shifts in the matters of accuracy and grammar.

A.D.L.