Thesis

Observations on

Enteric Fever.

By

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Observations on Enteric Fever

I have chosen the subject of Enteric Fever for my thesis because during the three years since I received my Bachelorship — having been engaged in private practice during the whole of that period — it has been one the most interesting and the most instructive of the diseases I have been called upon to treat — Perhaps the more so because it is one of those diseases, included under the head of fevers, which form a large portion of the General practitioners work — and which the Student of Medicine at the Kings Western Hospital has very few facilities for studying clinically, still less so for watching their progress — Feeling as I have done the great want of more extensive clinical experience in this respect I hope for the benefit of those who come after me that attendance at a fever hospital will before long be among the compulsory attendances necessary for a degree in Medicine at our Alma Mater:

This want of further experience during my hospital Studentship must be my apology for any shortcomings in this paper —

Geographical Distribution: Enteric fever has a peculiarity for place - appearing in healthy Country districts as well as in larger towns - In the country however it is sporadic & endemic - and we rarely get a "genuine epidemic: This difference between town and country is no doubt to a great extent due to the fact that in towns we have a larger number of people living under similar sanitary conditions, a similarity in water supply drainage, milk supply &c; whereas in Country districts (a small group of houses) they commonly each house has its own water supply, its own drainage & none at all save into natural drainage, in addition the milk supply in the country is more divided - does not come from one, two & three great depots as it commonly does in towns - So that given a water supply or a milk supply containing the poison capable of producing enteric fever, we find the effects if there are very much more confined than under similar circumstances in a large town - Moreover it is much more easy in the former case to trace the source of infection and by an early cutting away of that source to prevent its further spread -

The cases of enteric fever coming under my notice were distributed unequally through this district; the centre

of the district being a small market town of upwards of 3.000 inhabitants, lying in a valley, not connected with any large town by railway — and having a smaller villages around at distances varying from one & four miles: The majority of my cases occurred in singles, but in two distinct and widely separate villages, several cases appearing about the same time have the character of a small but genuine epidemic — (1) In the village of Deen four cases occurred in one house and three others in different houses in the same village, all within six weeks of one another — all these except two were under the care of the resident medical man — In this village which lies low in the valley, enteric fever has been peculiarly endemic for many years — a few cases occuring each year — But lately with the exception of the attack mentioned above, and since more attention has been paid to the water supply which for many years was bad, cases have been less frequent. (2) My other instance of a slight epidemic occured in the village of Blyth Marsh and here six persons were attacked in three separate houses; & these two epidemics? I shall again refer under the head of etiology —

Age of persons attacked - Most writers agree that Enteric fever is more common in persons from infancy to twenty-five, still more so from fifteen to twenty five, from which to old age it uniformly diminishes - My own impression as to its relatively less frequency in Childhood, is that there are many cases occurring in young children which are not diagnosed as such but are put down under the head of Simple Continued fever or infantile Remittent Fever - There is a greater difficulty in diagnosis in the case of young Children especially with regard to the symptom of abdominal tenderness, as however fortunate a Medical man may be in gaining the confidence of his little patient, it is I maintain almost impossible for him to assert the presence of abdominal tenderness in such cases - Frequently I have been puzzled in cases of this kind, Continued fever occasionally remitting, marked constipation throughout, no eruption, tongue coated in some cases becoming dry and brown: Are such cases to be classed Enteric? and is the bowel lesion, generally understood to be as necessary to this fever as the increase of temperature, present in these cases - Two points I have particularly noticed which induce me to mark such cases, doubtful

(1). That the course of the fever is more irregular, not presenting the diurnal variation so typical of Enteric Fever.

(2) That the termination is more abrupt, such cases as I have watched changing by crisis, so much so that the friends themselves can perceive and appreciate the change — I will just refer to one such case, a very striking one — Patient was a girl - a nice bright child of 3 years - had been suffering for five weeks symptoms as above mentioned, I had seen her the same morning when her temperature was 104° Fah: dry, hot skin and tongue - On the previous day the morning temperature was 103° Fah, the evening 103·2 Fah: — I received an urgent summons at 10 P. M. to go and see this child, as it was believed to be dying - I found the child had been asleep for nearly two hours, it lay in a cot bathed in perspiration, respiration scarcely perceptible; pulse 120, temperature 99·2 Fah as taken twice in the axilla allowing fully fifteen minutes for each record — The temperature did not rise again during the next eight days, in the interval the child became bright, & cheerful and hearty and ate of farinaceous foods, milk & egg puddings &c: I have not included this case amongst my

enteric cases, but its peculiar interest induces me to refer to it in this connexion —

To continue the subject of age in connexion with this fever from Dr. Hutchison's Statistics as well as from those of other authorities enteric fever is much less frequent in persons over thirty years than in those younger — and here we have at the outset a marked distinction from the allied specific fever — Typhus — which more commonly attacks those in the prime of life and cuts off the 'breadwinner' as Professor Saidaner so aptly puts it —

Why this should be so in the case of enteric fever is not to my mind at all clear — We know that one attack of enteric does not confer the same immunity — though no doubt it is so to a lesser degree — from a second attack as is the case with the other specific fevers, notably Scarlet Fever and Measles, or how would we explain the relapses so much more prevalent in this than in the other fevers — (I shall refer again to cases of true relapse) So that the argument advanced in the cases of Scarlet Fever and Measles, that they are essentially diseases of childhood and because of that relatively less frequent in older persons, will not hold here with the same force, the less so because a much smaller proportion of the community are attacked

by enteric fever and therefore a larger proportion are not protected by reason of a previous attack; supposing a previous attack to confer immunity.

From my notes of twenty-one cases I take the following ages

Two men ages from 40 to 44 years.
Three women " - 32 to 36 -
Six young men - - 16 to 22 -
Ten children - - 3 to 12 -

doubtful cases not included in the above list

A larger number of children attacked than is common, possibly to some extent owing to the fact that where the source of contagion was clear, the proportion of children exposed to the contagium compared with those older was as 2 to 1: where the source of contagion is not clear it was impossible to get reliable statistics: there was also this fact, that those from fifteen upwards usually left their homes for work, returning only at the week end or perhaps only once in the month or so

Etiology. Much has been done during the last ten years on this Question; still the same differences of opinion exist amongst eminent authorities as to the causes and propagation of Enteric fever - I shall state briefly some three different views which having my own cases in support or otherwise.

1. De novo origin: which is origination of Enteric fever independently of the disease which it generates.

Sir Thurchison accepts this origin, though he does not deny that the origin is more frequently from previous cases those who support this theory assert that under certain circumstances, the specific poison necessary to produce this disease, arises spontaneously, that is, independently of any of the excreta from previous cases: Others maintain

2. the existence of a specific materies morbi by and through which alone the disease is generated and these deny that putrefying excreta, Sewer gases, noxious smells per se could create the disease but hold that the "germ" must be present from a previous case, whatever the propagation and in support they refer to the persistent exposure of persons to such gases with impunity.

The support is weak, for we know that only a proportion

of those exposed to the specific materies morbi are attacked, and it has been argued that all excreta, all gases or all noxious smells contain a poison which can produce enteric fever –

To prove this de novo origin is no easy matter, and I maintain that only cases occurring in isolated districts can be advanced in support without fatal fallacies – I shall refer to one quoted in The Lancet for July 1865 by Mr. Henry Lawrence of the Cape of Good Hope, in which the possibility of fallacy is reduced to a minimum: the case, unfortunately fatal being verified by a post-mortem examination adds to its value:

The man was a Hottentot Cochman of 25 yrs: after describing the symptoms Mr. Lawrence refers to the necropsy which I shall quote in full. "Condition of small intestine External surface of ileum in its whole length considerably injected, particularly the last ten inches, and that portion in dark ecchymosed patches: Internally the lower part of the ileum is stained liver colour and for several feet presents ulcerations over Peyers Glands, one a clean-cut oval ulcer, shows the fibres of the muscular

"Coats higher up the patches of glands are thickened and
"present fine arborescent injection of the vessels; ileo-caecal
"valve much thickened and ulcerated. Two small ulcers
"in first two inches of colon"

The case occurred in the Lunesberg Stations: "No one in the
"Station had had fever for some years previously. There
"was no human habitation within three miles of the station
"where this occurred, and no newly arrived convicts
"were ever sent to that Station: I was the only medical
"practitioner within a radius of 50 miles and knew of
"no fever in the neighbourhood".

"The disease attacked no other person on the Station, although
the circumstances were so favourable for its spread both
by personal contact and by means of the excretions".

A case of my own will be of interest here though it is not
without possible fallacies; occurring sporadically
E. S. widow aged 35: living as general servant at a large
farmhouse, at a high altitude about 2 miles distant
from the Staffordshire Weever Hills, light soil with sandstone
and limestone rock beneath. ?

She was taken ill with diarrhoea, fever &c. and came home to a house, first outside a village in the valley of the Chusnet on a hill-side - She took to her bed and went through a well marked attack of enteric fever, with diarrhoea and abdominal tenderness, eruption &c.

This woman had not been away from the farm for three months, no case of Enteric fever so far as I could ascertain had occurred within three years, in that district, and the last case I could trace occurred over 3 miles away: This case occurred in the autumn of 1895 after heavy rains; the water used for drinking purposes was obtained from a spring, the water being within two feet of the surface allowing the entrance of surface water and surface drainage. The conclusion I arrived at was that this was a case of de novo origin, most probably from the water containing surface impurities, the results of decomposition:

Two inmates of the same house had had severe attacks of diarrhoea lasting from eight to ten days, both went on with their daily work and were not under medical treatment: it is quite possible that both these were mild cases of enteric and if so all no doubt obtained

the contagium in the same manner -

R. A. aged 19 working in large tanks, living about a mile away and so staying at the works during the dinner hour - living in a row of nine houses containing about thirty people under exactly similar sanitary laws -

Had a well marked attack of enteric fever, no other case in the neighbourhood - Works drinking water examined and found pure. Home drinking water obtained from a fast running stream, with abundant springs; clear of surface contamination

Origin of this case evidently was obscure though the probabilities were in favour of a de-novo origin.

This case occurred in the spring of 1887. and no other case has happened since in that parish or district.

In accepting this theory of spontaneous generation, the pythogenic theory of Murchison, I think we may take it for granted that the propagation of the disease in this manner is scarce and that the most common mode of propagation is from filth as at present - but with the addition of the germ from a previous case

In connexion with the spread of enteric fever, it is desirable to examine facts as to whether this disease is infectious. Professor Faidner affirms that it is "practically non-infectious as regards individual to individual, and that while this direct contagion from individual to individual is not admitted, evidence shows that effete matter has a notable influence in propagation of the disease." This infers that the infectious matter of the fever is not infectious at moment of passing: It is affirmed also that the fever germ only becomes infectious whilst undergoing fermentation & decomposition and that therefore it may be inhaled or even drunk when fresh with impunity —

I consider that cases do arise in which it is almost impossible to arrive at any other conclusion as to cause than that of direct contagion — It may be that the fever germ is less inert at the moment of passing than after undergoing fermentation and decomposition in the presence of filth, but that it is altogether innocuous if taken into the system at the moment of passing is a matter at any rate of doubt — I could conceive such a condition of body (Stomach and bowels) as would enable the suspected

innocuous germ to reach its full development and so acquire its specific properties - This may explain those cases where it has been supposed the disease was spread by direct contagion from individual to individual -
The body itself forming under certain circumstances the hot-bed wherein the germ of enteric fever acquires its infectious-ness: We know that fermentation and decomposition are continually going on in the alimentary canal, increased or diminished by the nature of the diet - The only distinct factor to explain this assumption is the time required by the non-infectious germ for its development into a specific infectious germ:
Vide Page
Here again we know that from a case of enteric other cases may and do occur within three weeks, but as we are uncertain as to the period required in different cases for incubation we shall obtain no exact data: Still it is not probable that the germ requires a longer time than it can live in the alimentary canal, for its development. -
In the case of cholera it is asserted that the cholera poison of bacillus only acquires virulent properties after the lapse of four or five days, and as in the case of cholera the germ is given off by the bowels

So also in enteric, it is possible that the enteric germ may acquire its virulent properties in four or five days - & this length of time we know it may remain in the alimentary canal along with fermented and decomposed food, and thus acquire infectiousness.
Whether this be a possible explanation of the direct communicability of enteric fever or not, certain it is that cases do arise in which it is difficult to conceive of any other mode of propagation than by direct contact with the patient and his emanations.
In the British Medical Journal for April 1885, Dr. Alexander Collie Medical officer of the Eastern Hospitals in a paper on the etiology of enteric fever, attempts to prove its contagiousness that is communicable by direct personal intercourse — in most cases probably by the recent stools, though other emanations from the sick person may produce it.
He mentions the cases of two Laundry women whose duty was to wash the dirty linen and to wash what was soiled. One of these women was exposed continuously for two years to all the soiled enteric fever linen of the hospital — the other more or less continuously for eighteen months and continuously for six months. He says "if decomposed enteric fever stools

produce enteric fever, why was it not produced in the cases of these two women? They were susceptible subjects as was afterwards proved by the fact that when exposed to direct personal intercourse with a person sick of it they took the fever.

At the end of the two years' service in the Laundry, a young man, brother of one of these women's sweetheart was admitted into hospital suffering from enteric fever – This woman visited him on four occasions remaining with him about ten minutes, about a month after the first visit she fell ill and passed through a well marked attack of enteric fever – She in her turn was visited by her fellow linen-washer who also fell ill three months after – Dr. Collie adds "Comment is almost needless".

These are certainly remarkable coincidences if they are not as Dr. Collie infers: Still the possibility is not small that the soiled linen was the source of the contagion: It is almost a daily experience that a certain number of persons may be constantly exposed to infectious diseases with impunity but some of these perhaps after a lapse of years become affected – a successful resistance to infection rather than a case of absence of infection as Dr. Collie supposes –

This is especially true with regard to Scarlet fever which we know to be highly infectious and contagious — At the present time I have patients with Scarlet fever, who were exposed two years ago to the same dangers of infection, but then they escaped to succumb during the present epidemic —

In the same paper after giving the statistics as to age &c. of persons attacked, in three London fever hospitals Dr. Collie arguing that enteric is a disease of childhood and early youth, concludes that a large number of nurses are protected by reason of their age — and for this reason and not because the fever is directly non-contagious, enteric fever is rarely seen in hospital nurses.

Further on after explaining with the aid of a plan the drainage Dr. Collie writes "If it be true that given susceptible persons and a sufficiency of exposure to sewer air, from drains containing enteric fever matters, enteric fever will be the result, why did it not result in this case? — For nine years 7429 persons being exposed to sewer air from drains through which the stools of 1293 Enteric fever patients had passed, but without

the least effect on any single person" Here were all the factors / Susceptible persons (2) enteric fever stools (3) exposure from defective drainage"

S. Collie does not argue here that drains may not convey enteric fever: his contention being that the disease is contagious in the ordinary sense; that in susceptible persons it arises by direct contact with the sick, if the contact be sufficiently close and prolonged as in the case of nurses: With this I cordially agree

"That the contagium does not spread to any great distance, say from one bed to another, in a well-ventilated well kept room is a factor bearing on the question, how far does the contagium spread? not at all on the question, does it exist?

Finally after giving three more instances S. Collie writes "Whatever conclusion may be drawn from them and whatever objections may be taken to them as evidence in favour of the view that enteric fever is an infectious disease, one fact is indisputable and that is that three persons fell sick of enteric fever within about a fortnight of their exposure to enteric patients

in rooms cut off completely from drains, in rooms in which there were no decomposing stools; and that these three persons were not exposed to any other known source of contagion; that is briefly, the absence of the cause, specifically infected drain and decomposing stool was not followed by the absence of the effect enteric fever -

I quote this freely from T. Collis's paper because as an authority with large experience in this particular class of diseases, his writings are entitled to a careful examination and because his experience in this respect enables me to trace cases of remote obscure origin which I shall treat further on.

Case of Direct Contagion

On pages 10 and 11 of this paper I give an account of a case of enteric apparently arising spontaneously - I said the patient E.S. came home ill, She was nursed during the early part of her illness by an aunt a single woman aged 44 years, who twice daily sponged my patient over as she lay in bed with tepid or cold water; all the motions were removed by her as soon as evacuated and were buried in the garden adjacent to the cottage, being previously

disinfected – they were buried at a depth exceeding two feet. Disinfectants were freely used all through the cottage – Two children, ten and thirteen years old belonging to my patient were the only other inmates of the house: After my patient had been home twenty days the aunt was taken ill with diarrhoea, abdominal pain, next day she was confined to bed and passed through a well marked attack of enteric fever – Whence the source? The water supply was obtained from a Spring some 200 yards away, & that it was scarcely possible for the disinfected buried motions to have found their way to this water – besides the topographical position of the house and the Spring rendered this impossible – The house was naturally drained being situated on the slope of a steep hill – The milk for the house was obtained from a farm close to – not connected with any previous case –

The aunt had not been out of the village for six months; In this case all other possible sources of contagion being absent, & was forced to the conclusion that it was a case arising from direct personal contact with a previous case – a conclusion which I had hitherto believed impossible:

In my own part I am inclined to think, that a more extended knowledge of the behaviour of enteric fever in the country, with all its and conditions of people attending on the sick, and where there is no question of compulsory removal to fever hospital, will prove that this direct mode of propagation is more common than most of our local authorities in towns are prepared to admit: A greater number of people of various ages being exposed to the influence of the contagium than is the case in a fever hospital:

Referring to my two groups of cases of enteric fever

Group I: Commencing with a young man W.B. aet 19 a tape worker in the village of Seer mentioned before on page 3, who passed through a well marked & exceptionally severe attack: The water which supplied this house and the adjacent one came from a well close to which had thoroughly been to ten months previously - a drain main close by the well and at first it was supposed that drainage matter had percolated into the well - In consequence I personally saw the drain opened and found it perfect, being lined throughout with Portland cement, it was not possible for any

escape to take place - Amongst the other possible sources, my patient when at work and during meal times frequently drank of water from a well in a low lying field at the back of the mill in which he worked - This water had been previously condemned as containing organic impurity and was often thus closed

Three other persons also workers in the mill were attacked within a few weeks of my first case, Source no doubt same as above.

Living in the house with the first case were five persons Father and Mother, sister of my patient, and two young children ages 8 and 10 years. My patient was nursed throughout by his mother and visited frequently by the two children - After four weeks one of the children after five weeks the other, after eight weeks the father, were attacked and all passed through a course of enteric fever - Not any of these three had drunk of the well water supposed to be cause of the first case -

The disinfected motions of the first case were buried in the garden, thirty yards from the house well spoken of above - I had told the mother there was no risk of infection

in allowing the children to sit with their uncle, in which case in a measure blamed after they fell ill —

Group II occurred in the autumn of 1885. at Blythmarsh a village of 400 inhabitants — Here I had six persons ill from enteric fever — Both in one house, two children and the father & the mother, and two children in separate houses, all within 50 yds of one another; In this district there was some difficulty and unpleasantness in the procuring of water; half a dozen houses obtained their water from the back of a shop but I ascertained that occasionally after quarrelling with the tenant of this well, these people fetched their water from another well close to, which had been condemned a year before by the Sanitary inspector on account of sewer and other percolation; at which time there was a case of enteric in the cottage supplied by this well — a case imported from the Potteries — The excreta from this patient were buried in a cesspit close to and from the fact that it was known previously that this well was subject to subsoil surface percolation — I assumed that in all probability, in addition to these percolation

faecal matter from this case also found its way into the well – The well was closed before the end of the first week of the first case – The three first cases in separate houses all occurred in one week – In none of these houses there were ~~two~~ two other children and the father and mother: first a child, in six weeks a second child, (both these cases) were attacked; in seven weeks the father and after twelve weeks the mother were attacked – the father's case was a mild one only lasting three weeks; the second child had two relapses and lay ill at the same time as the mother – Here the supposed source of contagion in the first case was cut off after the first ~~case~~ week Now we must conclude either that the period of incubation was abnormally extended in the three latter cases or excluding other sources of contagion, that they arose from personal contact by direct contagion: The mother and second child here washed the dirty linen of the first case, but the mother being of scrupulously clean habits, washed everything before there was any opportunity for decomposition:

From the other two cases in distinct houses, no fresh cases arose

in the house there were only father and mother in addition to the child attacked – in the other father and mother and a baby in arms: Seven houses had used the affected water with thirty persons – Three houses attacked

Another case arising out of the drinking of contaminated water

J. B aged 17 yrs. brought home from work ill with enteric fever; This youth employed by the Railway Co. had been living in lodgings in the outskirts of the town in a small self contained cottage standing in its own grounds with a well at the bottom of the garden from which the water for use in the house was obtained – This was one of the few houses still left with its own water supply – From my patient I learned that ten months previously a young man sharply enough also from this locality had passed through a well marked and prolonged attack of enteric fever – I wrote at once to S. Hicks, the Medical Officer of Health for the borough from whom I heard through his inspector, that the well water supplying the house showed abundant evidences of surface percolation and he also ascertained for me that the notice from

the previous case had been buried in the garden
This burying of the faeces in many cases without any
attempt at disinfection, constitutes one of the greatest
dangers in country districts of the spread of the disease -
or at any rate of the possibility of its spread - It would be
well for the public at large if the various Sanitary
Inspectors were to receive more stringent instructions on
this point from the L.G.B. so that instead of concealing
existing smells by throwing down or ordering to be thrown
down, carbolic acid powder &c commonly do in some
cases; they might take such precautions or order
them to be taken as would render the stools from
enteric fever patients harmless - Treating them with a
solution of corrosive sublimate 1 in 500 I would suggest
as a most effective destroyer of germ life

W. R. 21 years: miner brought home from a town
on the borders of the Staffordshire Potteries - On enquiry
from his former medical attendant, he wrote me that
there were several cases in the neighbourhood and that
the origin was from impure well water.

The former of these two cases was nursed by his mother, two children being frequently in the room with him & the father coming home at a week end – none took the fever In the latter case, there were four other persons living in the house and frequently in the room with him – he was also frequently visited by young men - his companions – no other case arose from this:

The former case had been living under similar conditions for six months, when the water in the well first acquired its specific properties is uncertain, but probably long before J. B. was attacked: he may have had many doses of the poison which for some time he may have resisted.

An interesting example of enteric fever contracted from a single dose of water containing the enteric virus is reported in the British Medical Journal for November 1878: The communication was forwarded to the Paris Academy of Science by M. Dujardin-Beaumetz:

M. Denet his wife and family hired a house at Pierrefonds, a fashionable resort near Compiègne, Certigny & two others. After they had

started if in the season they were told to beware of the water in the well. On this account they drank exclusively mineral water until the last day, when the stock was out and the servants were too busy preparing to return to Paris to go to fetch some bottles from the chemist. Madame Fenet said "For once surely there can be no harm in drinking the well water" They drank it. Six out of the nine persons have since died, including one of the servants the cook, two of the four children and Madame Fenet had had typhoid fever before and though attacked again by it after their return from Pierrefonds, have got through their illness

The well has been examined and was reputed to contain the bacilli which are believed to be associated with typhoid fever

The sewer gas must have been in a specially virulent form to attack so quickly and such a large proportion of those who had tea or ices in which it was contained. Our own experience teaches us that as a rule when we can track

the source of contagion, only a proportion of those who partake of the infectious matter take on the disease, and only a small proportion — This is notably the case where epidemics have been traced to an impure milk supply — Professor Saidler in Speaking of this class of the subject of the Glasgow epidemic traced to the milk supply, said that whereas 20 cases occurred in that epidemic seven houses where the milk supply was obtained from the infected dairy, still of those who used the affected milk only a small proportion were attacked It would thus appear that a large proportion of people either have a peculiar immunity from this disease, or that they require to take in the infectious matter for a considerable time before they succumb — In the illustration of the French family given above, if one attack does confer immunity as many authorities assert, we have a peculiar instance of an abnegation therefrom, of nine persons exposed to the influence of the materies morbi, four who were protected by virtue of previous attack? succumbed to the disease equally

with those not so protected: Similar instances have been in connexion with Scarlet fever and Measles, in which cases there can be no question that one attack does in a very great degree confer immunity – Referring to my notes on such cases I find four distinct cases, three of which passed through two distinct attacks of Scarlet fever, one passing through three distinct attacks – In the case of Measles my own nephew has had three distinct attacks, twice whilst on a visit here: During one of these attacks his little cousin of two years played with him and slept in the same room, had never had Measles and did not then take on the disease: Shewing in a remarkable degree the difference in susceptibility to the influence of infectious matter amongst children – I could give many more instances of a similar kind during the epidemic of Scarlet fever in this town now declining but these might be considered out of place in "Observations on Enteric fever"

This immunity or non-immunity is difficult to explain Given an opportunity or opportunities for the specific poison entering the system – Why does it not always

Added note.

In connexion with this subject of a necessity existing for a 'special soil' for the development of the virus after it has gained access to the body of the individual, it is interesting to find not only that bacilli are better cultivated in special media, & that when cultivated in different media they present marked differences under the microscope, but to find also that in the vegetable kingdom, inter alia, if we dress land free from clover with 'lime', an abundant crop of clover springs up: the seed present in the soil requiring a special manure - lime - for its germination:

produce its specific disease? does it require for its development or multiplication a special condition of body? a special condition of the blood and of the alimentary tract, some alone or of both? It would appear so as now could we explain those cases which we know have been exposed to and by inference have taken in the specific poison for many months with impunity, and have finally succumbed: It would appear that the body must be specially prepared or manured for its 'proper cultivation', just as the necessity exists, of a proper medium for the cultivation of lowly living organisms outside the body. Supposing the bacillus which has been found in the blood and tissues of persons suffering from enteric fever, and which in many instances has been found in water or milk from which it has been proved the disease was contracted, supposing this bacillus be the specific poison necessary for the production of the disease anew, we may infer that it requires the presence of a suitable soil or a suitable pabulum for its development, from what we know of the cultivation of other bacilli –

→ It is interesting in this connexion that all attempts

to produce its specific disease in animals by injection of the bacillus into the blood and alimentary canal of have as present failed: Though it is an undoubted fact that animals may acquire the disease - Dr Budd suspected that the acute infective fever of the pig, known as swine fever was enteric fever: This has been shown to be erroneous by Dr Klein: In Dec 1838 an outbreak of typhoid fever was reported by Dr Semes among the monkeys at the Menagerie of the Natural History Museum in Paris, which almost always ended in death: More recently, in January 1885 the London Zoological Society received six Canadian beavers which had lived for a time in Liverpool - In the course of four or five weeks after their arrival, four of the animals died, the remaining two were sent away and recovered - In all the beavers that died, ulcerated Peyers patches were found both abundant and solitary; the ulcers were very typical of the disease
The leading clinical feature was purpose diarrhoea
The above is taken from a report of a Meeting of the London Pathological Society on May 5th 1885:

A.

Notes from British Medical Journal. October 15th 1887. By its Vienna correspondent.

S. Bouchardel in a Lecture delivered at the Hygienic Congress at Vienna, maintained that typhoid fever was propagated by the water which we drank, the air which we breathed, as well as the infected dresses and hands of nurses. This is so interesting a connexion with contagion and transmission treated of in this paper that I shall make no apology for quoting it, after the Memoir conclusion of my paper -

After quoting numerous striking instances of propagation by means of water, S. Bouchardel states that experiment as well as direct observation had clearly shown that Eberth's bacillus could thrive and multiply in the water This observation on the influence of the air in the spread of typhoid I shall give at greater length

A man had contracted typhoid fever at Ulm and returned to his village where the disease had not been observed for several years - The stools of this patient were thrown on a dunghill, which done with, later, five persons were engaged in removing

Transmission of the morbid germ. It is commonly believed that the morbid germ enters the system by the alimentary canal:
1. I have given instances of its entrance through impure water and have incidentally mentioned its transmission by means of
2. milk, in which it appears the germ multiplies with peculiar rapidity and supposing the theory of direct contagion from the
3. individual to be true, it would infer transmission by the air. In connexion with this last a short extract from the British Medical Journal of September 17th 1887. is specially interesting

"At a recent meeting of the Société Médicale des Hôpitaux
"M. Gérôme read an account by M. Soulz of Eaux Bonnes
"of an epidemic of typhoid fever in which the morbid germ
"was transmitted by the air.

"A patient presenting the first symptoms of typhoid fever
"arrived at an hotel at Eaux Bonnes. She recovered
"in four weeks but the three daughters of the hotel keeper
"were successively attacked with the malady — there was no
"other case of typhoid fever in the town which is plentifully
"supplied with pure spring water. Bacteriological examination
"showed this water to be free from suspicious organisms
"During the treatment of the first patient no disinfectants

"measures had been taken: Faecal matters were emptied
"into the water closets of the Hotel, the door of these closets
"opened on to an ill ventilated passage in which the daughters
"of the Hotel Keeper slept. Their room which contained only
"one door and window - both opening on to the passage,
"was at only a Yard's distance from the closets
The insanitary conditions ~~in~~ under which these three girls were
living, would I think be one factor in their susceptibility to the
influence of the morbid germ - The above short account gives
us no history as to the kind of water closets or as to the system
on which they were arranged. But one would suppose from
the account that the faeces could remain sufficiently long
to undergo decomposition in the closets, which in a more
modern arrangements would be well nigh impossible.
Transmission by the air would allow an entrance into the
system by the lungs as well as by the alimentary canal.
and we have no evidence to show that this is not the case -
The so called typhoid bacillus has been detected in the blood
as well as in the motions of enteric patients, and if it is
transmitted by the air, there is no difficulty in supposing
that it is absorbed by the mucous surfaces in the lungs

as freely as by mucous surfaces in the alimentary canal. —

In the remaining part of this paper I shall deal more exclusively with my own cases — not attempting to describe each separately but in a general way.

Diagnosis

was comparatively easy in most cases, especially after watching the cases carefully for the first few days. Cases of bilious sickness and bilious diarrhoea with very often a certain amount of tenderness in the right iliac region, clay like stools, accompanied by febrile temperature have however confused me and I have frequently suspected the case to be one of enteric, when it has suddenly recovered. Are such cases terminating as mine have done in a week ten days or a fortnight, cases of true enteric having the necessary bowel lesion? or must they still be included amongst 'bilious' or 'gastric' fever of the older physicians. Cases too I have met with in children, with many typhoid symptoms (one case I have already referred to on page 5) but in which the fever has been of a remittent or intermittent

character - To another case I will refer here more fully though my notes are very incomplete

R. N. aged 2½ years was ill for three months with the following symptoms: general prostration, fearfully cross, obstinate constipation for the most part but with diarrhoea very occasionally lasting for two or three days, high temperature (only taken once a day) loaded tongue at times brown and dry or alternately moist for a few days: general restlessness; refusal or inability to take food: In three weeks the temperature became normal and the child appeared

1st remission. one week — to be getting well just; when, after the end of a week the

2nd do. ten days — temperature again became febrile and the other symptoms returned, this for two weeks again a fall in temperature

3rd one week — for ten days: it will be sufficient for my purpose

4th 8 days — here to state that after two more remissions my little patient speedily recovered:

Ought I to have included this case under the head of enteric fever and looked upon it as a case with many relapses or was it a case of infantile remittent fever described by Copland and others, and if so what was the pathology? So far as I was able to judge i the case of an ill tempered child

there was no abdominal tenderness: ~~tha~~ I could detect no eruption: no blood was ever passed with the motions -

Dr Copland in his dictionary of practical medicine referred to such cases as this in which there were distinct apyrexial periods as "cases of remittent fever assuming the intermittent type" -

There was no case of typhoid in the neighbourhood at the time, eight other children lived in the same house - none were attacked: I was puzzled at the time and am still inclining to the belief that it was one of enteric fever:

I shall refer now to a mistake in diagnosis: the patient a girl of eleven years was a resident in our Workhouse, and was removed to the workhouse infirmary ill under the care of my father the Medical Officer who judged the case to be one of typhoid fever and asked me to see it: I do not refer to it in any spirit of egotism, merely to show the mistake in diagnosis which a more careful observation of the patient would have prevented - The girl had been staying in one of the Potteries towns for ten days, a fortnight prior to her present illness - this as a possible source of infection. When I saw her first she had been ill

DISEASE.

Tubercular meningitis
Mary Holtshaw

Notes of Case.

Name

Age 12

Diet

Case Book No.

Diagnosis at first
'Enteric fever.'

Date of admission
15 days in Infirmary

Result Death.

Time.	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M
Bowels.			2	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	
Urine.	→ Passed in bed																		

Temperature (Fahrenheit)

107° 106° 105° 104° 103° 102° 101° 100° 99° *Normal Temperat. of body* 98° 97°

Died in the night

P.M. Tubercular meningitis

Day of Dis.																			
Pulse.	90		106		120		120		90		84		84		120		120		
Resp.																			
Date.																			

Entered at Stationers Hall. *Printed and Published by Wedderspoon & C*

One days a bright intelligent child when well, now dull and apathetic, temperature 102° 8. Tongue coated brown and dry, abdomen hard and apparently tender in the iliac region, slight deafness, pupils dilated bowels constipated: head restlessly moving about on the pillow — I concluded the case was one of tubercular meningitis and on the following days the symptoms typical of this disease were more marked, on the 10th day the child died. I was fortunate enough to obtain a post mortem examination which completely proved the diagnosis: No trace being found of ulceration in the small intestine and the spleen was not enlarged — The temperature a chart of which I give ~~taken~~ opposite showed none of the characteristics of typhoid fever temperature

Symptoms I shall refer briefly to the leading symptoms in cases under observation only including those cases in which no doubt existed as to the diagnosis.

Eruption In eighteen cases, the small lenticular roseoblood spots considered by some authors pathognomonic were present at various periods - Whilst for the most part their appearance was first noted from the seventh to the tenth day of the attack: in three cases I noted the first appearance on the 12th day. Generally these spots disappeared on the third or fourth day after being first noted but in one case in particular they persisted for ten days finally becoming very faint and disappearing - I rarely found that succession of crops which we are taught usually takes place - I have had as many as four different days' spots marked at the same time, some of the later ones disappearing before some of those noted before them

In two cases which I shall again refer to roseolaured spots were noted during the relapses; without which relapses are not designated true by some authorities; yet as I have myself seen cases in which no spots appeared during a primary attack, this must be fallacious:

these effects are no doubt due to capillary infection or congestion possibly analogous to the primary congestion in the Peyerian patches of the small intestine; why they should be present in such small numbers is however not clear, nor as to the determining cause. Of a possible cause, might not the bacillus found in the blood of enteric patients, or its products by escaping from the minute capillaries, occasion the congestion?

Sudamina were present abundantly in all cases during the decline of the fever, and in one case of true relapse during the early stage: but as they are common in all febrile diseases probably acute rheumatism etc. are not of peculiar interest here

A third form of eruption, consisting of pustules with hard and inflamed base and umbilicated a form found also in Bulgaria noticed in seven cases. Each of these patients was delicate, seen long well, before the attack and the pustules appeared from the fifth to the sixth week — Shall refer to one case more fully a young man of 19 yrs., in which there was the additional complication of congestive bronchitis — In his case the whole of the

abdominal surface was literally covered with pustules, some single others coalescing together. The pustules burst and formed scabs, finally dried up and disappeared during convalescence leaving small pits or depressions where the eruption had been most severe — Caused probably by the impoverished, impure blood, in a person weakened by the fever — This eruption resembled in a great degree Impetigo, which occurs in wealthy and broken down constitutions and has no necessary connexion with enteric fever

Diarrhoea with liquid yellow stools occurred in all cases Chiefly during the early stages of the disease. but also in the most severe cases continued until convalescence was established — I except two children in which obstinate Constipation was a marked feature throughout: The diarrhoea is caused no doubt by the bowel lesion to a great extent, the ulceration causing an excessive flow of fluid and mucus from the mucous surface of the small intestine in the early stages i.e. during the congestion of Peyers patches: and in the later stages no doubt the diarrhoea is accelerated by the ulcerative processes

forms or in the same patches - In the cases in which diarrhoea is present only for the week or ten days it is most probable that resolution takes place in the congested areas without ulceration, and in these cases it may be that the specific virus or its specific product does not find suitable circumstances for its further multiplication:
In many discussions I have read in the B. M. J. a number of observers report that diarrhoea is more common than not - This has not been my experience

Haemorrhage from the bowels may occur early from excessive congestion in small quantities, or during the ulcerative stage - Haemorrhages occurred in five of my cases; varying from the second to the eleventh week but only in small quantities, never exceeding one or two ounces so far as does the stools; except in one case in which haemorrhage occurred in the third week of the primary attack and in the second week of the relapse or seventh week of the disease. In the latter case patient passed in addition to liquid blood, a large spiral clot six inches long and weighing three and a half ounces

and the patient's mother assured me that it was "exactly in that state when passed". Slight haemorrhages occurred for four days afterwards: from the amount of blood passed, I suppose it must have come from ulceration connected with the Peyerian Glands, and not with the Sunday attack, as ulceration sufficient to cause it could scarcely have taken place in the second week of the relapse, supposing that during the relapse fresh patches in the bowel were affected and this seems to be the more common belief.

Deafness was a prominent symptom in nineteen cases amounting to absolute deafness for four or five days in two cases - In some of the cases though it was accelerated by the Quinine given, it was always noticed before its administration: noticed that the hearing usually became distinctly affected during the first few days, in some gradually increasing, and present until the fever was fairly on the decline: in others affected only for a short time - That it is not caused by the mere rise in temperature is proved by the fact that it does not occur in most febrile diseases, unless indeed connected with

organic lesion in the auditory apparatus – The deafness accompanying typhus it was merely functional ? the perfect hearing being restored with the restoration of the patient's health: or was it due to a hyperaemia of the labyrinth induced by the presence of a peculiar irritant in the blood ?
The large proportion of cases in which defective hearing or absolute deafness was present, even in cases of the mildest type, makes it particularly interesting in regard to the symptomatology of this disease –

Bronchitis of what I shall call the congestive variety, differing from passive hyperaemia of exhaustion in that it sometimes occurred early in the disease and from ordinary bronchitis, in its connexion and persistence with the fever, occurred in eight cases. In one otherwise mild case, it was the most prominent factor in the whole course of the fever {see temperature chart I. C.} The sputa, mucus mixed with air bubbles i.e. frothy and tenacious after standing, but otherwise free from yellow colour, amounted to two half pints in the twenty four ~~days~~ hours for many days together

commencing as it did with cough R. on the fifth day of the attendance and tenth day of the attack of fever. In another case S.B. the sputa and cough were so excessive that I had the greatest difficulty in persuading the friends that he was not consumptive and had he died the mother told me she should have considered that consumption killed him"

Bedsores in two cases one commencing in the seventh week the other in the fifth week - Not I think of the acute decubitus variety but purely from pressure; as one was relieved after I obtained an air bed for him; and the other which only reached the congestive stage was quickly relieved by the use of pad - Both appeared over the lower part of the sacrum

Abortion. The mother of two children previously attacked three months pregnant, aborted during the fourth week of the fever and suffered for several days from severe uterine haemorrhage, and was totally unconscious for forty eight hours - This delayed her recovery

but as I was myself confined to the house for three weeks about this time my notes of the case are incomplete. It is not uncommon for a pregnant woman to abort during any febrile attack. The case is only of interest in its bearing on the course of the fever — the woman made a good recovery in ten weeks

Temperature is admittedly a valuable aid in the diagnosis of enteric fever: presenting as it did in all cases observed the morning and evening remissions so characteristic of this disease. In country practice it is impossible to obtain the morning and evening temperature in all cases, as in the absence of a nurse I have never been able to obtain trustworthy records — In the two charts which follow all observations were taken by me, at as far as possible 8 A.M. and 8 P.M.
To refer more generally, a steady rise in temperature was noted during the first week, after which and until the gradual fall commenced, peculiar fluctuations occurred. During the ~~2nd~~ period of decline and especially during the last few days preceding the permanent fall, a wider difference between morning and evening temperature

than had hitherto occurred in the whole course of the fever was noted in eight cases, a difference often of from 3° Fah to 4° Fah: an illustration of my meaning will be found in Chart of William Russell's case from the 24th to the 27th days and again from the 17th to the 21st of the relapse —

The temperature for the most part is an indication of the severity of the attack, though there are marked exceptions in respect to the height of the temperature - I have not seen any case recorded in which death was due to hyperpyrexia purely. The highest individual temperature I have taken was in the case of a girl eleven years old, when on the evening of the sixth day the temperature reached 107°.5 Fah. the previous morning's temperature being 104°.2 Fah. and on the next evening it had fallen to 103° Fah: owing no doubt in some measure to the artificial means adopted to obtain a reduction i.e. complete immersion of the body in a tepid bath reduced till it was quite cold in ten minutes, after which the girl was wrapped in a blanket and lifted back into bed, these immersions were repeated every four hours for two days: In the evening of hyperpyrexia the child

acid and delicious, and could only be kept in bed by force - I mention this as it is the only instance in which such marked delirium has occured so early in the course of the fever It is interesting also in connexion with the cold baths that the childs mother noticed that the child was quiet for two hours after immersion and that the delirium returned gradually after that time. Except for refusing this she would never have continued the bathing, & mentions great indignation when it was first ordered.
This girl made a good recovery without complications, the temperature falling to normal in the fifth week:

In ten cases a permanent fall in temperature to normal occurred between the fourth and sixth weeks.
In four cases it occurred in the third week
Four cases complicated by relapse.
One case the fall took place in the eighth week
One xx. xx. xx. tenth week

Relapse: Two relapses in the case of enteric fever are to recurrences of the original disease: and as in every case of enteric we find peculiar pathological changes in the small intestine and mesenteric glands in connexion, without which changes the case is not enteric, so must it be in a true relapse:
S. Murchison as a result of his experience, gives three percent as the average in which relapses took place:
Out of twenty one cases I noted relapses in four cases: the youngest a child of two and a half years in which constipation was a marked feature during the primary attack which lasted for three weeks, diarrhoea only setting in during the last four days of the relapse which lasted for twenty four days, with an interval of ten days between the final fall of the primary attack and the return of the fever:
In both attacks the typical eruption was present.
The case of a girl aged 15 years 2 months in which two distinct relapses occurred, the first after an intermission lasting nine days and thirty five days from the commencement of the disease; the relapse lasted thirty seven days and was accompanied by diarrhoea, disappearance of the rash and delirium of a more excitable character

again after a seven days intermission a second relapse occurred lasting for fifteen days — the child gradually recovering from the sixteenth week.

The case of a young man Smith I shall treat more fully. The first attack lasted for twenty seven days, the relapse for twenty days; with an intermission period of seven days. The second relapse of doubtful nature lasted for eleven days, with an intermission period of ten days from the decline of the first relapse.

Different theories have been expounded as the etiology of a relapse.

1. Recontamination of the blood with the virus of the disease as a result of non-elimination owing to constipation. This theory infers that elimination takes place mainly if not entirely by the bowels, & as constipation is a marked feature during the convalescence of the fever in the majority of cases, we might expect a much larger percentage of relapses than actually do occur — We might expect to that the more purgative the diarrhoea, the quicker would be the elimination, but this we know is not the case, the presence of the

Report by W. Watson Cheyne from the Biological Laboratory of the International Health Exhibition. Sept 1884

Bacillus of Typhoid Fever. This is a small oval bacillus, which seems constantly in great numbers in the ulcers of the intestinal wall. It also forms plugs in the liver and spleen

After sowing the cultivations outside the body of the bacillus W. Cheyne remarks that it is not clearly proved that this bacillus is the cause of the disease

of the diarrhoea depends on the bowel lesion and the extent of it and therefore may continue for an indefinite period; just as we see discharges from mucous surfaces in other situations as a consequence of congestion or ulcerative lesions — Though the particular specific virus of typhoid fever has a special liking for particular portions of the intestine still it is present in the general circulation and it is difficult to conceive that it should be eliminated by the bowels and by them alone.

2. A similar recontamination of the blood in consequence of the commingling in the general current of the circulation after crisis of non-depurated blood which had lain by in the enlarged and congested spleen and so had escaped the purification of crisis —

In support of this by bacteriological experiment it has been noticed that the so-called typhoid bacillus was present in the spleen in groups or ~~plugs~~ ~~and~~ (in spleen & liver examined after death) and it is possible that these may have remained after the otherwise perfect elimination from the blood of the virus and being from some cause set free afterwards possibly during the "shrinking" to

to the natural size of the Spleen:

Others again argue that the relapses and the second fever arise from the contamination of another set of glands which probably has not been affected at first. The probability of a new set of glands being implicated is however hardly a cause of the second attack, but is one of the factors which go to make up a second attack.

In this theory we might infer the continued presence of the specific organism but for some reason or other inert during the intermission period—

The question of susceptibility must play an important part both in the production of the disease after the admission into the body of the specific cause and in the production of the relapse. On what does susceptibility consist? What state of body is necessary before the germ or specific virus can so become multiplied as to produce its effects viz. a specific fever? A different problem in reference to all specific fevers, more so in the case of enteric because apparently a larger proportion of people who are exposed to the cause do not suffer from the disease it produces, than is the case with the allied fevers

It would appear as if some factor, not ~~does~~ present in all persons, and of which we know absolutely nothing, must be present in the blood or alimentary canal before the specific cause can produce its specific effect: That is, the specific bacillus? or virus, enters the body, it is usually supposed by the alimentary canal, finds that body a suitable medium and so develops and produces its peculiar effects: Is there then some peculiar chemical state of the blood or some constituent present at certain times which acts as pabulum or manure for this specific virus and allows it to develop and increase? and does the decline of the fever indicate the using up of this "something" vitally necessary to the production of enteric fever:

Even supposing a pabulum present in the blood necessary to the development of the virus, the pabulum is used up and elimination of the virus and its products takes place: according to most authorities elimination only takes place by the bowels; but if the theory of direct contagion be true and I must maintain it is proved to be true, we may suppose that elimination takes

by the Lungs, Skin, Kidneys &c: though it may be that the virus is less virulent in this form:

a Relapse occurs, or any suppuration after the pabulum necessary to the production of the disease in the first place is used up and after the virus is eliminated from the body, then we require fresh virus and fresh pabulum – It is possible that for the production of this pabulum some formative process is necessary and that under certain conditions it continues or begins afresh, and it is also possible that the 'Group' or 'Groups' of bacilli said to be present in the Spleen and Liver by W. Watson Cheyne may remain as 'Groups' out of the general circulatory current for the time being, that is until the bacillus in the general blood current is eliminated, and that these Groups being again set free find new formed pabulum and produce the disease anew:

or again we know that after the entrance of the Specific virus to the body, a longer or shorter period, a period of incubation, occurs in which there is no fever: it has been asserted amongst others by S. Colbie that the incubation period may be extended to six or eight weeks or even more: that is we may have the Specific

cause of enteric fever present in the body for a period without any fever resulting - might not the same thing occur to occasion a relapse. A gradual using up of necessary pabulum in the original attack, a gradual fall in temperature to normal; a continuance of the pabulum formation in a temporary excess formation - again a period analagous to the period of incubation - i.e. a period in which the virus was not present in sufficient quantity to occasion an increase in temperature or produce its other effects.

It is remarkable in this connection that a relapse is usually shorter than the original attack, a second relapse shorter than the first.

On this theory, it would appear that as in the large majority of cases, no relapse occurs, that the virus is thoroughly eliminated from the body and that the pabulum is used up and its formation ceases:

The pabulum being used up and its formation ceasing conferring immunity

DISEASE.
Enteric Fever

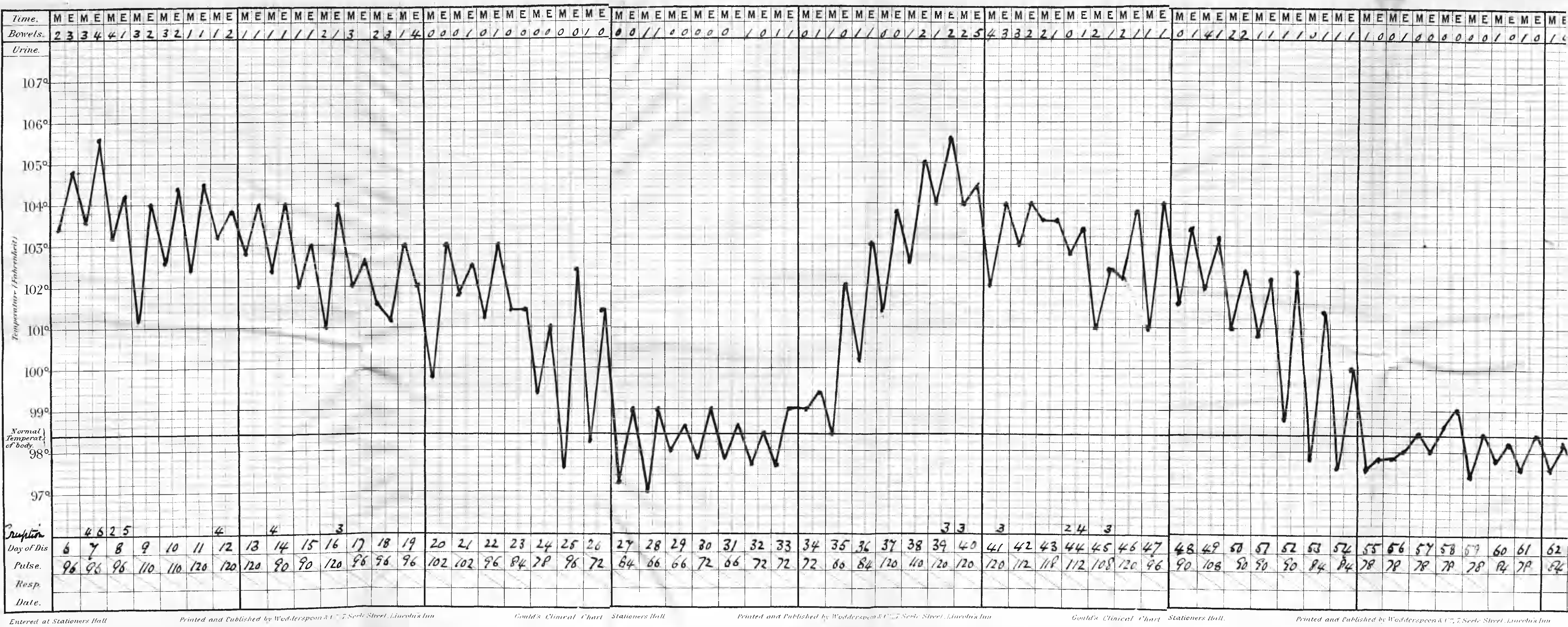
Notes of Case.

Name William Russell

Age 21.

Diet Milk

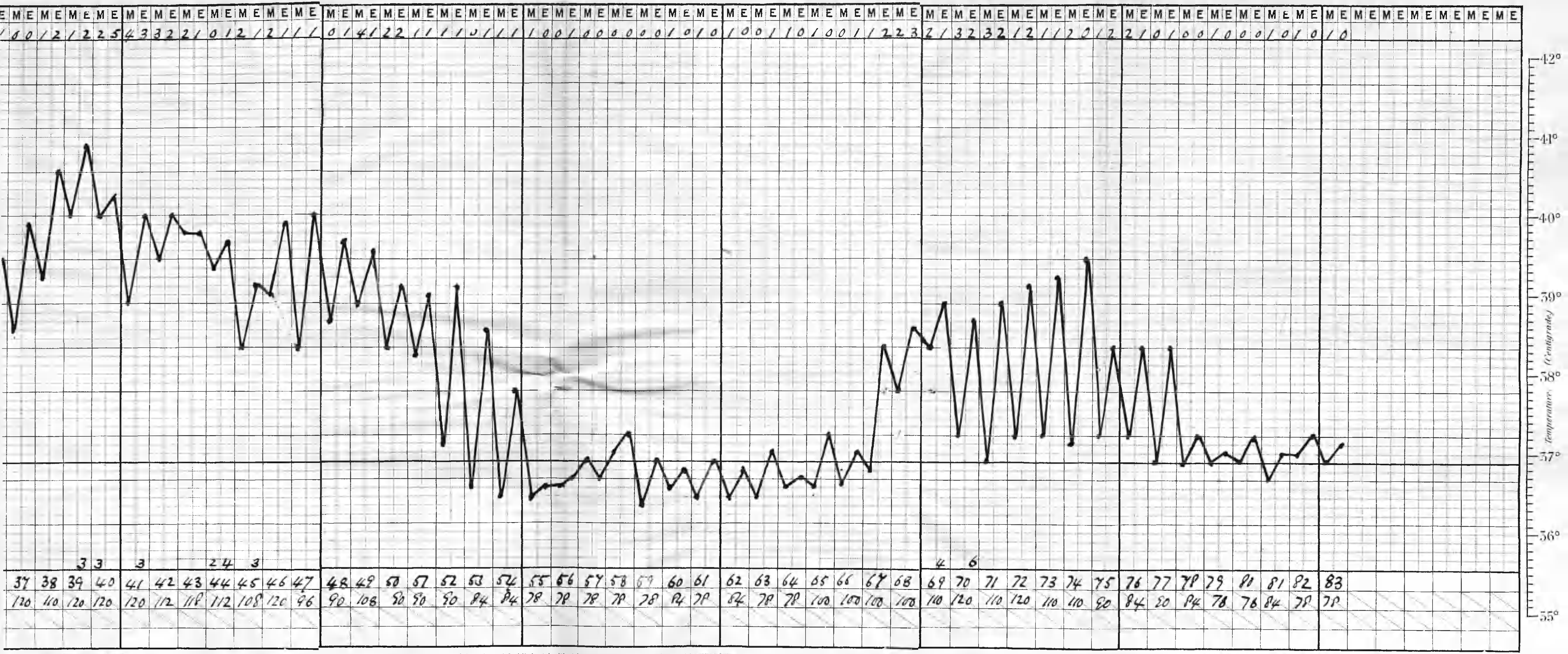
Case Book No.



Haemorrhage from the bowels on fifteenth & eighteenth days, and on eleventh day of relapse or forty fifth of disease (see text)

Date of admission. October 8th 1874

Result Recovery



42°
41°
40°
39°
38°
37°
36°
55°
Temperature (Centigrade)
37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
Gould's Clinical Chart
Stationers Hall.
Printed and Published by Wedderspeon & Co, 7, Serle Street, Lincoln's Inn.
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Stationers Hall.
Printed and Published by Wedderspeon & Co, 7, Serle Street, Lincoln's Inn.
Gould's Clinical Chart

The following is a report of a case in which one true relapse occurred, and a second one of a doubtful nature:
The case was the first one of enteric fever I was called upon to treat after obtaining my degree, and as the calls upon my time were less frequent in those days, my notes of the case are more complete of which I give a short synopsis here:
William Russell aged 24 yrs. unmarried, a collier working near Denton in the Staffordshire Potteries and lodging in a small cottage with another young man, both of whom occupied the same bed: When not at work W.R. was addicted to drinking, and as a rule got intoxicated at the end of the week:
He complained of feeling ill for three or four days previously, but on the fifth day he was much worse and consulted a Medical man who advised him to come home to Shendle his parents, He was seen by me on what I take to be the sixth day of his illness, pulse 96, tongue coated with white fur and tenderness & dart at the tip, pupils dilated, Complained of abdominal tenderness on pressure in the right iliac region, and said he had had several "watery" evacuations in the night and for two days previously Naturally bright, cheerful and intelligent (of prospective parentage)

Now he was peculiarly dull and apathetic, with a temperature of 103°.5 Fah: From my note book "Suspect will prove case of typhoid fever". and this diagnosis was amply verified on the two following days.

He was ordered milk jelly but no other kind of food: On the evening his temperature reached 104°.8 Fah: two evacuations since morning which had been saved for inspection: they were characteristic, thin yellowish liquid interspersed with yellowish flakes, typically pea soup like

Seventh day. Morning temperature 103°.5 Fah, evening 105°.6 Fah. the highest point attained to during this attack Cold Sponging over the whole of the body was ordered to be repeated every four hours, whilst the patient lay in bed, with the view of lowering the body temperature; and as the chart will show it apparently did lower the temperature or at any rate it may have prevented it reaching a dangerous point:

On this day the first appearance of the eruption was noted, four rose coloured spots, disappearing on pressure, being raised and marked on the abdominal surface.

This night patient was delirious and attempted to get

out of bed and demanded his clothes that he might go to work. During any sleep he had, he talked wildly and was restless. Six evacuations had been passed in the twenty four hours preceding in which I noticed flakes of undigested milk amongst the curd portion of the milk, of which the patient had drunk freely taking as much as six pints of milk in the day and night. From this time the mother was told not to allow him more than four pints in the day and night, and if patient wished for more drink either toast water or the above quantity of milk or to give him in addition barley water to drink. Later on in the course of the fever I noticed flakes of undigested milk when patient was not taking quite two pints in the twenty-four hours, so that it would appear as if a very small quantity of caseine could be digested in these cases and it is a question whether it is wise to put indigestible matter into the stomach during such an illness —

On the eighth day. The tongue was more heavily furred brown and dry and cracked. More spots were noted distributed on abdomen and chest. Temperature

Somewhat lower (see Chart). The diarrhoea had increased to eight evacuations since the previous night – Patient was more apathetic and the deafness which I noted first on the seventh day, became more intense and added to the general stupor: When roused patient was irritable.
Ninth and tenth days. The deafness was now absolute, patient could not hear not matter how he was shouted at; Nocturnal delirium more excited. Diarrhoea less frequent pulse 120.
Twelfth day. Two evacuations in twenty four hours. Pulse 120. Morning temperature 103°4 Fah: Evening 103°8 Fah. Rambling a good deal: He was given six grain doses of Quinine every six hours, and this was continued for four days: After the first three doses patient slept without rambling, his tongue began to moisten and he appeared generally better – No effect on the temperature was produced: Four more stools were noted on this day all three previously noted not having disappeared.
Thirteenth day: He was seen by Dr Eddison, physician to the North Staffordshire Infirmary: Pulse 110. Morning temperature 102°8 Fah. Tongue Lower lip with tendency to moisten

Three evacuations in the previous twenty four hours: deafness less absolute in spite of the administration of Quinine

Fourteenth day. tongue again drier and more crackled. pulse 90 markedly dicrotic; Two evacuations

Fifteenth day. first appearance of blood in the motions, about three ounces: Two evacuations

Sixteenth day. tongue remained dry, sordes collected about the teeth and gums, patient said he was "dried up", and delirium of a rambling, muttering character commenced again, this with an evening temperature of 104° Fah. From this day, three drachm doses of brandy were ordered in milk every four hours; after which the tongue became more moist, sleep more natural with less rambling.

Seventeenth day. Four evacuations. Three more spots pulse 96.

Eighteenth day. Four evacuations, motions blood emptied without my seeing them but the ~~~~ mother said there must have been a pint of blood, but as the motions were mixed with a quantity of urine patient said he had passed I doubt her accuracy — Patient perspired profusely for the first time during the attack. Pulse. morning 96.: evening 84

Nineteenth day. Four evacuations having been passed in the twelve hours and patient complaining of a good deal of abdominal pain, I gave him a pill containing half a grain each of extract opii and aconiti: next day pulse 102; slight delirium, no evacuation: tongue cleaning and moist; perspiration more profuse:

Twentyfirst day, one evacuation liquid, first since quinine was given; abdominal pain easier; pulse 96.

From the sixteenth day the temperature gradually, though by no means steadily (see chart) fell till on the morning of the twenty fourth day it came down to 99°.5 Fah. rising over 100° Fah. in the next three evenings – and here I would remark that before the final fall of the evening temperature to normal I have always noticed a greater variation between morning and evening temperature than during any other period of the attack: In this case on the twenty fifth day the morning temperature was 97·4 Fah: evening 102·6.

Twenty third day an eruption of acne occurred over the abdomen and back: urine much diminished only ten ounces being passed in the twenty four hours for which

ter minim doses of D. digitalis with 10 grs. citrate of iron and quinine three times a day was ordered; with marked increase in the quantity of urine passed during the next three days when the digitalis was discontinued.

On the twenty fifth day, the first solid motion was passed with great difficulty and pain. It was with only a few streaks of blood - was large, formed and clay coloured, a complete absence of bile. This was the first motion for three days.

On the twenty seventh day both morning and evening temperature fell to below 97°. Pulse 84. Tongue clean and moist. Hearing perfect. Slight tenderness on pressure in the right iliac region.

During the next seven days there was no fever, patient took large quantities of milk & beef tea and was still ravenously hungry, so much so that on the 33rd & 34th days he induced his mother to give him some bread and cheese.

On the 35th day the evening temperature rose to 102° Fah. pulse 120. Patient looked flushed and excited, rambled a good deal in the night; complained of violent headache

Referred mainly to the frontal region - This violent headache continued during the next four days, but appeared to be much relieved after 10 grains doses of Quinine.

On the next four days the temperature gradually rose with morning remissions till on the 5th day of the relapse or 39th of the fever it reached 105: 6 Fah: pulse 120. Diarrhoea with liquid yellow stools commenced again on the 4th day: Still evacuations. pulse 120: and on the fifth day, three shots were noted on the abdomen, four evacuations with abdominal tenderness: on the following day the diarrhoea had increased to nine evacuations when an opium pill was ordered as before; three more shots were noted: the tongue had become furred and dry with a tendency to crack: after the opium the diarrhoea was somewhat diminished and patient slept better: On the seventh day three more spots were noted, none of the others having disappeared as yet:

On the eighth day patient complained of pain in the throat during swallowing; the tonsils were inflamed and enlarged and slightly ulcerated. The throat was dressed

with a mixture of hydrochloric acid and honey iii 5 and a gargle of chlorate of potash and tincture of myrrh used frequently. Under this treatment the throat rapidly improved: Patient slept badly and rambled a good deal, tongue became dry and brown.
Six fresh spots were noted on the tenth day, three more on the eleventh, two of those last noted still remaining. Last pointed.
On the eleventh day of the relapse a large quantity of blood was passed with the motions and one large clot passed as such according to the mother, spiral in form, measured six inches long and weighed three and a half ounces. The temperature which had gradually fallen during the last three days, rose again for the next three days. Diarrhoea diminished. pulse 108.
On the 12th day. it was noticed that a bedsore was forming in the region of the sacrum, a large area was congested and inflamed: after which I was fortunate enough to obtain an air bed on which the patient was put: ~~and~~ the affected area being rubbed several times a day with whiskey on a piece of flannel - after which it gave

no cause for anxiety and gradually got well.
Small quantities of blood were noticed in the motions on the thirteenth day: the diarrhoea still being present though only two motions daily had been passed since the eighth day: pulse 96: tongue moistening but heavily coated; appetite bad: indeed during the whole course of the relapse only very small quantities of milk were taken: urine again diminished in quantity, when 10 minim doses of Digitalis three times a day were again ordered with benefit.
Fifteenth day Four evacuations during the previous night, with a good deal of abdominal pain – no blood: appetite rather better: From this time the temperature gradually fell till on the morning of the 18th day it was below 99° Fah. the tongue became moister and cleaner; patient was frequently bathed in perspirations and sudamina were abundantly present for the first time during the relapse. The motions though not formed were less liquid: pulse 84.
On the 20th day both morning and evening temperatures were at about normal: the motion passed was formed and contained colouring matter – bilo-

There can be no doubt that this was a case of true relapse by a return of the fever, abdominal tenderness, diarrhoea with characteristic stools, return of the eruption, and the passage of blood in the motions; this latter however might have been caused by the bowel lesion of the primary attack:

Headache here was a marked symptom for the first few days and though a certain amount of delirium was present it was of a more quiet order than in the primary attack: There was no desire to escape, he was more conscious though apparently more helpless - Much less milk was taken than in the primary attack: and so far as the danger to life, my own impression was that the relapse though of shorter duration was much more serious than the original attack: He began with he was much weakened by the first attack, and though he appeared to gain strength, in the interval between the two attacks - I considered him much more helpless, and so did those who nursed him, than during the first attack:

After the complete subsidence of the fever on the twenty first day of the relapse, 55th from the original attack, patients appetite improved so much that it was difficult to restrain him from taking solid food; after the first few days of this intermission he was allowed thin milk gruel & arrowroot & milk and beef tea and gathered gathered strength rapidly. No solid food was allowed: On the sixth and following days patient sat up in bed with the aid for bed rest and read a little – I continued to visit him twice daily when on the evening of the 14th day his temperature had risen to 101°. And for the next two days both morning and evening temperature exceeded 100°Fah. Diarrhoea again set, with liquid stools but browner in colour than hitherto. The tongue became furred and the appetite diminished; and sleepless nights were passed: Four Spots were noted on the fourth day and six the following day, all of which disappeared three days later: There was no abdominal tenderness: pulse 100 & 110.

2nd Relapse

From the fourth day the evening temperature rose

gradually to 103° Fah. on the tenth evening, the morning temperature on each of these five days remaining at or below 99° Fah: Pulse remained about 110: Sleepless nights were passed with slight muttering rambling.
On the evening of the seventh day patient complained of pain on the outer side of the thigh of a throbbing character - and on examination a small area was found to be slightly swollen and inflamed, with increased pain on pressure. Three days later, the swelling had increased and fluctuation was detected; a free incision let out about four ounces of dark brownish pus - this continued to discharge for the next two days after which it rapidly healed. It was evidently only a local abscess, probably connected with the impoverished state of the blood and arising idiopathically, as there was no evidence of a local injury: From this day (the tenth) the temperature and pulse-rate gradually fell and patient made a speedy recovery without further complications.
It is very doubtful if this can be called a true relapse it is true there was elevation of temperature with characteristic morning remissions, diarrhoea, and a reappearance

of rose colored spots disappearing on pressure:
Still it was remarkable that for the most part the
morning temperature showed remain at or about normal.
My own impression at the time was that the elevation of
temperature and diarrhoea were caused by the decay

DISEASE.

Enteric Fever

Notes of Case.

Name John Carr

Age 22

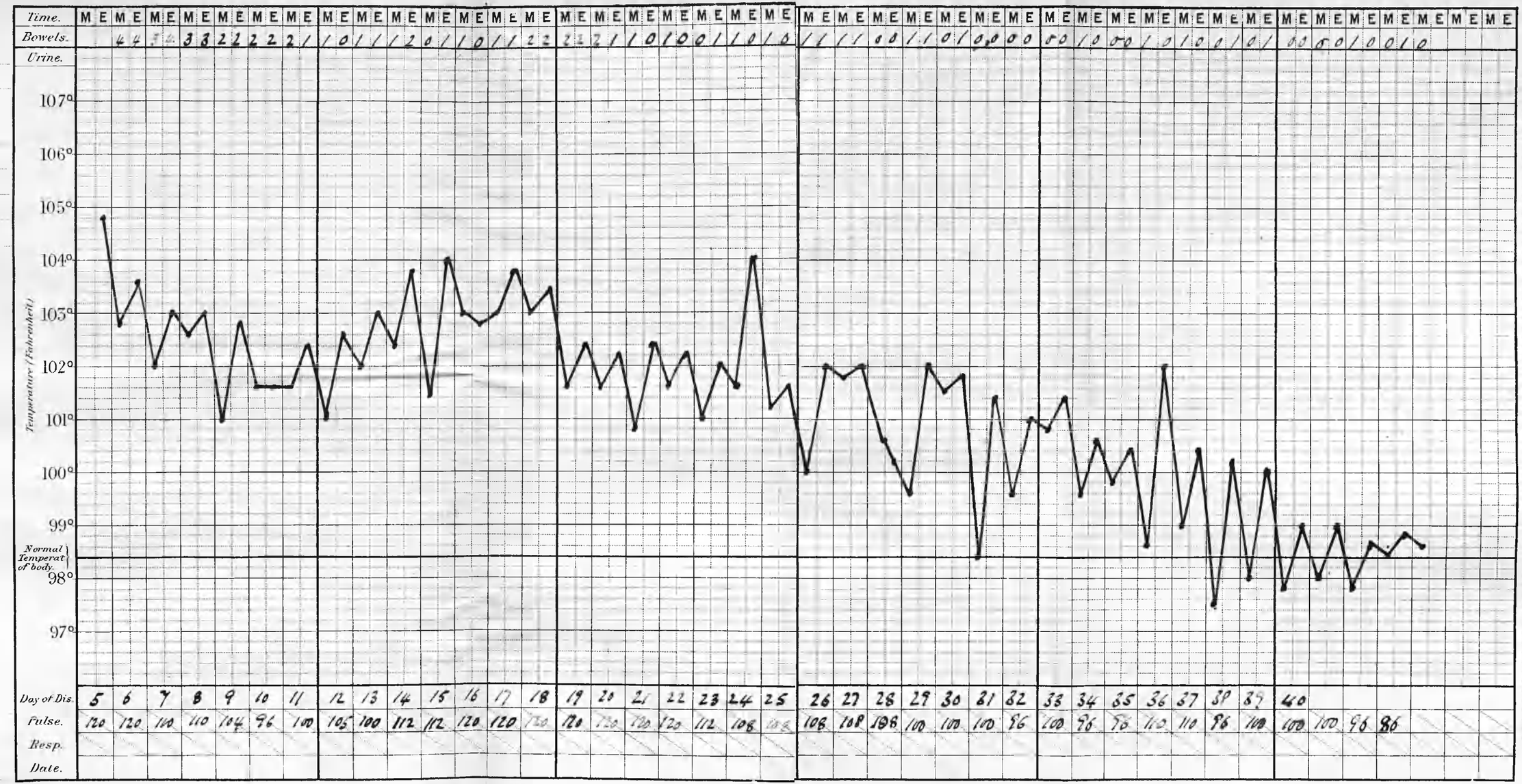
Diet Milk

Case Book No.

Date of admission

March 1887.

Result Recovery



Entered at Stationers Hall. Printed and Published by Wedderspoon & Co., 7 Serle Street, Lincolns Inn Gould's Clinical Chart.

Stationers Hall Printed and Published by Wedderspoon & Co., 7 Serle Street, Lincolns Inn Gould's Clinical Chart.

The next case to which I shall refer here more briefly, occurred in March of the present year [See chart]

John Carr aged 24 years, unmarried, a butty collier came to see me at the surgery, pulse 120, temperature 104 Fahr. tongue coated with greyish fur: complained of abdominal pain and had suffered from severe diarrhoea for three days previously and from vomiting this day and the preceding: I ordered him to go home and get to bed where he remained during the next six weeks:

This case was an isolated one in which the etiology was obscure - there was no other case in this town, nor had there been within twelve months: this house was supplied with town's water, presumably pure: the milk used came from their own cow. This young man was in the habit of visiting his sweetheart who lived in Dean, a village in which as I said before, enteric fever has been peculiarly endemic for many years, and possibly it was here he contracted the disease: He had taken tea there and had also frequently drunk the water: And as our evidence tries to prove that a stranger going into a district where enteric fever is endemic, is more susceptible to

to the influence of the disease, than ~~the~~ those who are natives of the place. I thought it not unlikely that it was here the specific virus found an entrance to his body:
Until he came to see me, his brother, two years younger occupied the same bed with him, but did not contract the disease; nor did anyone who visited him during his illness: A sister aged 20 living in the same house assisted in nursing him but never had anything to do with the emptying of the motions.
At 8 P.M. I visited him at home, temperature 104°.8 Fah. I thought from the fall next evening 103°.6 Fah. that the high temperature on the first evening of my attendance was possibly in some measure owing to the fact of the patient walking about during the early days of the attack.
I omitted to mention that when he visited me here, he fell over in a faint whilst I was examining him — Obstinate vomiting occurred during the first three days of my attendance and was only relieved by the sucking of ice. The diarrhoea continued, for the first four days seven and eight motions were passed in the twenty four hours, after which it was less severe till on the seventeenth

day the motions were semi-solid, though 3rd formed
The appearance of rose colored spots was first noted on
the fourth day & on what I judged to be the eighth
day of the fever; again on the sixth and eighth days
or tenth and twelfth of the fever:
The tongue became brown and dry on the fourteenth day,
patient had been restless all through, with a good deal of
quiet rambling during day.
The most important feature in this otherwise mild case was
the bronchial complication, Cough which commenced on
the twelfth day, became more severe on the 14th day
and on examination, sibilent and mucous râles
were abundantly present over the whole of both lungs.
Expectoration was profuse, as much as two half pint
cupsful in the twenty four hours of frothy, tenacious
mucus: and this continued for many days;
On the twenty first day the first formed stool motion
was passed without blood:
On the 24th day the evening temperature which was on the
decline suddenly jumped up to 104° Fah: next day
profuse perspiration broke out, tongue became moist

and the temperature declined. From the 25th day to 40th day, the cough and expectoration gradually lessened; patient slept well without vomiting; tongue cleared, and his appetite became voracious. The diet was exclusively milk until the 34th day, when milk gruel was allowed, made by boiling the oatmeal in water for half an hour, straining and thinning with milk.

Ten drop doses of "Tinture" were given for relief of the cough and expectoration, with great relief according to the patient, but apparently having no effect on the course of the bronchitis.

The final fall of the evening temperature occurred on the 40th day, after which patient rapidly recovered.

Until the cough set in, patient was sponged twice a day with cold water, but this was stopped with the occurrence of the bronchial affection. This sponging may have had something to do with the bronchitis but I should prefer considering it occasioned by the presence in the blood of an irritant, acting specially in this case on the mucous membrane of the bronchial tubes.

Treatment In the treatment of cases of enteric fever, it would be well if Professor Davidson's advice to his students was acted on - "That there was no routine: no specific or antidotal remedy, and that too much interference was to be condemned". I remembered this advice and have attempted to act up to it.

Artificial Reduction of temperature is much in vogue at the present time, but it is very doubtful in such a disease as enteric fever whether this artificial reduction if obtained has any effect on the course of the disease, on its complications or on any of the effects which tend to kill: If there are cases in which hyperpyrexia per se tends to kill, then such a reduction may be of service: such cases are of very rare occurrence, if they ever do occur in this disease: We have a specific poison in the system, producing specific effects, and if the artificial cooling of the blood in which the poison is circulating, assists in any way in eliminating this poison, then it must have an effect on the course of the disease: But then we know that this poison is present when the body temperature is normal during the period of incubation and that is presumably

during its development that the increase of temperature begins: the conclusion is that the virus can develop equally well in bodies with a normal temperature and is therefore not necessarily affected by a reduction from a febrile temperature to normal

VI. Cold baths. We find that immersion of the body in cold water lowers the temperature as taken in the axilla or anus for a certain period, after which it again rises: Whether this reduction is purely a physical phenomenon dependent simply upon abstraction of heat, or knowing the enormous influence exerted on the central nervous system by even slight impressions made over a large peripheral distribution of nerves, whether the application of the whole surface of the body in form of water below the temperature of the body acts by exciting a reflex inhibitory influence upon the nervous system; it is quite certain that such a reduction does occur and can be maintained by continuous immersion —
This method of treating enteric fever has been advocated very strongly in Germany, where cases have been kept continuously immersed during the whole course of the fever, with good results.

In the proper carrying out of this extreme treatment it is necessary to have special arrangements for graduating the temperature of the bath and for immersing the patient without exertion on his part: such arrangements are not practicable outside a fever hospital.

For myself. I have found patients very unwilling to submit to being put in a bath frequently; the friends still more unwilling; but in the case of the child whose temperature reached 107° Fah, the cold baths were repeated every four hours and the temperature was apparently reduced. In addition to the reduction of temperature I have found sleeplessness and delirium relieved, patient feeling generally more comfortable: a bracing effect is produced, it may be from the effect on the nervous system —

Short of continuous or uninterrupted immersion of the body, I have made it a general rule to have my patients sponged over frequently with cold water; and on several occasions I have taken the temperature before and an hour after this sponging and have found reductions of temperature varying from one to two degrees Fah.

The cold bath or graduated bath would be contra-indicated in cases where Syncope occurred during or after the bathing, in cases of intestinal haemorrhage, perforation and peritonitis and in all pulmonary complications

Again artificial reductions are attempted by the use of drugs notably Quinine. Salicin. Anti febrin — My own experience with Quinine is negative, I have given it in doses of from six to fifteen grains repeating even four hours, without any appreciable effect on the temperature in this disease: It is maintained by some that even larger doses should be given to produce any effect: I have found great benefit resulting from eight ten grain doses, in the headache and delirium of the Cata stage of the disease given at bedtime

Salicin and Anti febrin I know nothing of in connexion with this disease though from their effect on the temperature in other diseases, notably Salicin in connexion with the fever attending acute rheumatism, I might infer they would act similarly in the case of enteric fever If such a reduction had any effect on the course of the fever, they might be

useful here: but this point requires more proof—
Is it necessary to control the diarrhoea in enteric fever? this without attempting to cork them up which must be bad practice: In cases where the diarrhoea has been excessive i.e. where the number of evacuations has exceeded eight or nine I have usually given a pill containing ½ gr of Ext. Opii with apparent benefit: if the bowels are corked by opium, there must be great danger of perforation, the effete matter instead of finding a natural vent, swelling up the bowels: Small doses given where the diarrhoea is excessive may act beneficially (1) by diminishing the amount of secretion poured out into the bowels, (2) by lessening the peristaltic action without in any very great degree tending to retain the contents of the bowel, (3) it may act in the later stages of the disease, during the ulcerative process going on in the bowels, beneficially on the ulceration, as we know it does on ulcerative processes in other situations
Many cases of enteric have been reported in which constipation is a marked feature throughout, I have seen one such case; I do not know of any statistics that show

Whether or not the disease is more fatal a this time;
but I have always dreaded constipation and have
watched anxiously for the first solid motion, after a
few days interval without an evacuation, during the
decline of the fever: and
Where constipation has been marked in the early stage, I have
given 4 grain doses of Grey powder - Where it has been
marked during the decline of the fever and during convalescence
I have not interfered unless patient was five days
without an evacuation, when I have given three drachm
doses of Castor oil and repeated it every four hours till
the bowels acted - Much harm I feel sure would be
done during the decline by the free use of purgatives,
supposing constipation to be a feature of the decline:
Probably the use of an enema would be less risky than the
administration of oil -

Diet. With respect to food I have kept my patients almost exclusively on milk: With the exception of four cases in which the friends would insist on the patient taking beef tea: In this neighbourhood it is remarkable how much the people think of beef tea and how little of milk – I have always found in almost all acute diseases that there is a greater tolerance for milk, than for any kind of meat infusion of which the patient quickly tires and sickens.

Should the quantity of milk be restricted? I have in a few cases restricted the quantity to four pints in the twenty four hours, but as a general rule have not placed any restriction on the quantity. The appearance of undigested flakes of curd in the motions is said to be an indication that the supply of milk should be reduced, on the ground that it is useless to burden the stomach with what it cannot turn to account, but even infusions in fevers and acute diseases – I have observed the motions carefully in respect to the quantity of milk taken, and have noticed flakes present in the motions when only a small quantity of milk was being taken, namely two pints in twenty four hours: and again I have noticed the absence

of flakes in the Patient when as much as seven pints of milk was taken in the twenty four hours: This I think is due the fact that a larger quantity of gastric juice is present in the Stomach at one time than another, and that if an efficient is present when the milk reaches the stomach, the curd portion of the milk becomes separated from the liquid portion and passes through the bowels in that form: We know that in apparent health, milk will be more easily digested at one time than another and I have especially noticed in the case of young children, that milk taken occasionally either forms large masses of curd which are ejected or are passed with the motions in the form of curd, and this apparently with little general disturbance of the patients health.

In these records I have preferred not to interfere, even if flakes were present in the motions, unless the amount taken was very excessive, when I have ordered whey in place of milk, but never found a patient who could drink it for many days: "it was too sickly to drink constantly."

Beef tea and the various infusions of meats, I have never ordered in enteric fever, though they have been given by the friends

patients cannot take much of them, they are usually
acidity and they tend to increase the diarrhoea; in addition
their nourishing properties unless thickened are very small
compared with milk.

As to diet during the decline of the fever and during convalescence
it is supposed to be dangerous to allow anything but liquid
food for some days after the complete subsidence of
the fever: the only possible reason against such foods is
the danger of any undigested bits coming in contact with
the ulcers in the bowels and causing perforation or short of
that haemorrhage: it cannot be with the object of keeping
the patients off that solid foods is forbidden, for we find
patients as solid and hard passed on a milk
diet, as on any other diet, and this not in exceptional
cases but as a rule: for this reason I would advocate
the use of oatmeal and milk, made in the way I have
described elsewhere, malt and flour and milk = malt food
custards and jellies, in addition to simple milk, during
the decline of enteric fever and during convalescence
much might be said on this subject, especially in connexion with
the peptonised foods now in the market, peptonised milk

being extremely valuable i acute disease ; but it would be out of place i such a paper as this

Stimulants There is no subject in the whole range of medicine which requires greater care & greater thought than the judicious use of Stimulants - My own practice has been to give small doses viz of brandy in milk in those cases which at the end of the third or fourth week have a parched brown tongue with collection of sordes on the teeth, and patient appears to be gradually falling into a state of stupor - and these are the with apparent benefit. Still the more I see of and become accustomed to the various stages of this fever, the less alcohol I find it necessary to order - Mere experience alone can give the judgment necessary, as when alcohol is indicated

In conclusion I might have referred more fully to different methods of treatment advocated in this disease, the mercurial treatment, the use of digitalis &c. But as my experience has been necessarily limited, any remarks would be of little value - I would just refer however to what I consider an abuse of a valuable drug, namely Digitalis

I can well remember digitalis being given in a case accidentally admitted into the wards of the Glasgow Western Infirmary, with the view of strengthening and so quieting the action of the heart in a man who appeared to be rapidly sinking - and who did die - It appeared true at the time that the man had not the necessary physical strength to fight with the disease and that the attempt to act specially on an organ like the heart, not alone at fault, was not only erroneous but objectionable: I took no notes of it at the time but I cannot but help comparing it in my own mind, to the spurring onward of a horse already "spent": the horse responding until it fell or died: So with the heart in the particular instance to which I refer, no doubt it would respond to the action of the drug but at what expense to the body corporate?.
