

Typhoid Fever
in
Children



George Phillip +
Valing. W.

88, The Avenue
Taling
London, W.
March, 1898

Professor Fraser

Dean of the Faculty of Medicine
Dear Sir,

I beg to Submit, for the
approval of the Medical Faculty, the
following Thesis, for the degree of M.D.
It has been composed entirely by
myself.

Since obtaining my degree of
M.B. in 1893, I have been engaged
in Hospital & Private Practice.

I have the honour to remain

Dear Sir

Yours faithfully
George Phillips

Introductory Remarks.

Abstract.

page 1. The diagnosis of Typhoid Fever in children as compared with adults. — difficulty in diagnosis under 2 years. — its rarity at that age — the frequent absence of characteristic symptoms.

page 2. Liability to disease as regards age of child — frequency as compared with other exanthemata. — severity of disease usually increases, with increase in age of child

page 3. — Exceptions.

page 4. Differences between child & adult.

In Children (1) Frequent abortive character.

(2) Insignificance of local lesion.

page 5. (3) Milder course.

(4) Less frequent severe complications

(5) Lower mortality.

There is no great difficulty surrounding the diagnosis of Typhoid Fever in the adult, when once the most characteristic symptoms are present; & we have eliminated by careful examination of the chest the possibility of Acute Tuberculosis.

With children, however, the diagnosis is much more difficult; & this difficulty may be present throughout the whole course of the disease; & possibly the presence of an Epidemic in the place, is the factor, that finally enables you to rightly appreciate the exact significance of symptoms, which, have hitherto, proved only too obscure. This last remark applies more especially to children under 2, years; in whom Typhoid is fortunately very rare, & is usually met with during the course of an Epidemic. In children of this age, the group of symptoms are almost entirely masked by the febrile bronchial catarrh which accompanies them. Also in the case of ricketty or syphilitic children, or even if such complications be absent, a chronic enlargement of the spleen is

often noticed; so that, this important symptom cannot be taken into consideration in forming the diagnosis.

If we exclude those rare cases of Typhoid Fever occurring under one year — *Murchison quotes a case in a child of 6 months + Henoch quotes 2, cases in children between 6 to 7 months. — Typhoid Fever in children up to 5, years is comparatively rare; but from 5-15, years is by no means infrequent; although it occurs far less often than Scarlet fever, measles etc. The younger the children, therefore, the more rarely are they attacked; & the greater are the differences in the attack, course & complications of the disease; as compared with adults. As the child gets older these differences become less & less marked; although in rare instances, a very young child may be as severely attacked & may present the same grave complications, e.g. Haemorrhage from the bowel; as we meet with in

*Murchison, 1843, Continued Fevers pg: 440.
+Henoch, Lectures on Children's Diseases New Sydenham Society Trans: Vol. 4. pg. 321.

adults. Henoek quotes the following case of fatal haemorrhage in a boy of only 5, years.

"In a boy of 5, years, copious evacuations of fluid & clotted blood occurred on the 16th day of the disease, & were followed by a rapid fall in the temperature from 103.5° - 98.1° F. within a few hours; but this only lasted till the following day, & then gave place to a renewal of the high temperature. The case ended fatally on the 20th day & at the p.m. we found extensive ulceration"
Henoek. Dis. of Childn. N. Y. S. U. p. 329.

A thorough appreciation of the differences which exist between child & adult, is almost of as great importance, in forming a diagnosis; as the knowledge of those diseases, with which Typhoid, in its initial stages, may be confounded. My object, therefore, is not only to endeavour to give a clinical picture of the disease; but also to point out, wherein, the chief differences lie, between Typhoid fever as it occurs in the adult & as we meet with it in the child.

The Physician when once he has made up his mind as to the true diagnosis

is wiser, if he uses Circumspection, in conveying to the friends his opinion. For if he merely abruptly mentions that the child has Typhoid fever; & then after an illness of 5-8 days, the patient sits up in bed, & asks eagerly for food, & the symptoms all suddenly disappear; the friends may doubt the accuracy of his diagnosis, unless he has forewarned them, that this may take place. For it is this, the abortive character of Typhoid fever in children, that constitutes clinically the chief difference & is observed not only in mild cases but also in cases with a violent commencement.

The next most important difference is the insignificance of the local lesion in the bowels, as found after death. Cases may occur in which during life no doubt has existed as to the diagnosis of Typhoid fever; & yet the p.m. examinations have shown only such slight changes in the intestinal glands; that confirmation of the diagnosis has had to depend almost exclusively on the Bacteriological

Examination. This disproportion in Children is the rule rather than the exception, whereas in adults the converse holds good. ❖

The milder course of the disease; & the less frequent & more complications; & as a result the lower mortality amongst children; have all been described by authors as differences. When, however, we come to consider more closely the Pathological Anatomy; we find that these differences, depend mainly on the insignificance of the local lesion in Peyer's patches & the Solitary glands of the Small intestine & can scarcely be classified as differences *per se*.

❖Hirsch. Charité Annalen 1846 4. S. 542.

Pathological Anatomy

Abstract

page 6, *The Intestinal Lesion*

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page 7, — al Examination in these cases — Superficial
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page 8, Condition of Peritoneum — Enlargement
of Mesenteric Glands.

page 9, Bronchitis — Broncho-pneumonia —
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& Perforation of bowel. —

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Under this heading we meet with many differences; the most important of which occur in the Intestinal tract & the Lung.

The solitary glands & Peyer's patches of the small intestine are enlarged, in the early stages of the disease, into soft swellings; & usually show on section infiltration & increased vascularity.

The mucous membrane of the bowel, between & around, the glands is slightly swollen & covered with a considerable quantity of glistening mucus. Anatomically, therefore, we have to deal, with a Catarrhal Enteritis; without the copious serous transudation, that is met with in simple Intestinal Catarrh, Cholera Nostras etc. These conditions, when found in children under 2, years of age, prove nothing, unless cultures from intestinal glands, mesenteric glands & other organs show the Typhoid Bacillus; because, up to this age, the Peyer's patches & Solitary glands become enlarged, in simple intestinal Catarrh & various infectious diseases. *

* Holt. 1897. Diseases of Infancy & Childhood, pag. 1009.
Hensch. Diseases of Children Vol. 7. p. 320. N. Syd Soc.

If the bowel affection is more severely developed, a few solitary follicles & one or more follicles of a Peyer's patch, show signs of commencing ulceration. This ulceration, unlike that which occurs in the adult, usually consists, merely, of a reticulated loss of substance, in the frayed & jagged edges of which, can be seen the remains of the follicular tissue. This is best observed by gently shaking the bowel under water. Such losses of substance, it appears, heal without leaving a connective tissue scar; the regeneration taking place from the gland substance, left in the edge & base of the superficial erosion. Milliet drew attention to the milder character of the process in children, the scarcity of the ulcers & their small size; all of which characteristics he attributed, to the preponderance of the "plaques molles" of Louis. In some cases, the ulceration of the bowel in children, presents exactly the same characteristics as that found in adults. As in adults it

Commences in the Ileum & is most severe in the neighbourhood of the ileocolic valve. More rarely, ulceration may be met with in the Jejunum & the commencement of the large intestine. True, or wide spread, Typhoid ulceration in children under 2, years is exceedingly rare.

The Peritonium. In children peritonitis is rarely present as a result of the ulceration. It is only when perforation has taken place that we meet with it.

The Mesenteric glands are enlarged. Co-incidentally, with the intestinal glands. Their appearance, as in adults, varies according to the stage of the disease, at which death occurs. In rickets & Scrofulous children, the condition of the mesenteric glands usually met with in these diseases, may be so altered by the typhoid infection, as to render it impossible to distinguish, recent, from chronic enlargement.

The affection of the Bronchial mucous membrane is the next most important consideration. Although bronchitis and

respiratory complications, are common enough in adults, suffering from Typhoid & frequently lead to a fatal termination; yet in children, the intense inflammation & consequent swelling, of the bronchial mucous membrane, & the readiness with which this spreads to the capillary tubes & gives rise to broncho-pneumonia; constitutes a special danger & pathological difference. The bronchitis, in no way differs, from that due to an independent cause; except that, occasionally, we meet with swelling of the bronchial glands accompanying it.

- In very young children a similar swelling in the Inguinal glands not infrequently occurs. -

The swelling of the Spleen is usually very marked; a soft, friable mass, with rounded, impressible edges; the distinguishing characteristics of which, even during life, may be appreciated on palpation & differentiated from the hard, sharp borders of the enlarged spleen of rickets & syphilis. Rupture of the spleen, which according to Robitansky,

is liable to take place in adults suffering from Typhoid, is not mentioned by him as ever occurring in children *

The presence of the Typhoid Bacillus in the spleen, mesenteric glands & intestinal glands & occasionally in the kidney & other organs, is as easily demonstrated in children as in adults.

The pathological appearances just described, are those that we expect to find in a child who has died of Typhoid. Especially is this true with regard to the superficial character of the ulceration; its limitation to the gland follicle; its rare tendency to extend widely, into the adjacent mucous membrane; or deeply, into the muscular coats of the bowel. It is on this account, that, Intestinal Haemorrhage and Perforation of the Bowel, are so uncommon in children.

The following case that might have gone on to perforation has come under my own observation.

"A little girl aet: 3 years, who had a severe"

" attack of Typhoid, with extreme tympanites & brain "
 " symptoms; died in a comatose condition, apparently "
 " from exhaustion, on the 17th day. On p.m. Examination "
 " there was found, Extensive ulceration in the immediate "
 " neighbourhood of the ileo-caecal valve. The extent of "
 " the ulcer, was due to the running together of a "
 " number of small ulcers; & towards its center, it had "
 " advanced, up to the peritoneal covering of the bowel, "
 " which, however, was still intact. In this case, it "
 " seems very probable, that perforation, would eventually "
 " have taken place, if death had not ensued earlier. "
 " There were two clinical points of interest in the "
 " case. The absence of haemorrhage from ulceration "
 " of some intestinal vessel; & the fact, that the child "
 " although perpetually comatose, always appeared to "
 " feel pain on palpating the ileo-caecal region. "

The changes in the other organs
 myocardium, liver, kidney etc. are,
 for the most part, the same in children
 as adults. The waxy & granular
 degeneration of the voluntary muscles, as
 first described by Zenker, is rarely observed
 in children; the same may be said
 of muscular haematoma (Virchow)
 On the other hand, the degeneration

of the heart muscle, in which it becomes soft, pale & extremely friable; & shows on microscopic examination, thick, granular infiltration, of the muscular bundles, with rupture here & there, but with the striation still preserved, is present in children about as frequently as in adults.

Other changes, may be found, in the various organs after death, which are due to complications during life: These changes do not differ from those due to independent causes, & consequently, need scarcely be considered here, but will be mentioned later, when studying the clinical aspects of the disease.

Causation

abstract. Predisposing Causes.

page. 13, Sex — age. — difficulty of forming statistics.

page. 14, Mode of prevalence — Season. — Temperature

" 15, — pollution of Tutokam Springs. — Moisture — Pettentof's view.

" 16, — St. Thomas's view. — Soil. — Dr. Robertson's Experiments.

" 17, — Poor Air. — Alessi's Experiment.

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Exciting Cause & Dissemination.

" 20, The Typhoid Bacillus — Typhoid Infection(?) — Chief
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by means of which, the organism enters the body of
the recipient. —

" 21, A. Pollution of drinking water occurring at.

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(2) Springs.

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" 22,

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III Periphery.

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" 23, at Periphery at Unid: College Hospital. — other examples.

" 24, B. Pollution of milk. — cans washed in infected
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" 25, C. Pollution of other foods.

" 26, D. Transmission of Virus by air & flies.

" 25, Period of Incubation.

In view of the recent epidemics at Maidstone, Lynn & Clifton* it may perhaps be permitted, to enter more fully into the causation of the disease, than the title of this paper seems to justify.

Predisposing Causes.

The sexes are attacked in about equal proportion, but from the ages of 3-20, the mortality amongst males, appears to be greater, than amongst females.

Ages. Children are more frequently attacked than adults, although the Registrar-General has pointed out with reference to Infantile Enteric fever; that probably many of the deaths so registered, are "not due to this disease, but to some undetected cause manifesting itself in febrile symptoms". In Epidemics, however, it has frequently been observed that in a family where all alike have been exposed to infection, the children exclusively, or in greater proportion, have been attacked by the disease* The greater percentage of cases amongst children, whose ages ranged from

* Stevenson & Murphy 1893. A Treatise on Hygiene U.S. p. 317.
* Davies M.D. Bristol. The outbreak at Clifton & its connection with the milk supply. B.M.J. Dec. 4. 1897. 1669.

4-15 years, was remarked upon in The Maidstone Epidemic.

Mode of Prevalence. Typhoid fever is an Endemic disease in this Country as well as on the Continent & in America. When, in this Country, it becomes suddenly Epidemic, it is most often, through Contamination of the drinking water, & sometimes through the water in milk & other beverages.*

Season. For London, it appears, that both the prevalence & mortality of this disease, are greatest in Autumn & least in the Spring & Early Summer. Murchison gives the months in the order of greatest prevalence as follows:- October, November, September August. A very similar relation to seasons, according to Hirsch, is obtained for a number of European towns, including Paris & Berlin, & also for Massachusetts & Boston. In New York, the maximum prevalence, N^o Whiteleggs says, occurs in September.

Temperature, Moisture & Soil. Typhoid fever is always more prevalent after dry

* Special Discussion on The Prevention of Enteric Fever 1897
Roy. Med. & Chir. Society.

& hot summers, whereas Autumns following
 cold & wet summers are more free from the
 disease.* The pollution of the Lutsham
 Spring, in the Maidstone Epidemic 1897, seems
 to offer an explanation, why this is so in
 some cases.† "This spring is a surface spring,
 only 3 feet below the turf of an unfenced meadow, the
 soil being of clay. During the dry, hot summer of this year,
 the clay had dried into a cracked & fissured mass; which
 means, that direct channels are provided by nature, to the
 surface springs immediately below; thus rendering impurity
 of the water the easiest possible matter. And this is exactly
 what happened; a number of hop-pickers were actually
 allowed to encamp, in the very field, in which the Spring
 is situated; & on inquiry by the Med: Officer of Health,
 it was found, that this Colony, suffered, during its
 stay, from Enteric Fever." Pettukofski's
 view, that a rapid fall in subsoil water,
 that has attained an unusual height, leaves
 behind in the superficial layers of the soil
 the germs of the disease & so leads to an
 outbreak; although applicable to Munich,

* Murchison. Treatise on Continual Fevers. page 449.

† Epidemic of Typhoid at Maidstone British Med. J. Oct 2. 1897.
p. 935.

has not been found to explain, the rise & fall of Typhoid fever in other localities, during other epidemics, & therefore other conditions, notably those of contamination of water or food stuffs with matter directly derived from sewage & indirectly from bowel evacuations of Typhoid fever cases had to be considered. Dr. Thorne 1867 showed that an outbreak was coincident with rise of subsoil water after great drought* On the other hand the reason why warm damp weather is often followed by an outbreak of the disease, may possibly be explained by the fact, that these conditions, warmth & moisture, apart from saturation, are most suitable to the propagation of the Typhoid Bacillus. The experiments recently performed by Dr. Robertson prove that the Typhoid Bacillus is capable of growing & multiplying in the soil; that under certain conditions — amongst which, occasional supplies of organic matter appear to be the most important — these organisms

* Stevenson & Murphy. A Treatise on Hygiene V. 4. pp. 167.

Can survive during protracted heat, cold & wet from one summer to another.*

Sewer Gas. The experiments of Alessi, carried out at the Hygienic Institute at Rome, on the breathing of sewer gas as a predisposing cause of infection with Typhoid, clearly show, that as far as rats, guinea pigs & rabbits are concerned that the inspiration of putrid gases predisposes to the action of even attenuated Typhoid. The experiment consisted in inoculating 2, distinct lots of the above mentioned animals with the same quantity of pure cultures of Typhoid. The 1st had been exposed to the influence of sewer gas prior to inoculation. The 2nd was the control experiment.

The result showed:-

	1 st Lot	2 nd Lot
	Animals exposed previously to sewer gas	Animals not previously exposed to sewer gas.
	Both inoculated with same quantity of pure cultures of Typhoid Bacillus	
rats	75, p.c. died	7, p.c. died
guinea pigs	75, p.c. died	} all survived.
rabbits	all died.	

In conclusion Alessi states that pre-disposition is probably diminished by prolonged breathing of the said gases.

* Robertson. Notes on an experimental investigation into the growth of Bacillus Typhosus in Soil. Brit. Med. J. 1898. Jan 8

This last statement agrees with Murchison who writes with regard to sewer workers "That it is not probable that this occupation predisposes to the disease."

With regard to this question, it is the opinion of N. Thompson, Prof. Corfield & others, that the air of sewers & drains, which has become specifically contaminated, may, if allowed to find its way into dwellings through defective house connection, cause, from time to time, Enteric fever amongst the inhabitants of such dwellings. *

N. Adams of Maidstone writes "There is no evidence that sewer gas contains, or has ever been known to contain, Typhoid germs. It is, of course, not impossible that dried or partially dried bacilli may be suspended in the air. Thus Lassurie (quoted by Prof. Diskfield in Allbutt's System) passed a pulverised spray of water over a quantity of dried Typhoid Bacilli & found that the particles of spray carried the bacilli some distance. We believe we are correct in asserting

* Stevenson & Murphy 1893. A Treatise on Hygiene V. 4 p. 320.

Prof. Corfield. Special Discussion on The Prevention of Enteric fever 1897. Roy. Med. & Chir. Society, Jan. 11, 98.

That up to the present the only pathogenic germ that has been found in sewer air is the *Staphylococcus pyrogenes aureus* which was identified by Uffelmann. Indeed Kirschner has said that "we are entitled to affirm, with a probability bordering on certainty, that presumably pathogenic germs will never be found in sewer air" " ∴

The other predisposing Causes may be briefly summarised by saying; that Typhoid is independent of bad ventilation, & over crowding; attacks all classes indifferently of rank, or occupation, or previous disease; although certain families seem to be especially prone to infection as e.g. the present Royal Family. Recent residence, is quoted by Murchison, Andral & others, as a strong predisposing Cause. Long residence in an infected locality probably gives immunity from the disease (Hirsch)

Exciting Causes & Dissemination.

It is not within the scope of this paper, to deal with the bacteriological evidence, with respect to the causation of the disease. It may be sufficient to

say, the ability of the Enteric fever virus to multiply in water & milk, is a strong indication, that it is a living organism. . .
 Further, Epidemiological facts support the view, that this organism is decidedly facultative, being capable of thriving & multiplying, not only in water & milk, but also in the soil (Thompson)

Typhoid fever is a communicable disease, but looked at in the light of modern experience of Epidemics it is doubtful whether it is infectious in the popular sense, this point however, still remains a subject for discussion & cases occur, from time to time, which cannot always be attributed to known, recognised, causes of infection. The bowel excreta — & according to Wright & Temple the urine* — are the channels, by means of which, the virus is mainly given off from the body of the patient. These, therefore, constitute the great source of infection; & may enter the body of the recipient, either by the contamination of

* Lancet. July 27. 1895.

drinking water, or milk or food, or by the excreta drying, becoming detached & being carried by the air,^(a) or by flies.^(b) †

(1) Reservoirs & Public water supplies must be regarded as causes of Epidemics of Typhoid. The contamination may take place at the Source, Course or Periphery.

I, Source. (1) Wells. The now classical report of Typhoid at Redhill, from the pollution of the Caterham wells, will serve as an example of direct defilement of an adit by specific excreta. Other causes of the pollution of well water are, leakage from a sewer as at Guilford; by the tricklings from the surface of an adjacent sewage farm; by back flow from a river; by leakage from foul ponds & cesspools.

(2) Springs. The pollution of the Tutsham Springs, already referred to in the recent Maidstone Epidemic. Given the fact of contamination, wells & Springs

† Stevenson & Murphy 1893. A Treatise on Hygiene Vol. p. 320.

(a) Dr. J. E. Squire. } Special Discussion on the Prevention
 (b) Surgeon-General Jameson } of Enteric Fever. 1897. Roy. Med
 (1) Dr. G. U. Poore. } & Chir. Society.

are especially dangerous, because there is no escape for the polluting matter, except into the supply pipes.

(3) Rivers. These, when polluted, have an outlet other than the supply pipes; & have the additional advantages of oxidation & sunlight.

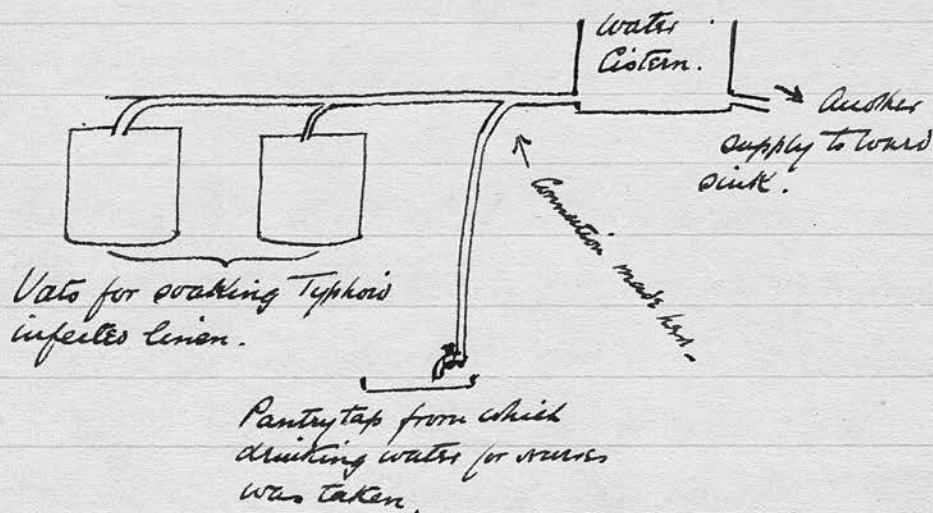
II, Course. The most common cause of pollution in the course, is intrusion of foul air or liquid by leaking water-pipes, during intermissions in the supply. This danger is increased by the common practice, of laying the water mains & the sewer-pipes side by side.

III, Periphery. Pollution at the periphery, that is, through the taps, is most important. It is liable to occur whenever a tap is left turned on & a vacuum is produced in the supply pipe by intermission of supply, so that, foul gas or liquid or even solids, are sucked back into the house-pipe or main.* The recent outbreak of typhoid fever amongst the nursing staff at University

* Dr. E. V. Pootz. Opening address. Special Discussion on the Prevention of Enteric Fevers 1897. Roy. Med. & Chir. Soc.

College Hospital is an example of peripheral pollution; although not quite such a good one, as the report by Dr. Buchanan on the outbreak at Caius College, Cambridge; because at University College Hospital the taps were not "on the main". The cause of the pollution at University College Hospital was briefly this:-

During the summer vacation, on account of certain improvements that were being made in the hospital, the Nurses dining room was temporarily closed. In order to get drinking water at the new dining premises, a connection was made with a pipe leading from the cistern as shown in the diagram. This pipe



also supplied 2 vats used for soaking Typhoid infected linen prior to disinfection. Before the water was used for the nurses the cistern was cleaned out, being previously

emptied by turning on the taps. Presumably, (the dates of invasion, & the cleansing of the cistern, & the drinking of the water, justify the conclusion) some of the infected material from the vats must have then been aspirated into the cistern. *

Other causes of pollution at the periphery are common, as e.g. leakage of stand pipes; flooding of the streets with sewage after heavy rains etc.

Milk may be the cause of epidemics as has been shown more than once in Glasgow. The infection takes place either by cleansing the utensils in contaminated water; or adding contaminated water to milk to make up sufficient quantity; or direct contact of a person suffering from Typhoid with the milk.

Dr. Allen M.D. to Petermannsburg, has also expressed the opinion, based on experience in Africa, that cows suffer from a disease similar to Typhoid in man which can be communicated through the milk. "

* British Med. Journal 1897. Oct 23. & 30. The Recent outbreak of Typhoid Fever at Union Coll. Hosp.

** Stoveman & Murphy 1893. A Treatise on Hygiene Vol. II p. 324.

Contamination of food stuffs as butters & cheese; from infected milk; as well as, ice creams, aerated drinks etc from infected water; or watercress & oysters lying in sewage polluted water; have all been given as Causes of Enteric fever, & may explain the origin of many cases which at the time appeared obscure.

The period of incubation is commonly about 2, weeks; but may, in some instances not exceed one or two days.*

*Murchison. *Tracts in Continued fever* page. 469.

Symptoms & Clinical Course

Abstract.

page 25. Stage of Incubation.

" 26. Stage of Invasion - Gradual onset. -

" 27. symptoms of Gastric & Bronchial Catarrh - Malaise -
irregular but sustained temperature.

" 28. Stage of Advance & Eruption - pathog-
-nomic symptoms now appear. - Characteristic temp-

" 29. - sature - facial expression - loss of appetite - Vomiting

" 30. - diarrhoea or constipation - character of motion. -
Abdominal distention, tenderness, & gurgling. - Enlarge-
-ment of spleen - roseola - limited number

" 31. of spots in children - The urine - The nervous
symptoms.

" Stage of Resolution, the marked remission,
& gradual fall in the temperature - symptoms gradually disappear.

" 32. Stage of Convalescence - recovery.

Graver Cases. - Increase in Nervous symptoms. -

" 33. somnolence - delirium. - Typhoid state. - Coma
- Coma - death. Broncho-pneumonia - respi-
-ratory embarrassment - Cardiac failure. - protracted
Convalescence or death.

Typhoid fever in children begins gradually; the insidiousness of the Invasion, being, if possible, more marked than in adults. From this cause the exact date of onset is difficult to determine. If seen in the first days of Invasion, there is fever; furred tongue; loss of appetite; & frequently pains in the joints. These joint pains occur, without any swelling, or other evidence of Rheumatism, but coupled with the headache, which is, probably, as common a symptom in children as in adults,* they tend to make the child irritable under examination. Diarrhoea may or may not be present. Some bilious vomiting may have occurred, but as there are no other abdominal symptoms, the case appears to be one of acute Gastric Catarrh. During the next few days there is not much alteration in the condition of the child; the pulse is somewhat accelerated; the skin feels hot & feverish; the edges of the tongue show commencing redness, in place of the fur. There may have

*Murchison. Treatise on Continued Fevers 1873 p. 533.

been some Epistaxis. Sleep is disturbed; the child is falling away; is feverish, & readily lies in bed. At this stage, however, the prostration is never persistent, it is present for a time, when the child appears to recover itself & sits up, & may take up a toy, or play for a little time, only however, soon to get tired, & lie back again in bed. There is a loose cough, with somewhat increased frequency of respiration, especially towards night, as the fever increases. If the temperature has been taken 2, or 3 times in the 24 hours, the fever is seen to be a continuous one, with a gradual increasing evening rise, but with remissions each morning. Physical examination gives negative, rather than positive results; with the exception of a few rhonchi in the lung, & the gastric symptoms, already referred to, nothing definite, can be made out, & although the physician recognizes, that, he is face to face with a distinct & feverish disease, he is not yet in a position, to eliminate, acute Gastric Catarrh — "Gastric Fever" of older children — because

it is not until the 2nd week, that the other symptoms — Enlargement of the Spleen; Characteristic Temperature curve; & roseola; — pathognomonic of Typhoid, make their appearance. On the other hand the initial symptoms during the Stage of Invasion are often so slight that the physician is not called in until the beginning of the 2nd week the period of Advance & Eruption.

The symptoms, already referred to, are now more exaggerated. The rate of the pulse, generally corresponds to the degree of fever, being rapid at night, but slowing down again in the morning; in some cases, however, it is moderate throughout the whole course of the disease, seldom exceeding 90, per minute; it is regular, & easily compressible. The temperature, by this time, has reached its height, which is maintained for some days; but still retains its remittent character. Each day, it begins to rise early in the afternoon, & attains its maximum, between 7 & 12. p.m.; about midnight, it again begins to fall; the greatest remissions

being between 6 & 8, a.m. The skin, is hot & dry, but during the remissions, is often covered, with a clammy sweat. Unless the case is a very mild one, the facial expression, now, begins to indicate the weakness & prostration of the child; the apathy; the pallid complexion, with malar flush; the wrinkled brow; & dilated pupils; are the most noticeable. The lips, are dry & cracked; the tongue is covered with a white fur, except at the edges & point, which are unusually red; the breath has a sweet insipid smell; the appearance of the fauces is normal. The child has no appetite; but perpetually calls out for drink; which is often taken so greedily, that it is vomited up again, almost as soon as swallowed. Although constipation may exist during the whole period of the disease, diarrhoea is, perhaps, more usually met with, there being 2, 4, or more motions in the 24, hours; the motions are watery, & yellowish in colour, & either resemble in their general appearance,

The stools of uncomplicated intestinal
 Catarrh, or present the characteristic
 "pea soup" appearance. Often diarrhoea,
 & Constipation, alternate with one
 another, during the course of the disease.
 The abdomen, is slightly distended &
 tympanitic; although the Gastric,
 left hypochondriac, & right iliac regions,
 are usually, somewhat fuller than
 the general surface. There may be
 some pain & gurgling on palpating
 the right iliac region. The enlarge-
 -ment of the Spleen, at the commence-
 -ment of the second week, can as a
 rule, be easily palpated, as a roundish,
 soft, tumour, under the edge of the
 ribs. This is rendered more easy, at
 the commencement of the 2nd week,
 because, at this time, the distension of
 the abdomen is not very great. In
 children, tympanites, is seldom as marked
 as in adults. From the 7th, to the 12th
 day, the characteristic roseola makes
 its appearance, occurring as in adults,
 in successive crops, of small, round,

somewhat sharply defined, slightly
 raised, red papules; they disappear
 on pressure, but appear again, when
 the pressure is removed. They are,
 most frequently seen, on the abdomen
 & lower part of the thorax, only occa-
 sionally on the back, & scarcely ever
 on the thighs. Their number in children
 is usually very limited.* The urine
 at this stage is dark & high coloured.

The nervous symptoms, the numbed
 condition of the head, & vertigo continue.
 The child may be very drowsy, but is
 quite conscious, & the memory is good;
 towards night, however, the exacerbations
 of the fever, gives rise to disturbed
 sleep, restlessness, & slight delirium.

Towards the end of the 2nd, & in the
 beginning of the 3rd week, as we approach
 the period of Resolution, the remissions in
 the temperature, which in adults are well
 marked, in children are often greatly
 exaggerated (Remittent Stage, Liebermeister)

* Murchison. Treatise on Continued fever p. 510.

At the same time, the temperature is seen to be falling, so that, as the 3rd week advances, it assumes an intermittent type, some mornings, even being, subnormal. The rise, in the evening temperature, still continues, but if no complications supervene, ceases to occur, about the 21st day. In favourable cases, towards the end of the 3rd week, the symptoms gradually disappear; & with the return of the evening temperature to the normal, Convalescence may be said to commence.

Although Convalescence is always gradual, it is surprising, how rapidly children recover their strength, as compared with adults.

In grave cases, the 3rd week shows an increase in the Nervous & Bronchial Symptoms. Coma may occur, which is interrupted by delirium; or the delirium may become constant, or only cease during the remissions in the temperature. Occasionally, the child lies motionless, apparently sleeping, but seems to understand questions, although the answers, are usually, unintelligible. Accompanied with this, there is increased

frequency of the pulse; Dry brown tongue;
 & an increase in the Abdominal symptoms.

Under these conditions, unless the child rally,
 death may result from heart failure; or with
 the increased wasting & exhaustion, the
 "Typhoid State" is produced, & death take
 place by Coma.* According to West, con-
 -vulsions may precede the Coma, & constitute
 a not infrequent mode of fatal termination
 in Children.† Again, especially in young,
 & delicate children, increased secretion may
 collect, in the finer ramifications of the
 bronchial tubes, & the child being too weak, to
 expel it by coughing, a blocking of the capil-
 -lary tubes, & collapse of many of the air
 vesicles may take place. As a result of this,
 death may easily supervene, from the combined
 effects of respiratory embarrassment & cardiac
 failure. In serious cases, such as the
 above, if recovery takes place, convalescence
 is naturally delayed, & it may be weeks,
 or months, before the child is far from danger.

* Murchison 1843. Treatise on Cholera p. 499.

† West. Lectures on Diseases of Infancy & Childhood 1848
 edition 1857 p. 561.

Further Consideration, and
Analysis of Principal Symptoms
abstract.

page 34, Temperature - average duration. - remissions

" 35, - fall of Temperature - Lysis. - Crisis.

" Epistaxis.

" Alimentary System. - lips. - tongue. -

" 36, appetite - Vomiting - prognostic significance -

" State of the Bowels. - frequently constipation in

" 37, children. - Probable cause, Carmichael, tracheitis. Wilks.

" 38, character of motion - Intestinal haemorrhage

" 39, - its rarity in children. - Tympanitis - gurgling - abd. pain.

" 40, Haemopoietic System - Spleen - Widal's
serum test.

" 41, Circulatory System - Dilatation of Ventricles

" - cardiac failure - pulse - see page 28,

" Respiratory System. Bronchitis - Hypostatic

" pneumonia

" Integumentary System - the rash in children

" 42, as compared with adults. - Sudamina. -

" 43, Urinary System. Retention - Urinary Analysis.

" Nervous System. Sensory Functions.

" 44, Cerebral & Mental Functions. - Delirium,

" 45, - Somnolence. - aphasia - Amblyopia -

" 46, Epileptiform Convulsions - probable
causation

The foregoing description of Typhoid fever in Children, is capable of numerous variations. In further consideration of the subject, keeping in view the main object of the paper, as to the differences, between Typhoid in children & adults, it will be well to follow the ordinary method of case taking.

Temperature. The average duration of sustained temperature, is probably, shorter in children under 10, years of age, than in older children, & adults. Morse*, in 75, cases under 10, years of age, gives the average duration 19.3, days; whilst in 202, cases from 10-15 years, the average duration is 22.6, days.

The remissions in the temperature, already referred to, during the period of advance & eruption, are not invariably present, but when absent they usually indicate some lung complication. In rare cases an inversion of the order of the remissions may occur. In abortive cases, the

* Morse. Boston Med. & Surgical Journal 1896 Feb 7 27th

∴ Hirsch Lectures on Dis: in Children New. York. Vol. I. p. 326.

temperature usually falls by Crisis, instead of lysis. Henoek quotes the following case in point:*

"Boy of 3 years, duration of aeme 7 days; temperature
 " norm. 103.3° evn. 105.3° Fahr: pulse 160, on the "
 " following day temperature norm. 98.1° evn. 99.5° "
 " pulse 88. After this no return of fever"

Epistaxis amongst children is a fairly common symptom, & may occur at any period of the disease; "Barthez & Pilliet mention that in 10% cases they met with Epistaxis in 1/5th the number.

Alimentary System. Children by constantly picking their lips, during the course of the disease, may produce ulceration, especially at the angles of the mouth, which only heal slowly, during the convalescence. The tongue, as occasionally happens in adults, may be entirely red, smooth & glazed, with a clean surface. The cracked & deep fissuring of the tongue, are not so frequently met with in children. Ross

* Henoek. Lectures on Dis: in Children New Syd. Soc: V 7 324.

∴ Barthez & Pilliet. Traité des Malad des Enfants 1853. V 4 p: 635.

of the epithelium of the tongue in patches, as met with in other gastric disturbances in children, is also often observed. The loss of appetite, is nearly always present; in favourable cases the appetite begins to return, in the stage of resolution & as convalescence becomes established, the craving for food is usually very marked.

Vomiting, is commoner in children than in adults; (Montmolin, Henoek)* when present it is generally at the onset of the disease, & for the most part occurs after drinking.

© Murchison, regarded vomiting at this period of the disease, as a favourable symptom; Löschner & others however considered it a bad prognostic sign. Vomiting after the 2nd week, is a serious symptom & usually indicates commencing peritonitis.

State of the Bowels. Diarrhoea is not so frequently present, in children, as in adults. Carmichael gives it, as the

* De Montmolin. Observations sur la fièvre typhoïde de l'enfance 1856.

* Henoek. Lectures on Children's Dis: New Ed. Sec: V. 338.

© Murchison. Treatise on Cholera & Typhoid fever. 1873 p. 532

Result of his Experience, that Constipation is as frequent as diarrhoea, & in cases of average severity, the existence, or non-existence of diarrhoea, depends largely, on the unsuitable, or suitable feeding of the child.* Moore states, that in children under 10, years, Constipation was present in $\frac{2}{3}$ rd the number of cases, & diarrhoea only in $\frac{1}{3}$ rd. ∴ The Cause of the greater tendency to Constipation amongst children is difficult to determine. According to Murchison, the insignificance of the intestinal lesion will not account for it. He writes "There is no relation between the intensity of the diarrhoea, & the extent of the intestinal lesion found after death." † Wilks also mentions, the case of a girl, who died at the end of the 3rd week, her bowels had been confined, & after death, the Small intestines were found filled with firm Scybala, with an ulcer beneath each.

* Carmichael Diseases in Children 1873, 46, 55.

∴ Moore. Typhoid fever, with an analysis of 284. Cases
Boston Med: & Surg: Journal 1876. No: 27th.

© Murchison. A Treatise on Continued fevers 1873. p. 524.

† Wilks Physiological Chem: Day's Trans V. j. 150.

Even when there is considerable apathy & drowsiness, children of only one year, usually let the nurse know, when they want attending to. It is only, in cases in which there is deep coma, that the motions are passed involuntarily; also, in the later periods of the disease, & convalescence, when the child, although quite conscious, is weak, & averse to disturbance, he may pass his motions under him.*

The motions may be quite normal in appearance only very bad smelling. The loose motion, may present the well-known character, or the colour of café-au-lait. The reaction of the stools; their separation into layers; the difficulty of demonstrating the presence of the Typhoid Bacillus; & the occasional presence of worms; apply to children & adults alike. Intestinal haemorrhage, as previously referred to in the pathology, is very rare in children, & only exceptionally, is the cause of death in children suffering from Typhoid. Out of 946 cases collected from Hospital Reports by Morse, he only

* Hirsch, Basky & Rivitt. Hirsch Lect: in Dis: in Children
New Syd. Soc. Trans. V. 4. p. 340.

found it present in 3, p.c. The abdomen, is either normal in appearance, or distended, never retracted. Tympanites, is only exceptionally developed to such an extent, as to interfere with the respiration; in very young children, it may be entirely absent. In children, it is often difficult to determine, the amount of tenderness, or even its existence, on palpating the ileo-caecal region. The presence, or absence, of gurgling, is not of much diagnostic value, as Köschner, Hruoch & others, have shown that this symptom, is present, in simple diarrhoea of children, in the left, as well as, the right, iliac region. Severe abdominal pain, is mentioned by Barthez & Pilliet, as occurring occasionally in children. They quote a case in a boy of 11, years, who during the course of Typhoid fever, was seized with severe pain in the abdomen, which lasted for 36, hours without intermission. The condition of the bowels was not referred to. * Hruoch considers that these pains are colic, due to fecal ac-

-cumulation, that they occur most frequently before defecation, & are relieved by the action of the bowels.

Mæucopietic System. Enlargement of the Spleen, is almost invariably met with after death, yet during life, it is often difficult to estimate. If it is increased, to 2 or 3 times its normal size, it can be palpated through the abdominal wall. If, however, there be much distension of the stomach & colon, palpation & percussion, are alike difficult. These difficulties, may in part, account for the wide divergence in statistics. In 131, Cases of Typhoid in Children, Jaupin* discovered Enlargement of the Spleen in 109. Cases; whereas Parthey & Rilliet, met with Enlargement, only in 28 out of 105 Cases.

The Widal Serum test, has met with as satisfactory results in Children as in adults.©

*Jaupin. Fièvre Typhoïde chez les Enfants. 1839
Journ. des Con. Méd. Chic.

© Parthey & Rilliet. Traité des Malad. des Enfants 1853. Uq. 677.
© Colville & Donnan The Exam: of 100 Cases of Typhoid Fever by Widal Serum test. B. Med. J. Oct. 16. 1897

The reaction, as a rule, takes place somewhat earlier in children than in older patients. *

Circulatory System. As in adults, we may have degeneration of the heart muscle, & dilatation of the ventricles, as a result of the wasting & emaciation. With the remissions in the temperature, - which usually take place in the early morning, - marked, & alarming collapse, may take place, which sometimes ends fatally, especially, if somnolence be very pronounced.

Respiratory System. The Bronchitis has already been referred to. Hypostatic pneumonia may also occur.

Integumentary System Although the character of the rash is the same as in adults, certain differences are described in children.

1. The spots are less numerous, usually not more than 6, being present at one time,

* British med. Assoc. 1897. Serum diagnosis of Typhoid
- from. "The reaction in children. B.M.J. Dec 18. 1897"

Early more than 20, Barthez & Rilliet only once in 111, Cases found a Copious rash.

Henoek, however, observed 10, in 302. Cases *

2. The rash appears earlier, than in adults; may occur, as early as, the 4th day. — The Eruption seldom lasts longer than 7-8 days. ©

3. The Eruption is more frequently absent under 10, years of age, than between the ages of 10-30. ©

4. Barthez & Rilliet was of opinion, that in Children the Spots were fewer, & oftener absent, in Gross, than in mild Cases. †

The presence of Sudamina - Vesicles, are probably more common in Children, due to the more frequent Copious Sweats, occurring during the greater remissions in Temperature.

© Barthez & Rilliet, 1853, Traité des Maladies des Enfants V. ij. 684

* Henoek. Lectures on Children's Diseases New Ed. Soc. Trans. V. ij. 324.

© Murchison 1873, A Treatise on Continued Fevers p. 511.

Jaupin. 1839. Fièvre Typhoïde chez les Enfants. Jour. des Clin.

Barthez & Rilliet 1853. V. ij. 683. (Més: Chir:)

© Murchison 1873. pass 511.

† Barthez & Rilliet 1853. ij. 633.

Urinary System. Retention of urine is not common in children suffering from Typhoid. The chief points, with regard to the urine, which have been fully described by Parkes, Vogel, Moos & others, are briefly these. The quantity during the first 8-10 days is diminished about one half; during this time it is dark, strongly acid, & of high specific gravity. As the fever advances, the quantity of urine increases, is of pale colour, & low specific gravity, & the acidity diminishes. The daily quantity of urea, is increased throughout the whole period of the disease, although this increase is most pronounced during the first weeks. According to Wright & Semple*, Typhoid Bacilli are nearly always present in the urine.

Nervous System. Sensory Functions. Cutaneous hyperaesthesia, of the lower extremities & abdomen, is mentioned by Murchison, as occurring most frequently in children. It may occur in the

* Wright & Semple 1895. Lancet July 27th.

first week, or not until Convalescence, & is not a formidable Symptom.* Bartley & Rilliet, speak of Anaesthesia, as an occasional grave Symptom in Children.

Headache, Condition of the pupils, & Vertigo, have already been considered. Deafness is Common during Convalescence.

Cerebral & Mental functions. Although the delirium, presents much the same Character as in adults, it occurs earlier, is seldom so violent, & under 10, years of age, is not so frequently observed. Jaupin, as well as, Bartley & Rilliet, mention delirium, as occurring in about $\frac{1}{3}^{\text{rd}}$ of their cases; whereas, Murchison found delirium present in adults, in 6%, p.c. † Hnoch, considers that serious nervous symptoms in Children, even after they have reached the age of 11 or 12 years, ^{are} rare. He mentions violent & passionate screaming, as occasionally taking the place

* Murchison 1843. A Treatise on Continued Fever. 542

† Murchison 1873 " " " " " 534

of delirium in young children.*

Somnolence, may be very pronounced; West has known it so overwhelming at the outset of the disease, that the child fell asleep 2 or 3 times during breakfast.†

Aphasia, as also Amblyopia, may rarely occur during the intermittent period, or at the commencement of Convalescence.‡ Rehn, has also described paralysis of the laryngeal muscles; & Boucher, has observed haemorrhage into the retina, in children with Typhoid.

Epileptiform Convulsions are mentioned by West, Barthez & Pilliet as sometimes occurring in Typhoid. They do not occur at the outset, as is the case with Scarlet Fever, Pneumonia, etc., but during the course of the disease, in the 2nd or 3rd week, & are not convulsions which are due to a sudden rise in temperature, they

* Hensch Lect: on Dis: in Children Med. Syd. Soc. V. 4. 329

† West 1854 Lect on Dis: in Inf: (Childhood). 558.

‡ Rehn. Deutsches Arch für Klin. Med: xviii

are more numerous than such are wont to be, & are frequently followed by paralytic symptoms, in the muscles of the face or eye; usually also, when a post mortem examination has been rendered possible, serous effusion has been found between the meninges of the brain, or a suppurative meningitis is discovered. * Löschner published a series of such cases, & first drew attention to the fact, that, Purulent meningitis may occur not merely as a sequela of Typhoid, but also may exist tolerably simultaneously with the symptoms of the disease. He writes "Dass die Meningitis purulenta nicht nur als Nachkrankheit, sondern auch so ziemlich gleichzeitig mit den Symptomen eines Heotyphus vorhanden sein kann."

The differential diagnosis between the diseases, must in such cases, be exceedingly difficult. Löschner's cases occurred independently of Pyæmia, or middle ear disease, & no suspicion of Tubercle was raised. † Trousseau has recorded a case of Typhoid complicated with Tubercular Meningitis.

* Löschner. Aus dem Franz-Joseph-Kinderhospital Bd. 4 S. 369.
 † Trousseau. 1859. Union Méd. Août, 6.

- abstract -

Diagnosis.

page 47, Acute Gastric Catarrh - Difficulty in
eliminating the various manifestations of
" 48, Acute Tuberculosis. - The exclusion of
other diseases which resemble Typhoid in its
early stages.

Relapses.

page 49. Relative frequency in children.

Complications

page 49. Bowel complications less frequent in
children - Relative frequency of Lung compli-
cations - Other complications -

Prognosis

page 50. Value of Temperature Chart in this
relation. - The presence or absence of
Nervous symptoms - The presence of
absence of complications.

From the foregoing considerations, it is apparent, that although Typhoid Fever may be suspected, its diagnosis in children, is often difficult.

In the early stages of the disease, Acute Pastic Catarrh has to be eliminated, & as already shown in the clinical description this is mainly affected by time. Later in the disease, the various manifestations of Tuberculosis, closely resemble Typhoid.

In Acute Miliary Tuberculosis, we have so many symptoms, common to both diseases; that, should there be a Tubercular family history, it is scarcely possible, to exclude the disease, except, by prolonged observation.

The only sure diagnostic sign, between the two diseases, is the occasional presence of Tubercle in the Choroid, in Acute Tuberculosis.

So also with Tubercular Meningitis. Although many distinguishing rules are given, such as;—
The greater urgency of the vomiting; the moist tongue; the retracted abdomen; the absence of diarrhoea & rash; the greater proximity of the Cerebral symptoms;

Squinting; the occasional fall in the
 temperature to normal; in Tubercular
 Meningitis, & the Enlarged Spleen;
 rash; Characteristic temperature; &
 diarrhoea in Typhoid. All these
 rules may be unavailing at the bedside;
 also under 5, years, the time of greatest
 frequency of Tubercular Meningitis, the
 Characteristic Typhoid symptoms, are
 usually, less distinct. Tubercular
 Peritonitis is not so difficult to eliminate
 as in this disease the temperature soon
 becomes subnormal & the abdomen is usually
 retracted*. It is, however in cases
 such as these that the Widal serum
 test will probably be of the greatest service.
 The other diseases which are sometimes
 mistaken for Typhoid, but as a rule,
 are easily excluded at the end of a
 few days are; Septicaemia, usually
 as a result of acute Osteomyelitis or
 some chronic abscess; Influenza;
 the other exanthemata; & Trichiniasis.

* Murchison 1873. Treatise on Continued Fevers p. 595.

Relapses are relatively as common in children as in adults. Barthez & Rilliet notes 3 in 111, Cases.

Complications. As mentioned in the Pathology & elsewhere, the grave bowel complications, Haemorrhage; Perforation; & Peritonitis; are less frequently met with in children. As in adults, Lobular pneumonia; is more common than Lobar pneumonia. Knock considers, that even, lobular pneumonia is comparatively rare. His statistics show, 18, in 302, Cases. The consolidated area, may break down, & abscess; or gangrene result; or tubercular deposit may take place. Amongst the complications, which are commoner in children, than adults may be mentioned Otorrhoea; Parotitis, with great swelling of the loose cellular tissue of the neck; Diphtheria (Barthez & Rilliet mention 6, cases as occurring in their 111,); Cancrum Oris. Dropsy without any abnormality of the urine, has been frequently observed in children by Stoeber, as also by

Barkley & Killet. Erysipelas, is probably not so frequently met with in children as in adults.

Prognosis. As a rule, the younger the child the better the prognosis; even however in older children, the grave complications, are less frequent than in adults. Given, therefore, a case without complications, in an otherwise healthy child, with a temperature not exceeding 103.5° - 104° Fahr., the prognosis, although guarded, would be favourable. As in adults, high temperature, or a sudden increase in the height of the temperature, or the absence of morning & evening remissions, are bad prognostic signs; so also, are very pronounced nervous symptoms. Muscular tremors, especially if the mind is clear, indicate deep & rapid ulceration, & on that account, are to be regarded as grave symptoms.

Treatment

- abstract -

page 51. Prophylactic measures. - isolation - cleanliness
- disposal of stools.

Treatment of disease. - milk diet only

" 52, when possible. - Value of diet in controlling
diarrhoea. - medicinal remedies. - Constipation

" 53. - prevention by diet - Action of Calomel -
Castor oil & Enemas. Intestinal antiseptics

Antipyretic remedies - Cold bath - Cold pack

General - local - Sponging. - Antipyretic

" 54, drugs. Bronchitis & Cardiac

" 55, Failure. Treatment of Complications.

Attention to diet during Convalescence -

The treatment of Typhoid fever in children, does not differ materially, from that employed in older patients.

Prophylactic measures, in both cases, are of paramount importance. Complete isolation when possible; scrupulous attention to soiled bed clothes & linen; complete disinfection or destruction of Typhoid stools.

The treatment of the disease, should be conducted in a cheerful, well ventilated room, & if the case be one of only moderate severity, with a temperature not exceeding 103° Fahs., this resolves itself, for the most part, into careful regulation of the diet & attention to the bowels.

If milk agrees with the child, this should be the only diet, given in small quantities at a time, mixed with $\frac{1}{3}$ rd barley, or lime water; & the amount per diem, regulated by finding out, exactly how much the child can digest. If the milk disagrees, or too much be given, curds will appear in the stools. The quantity, should then be diminished, & the milk boiled, & perhaps more lime water

added, or peptonised. If however, the milk still disagrees, mutton or chicken tea should be substituted. *Carmichael considers, that, by thus carefully regulating the quantity & quality of the diet, & not overstaying the impaired digestion, diarrhoea, may in many cases, be prevented, & in some cases, successfully treated, by this means alone. If however, diarrhoea becomes protracted, Carbonate of Bismuth with Chalk or Dover's powder, or in older children, Tincture of Opium, may be necessary. Constipation, on the other hand, is often very troublesome. Although Beef, & Malt teas are slightly laxative, & may be substituted for the milk, other remedies are often necessary:— Many Physicians, especially in Germany & America, recommend that a Calomel purge should be given, if the case is seen within the first week. Certainly in cases with constipation, very furred tongue, & much headache, this treatment appears beneficial; part of the Calomel

also, is converted in the Stomach, into the Bichloride of Mercury, & acts as an antiseptic to the bowels. During the course of the disease, Constipation is best relieved, by Castor oil or soap & water Enemas. Under no circumstances should a strong purgative be given.

Salol, Naphthaline, & other intestinal antiseptics, are recommended when the motions are very offensive, & there is much flatulence.

As the patient is getting better, & the temperature falling, Eggs, may be beaten up with the milk, Custard, & arrowroot, may be taken. It is wise however, to make no material alteration in the diet, until a week has elapsed, after the return of the temperature to normal.

In children, continuous Antipyretic remedies, are rarely required. Hirsch considers, that cold baths, & even the cold pack, are not so well borne, by children as adults. That the first bath must always be considered in the light of an experiment, & should not be again tried if followed by symptoms of collapse. Sponging the child with cold water, or the

Application of ice bags, to the head & abdomen, alternately, usually are sufficient in all cases.

Of Antipyretic drugs; Quinine* is taken well by children; Phenacetin[†] also suits most cases. On the other hand, Salicylate of Soda[©], may give rise to vomiting & alarming collapse, when given in large doses, to reduce the temperature.

Bronchitis, does not usually require special treatment.

Although Cardiac failure, may take place at any time, during the course of the disease, & require the administration of brandy & other stimulants; the time the child is most liable to it, is in the early morning, just after the remission in the temperature. At such time, it is always advisable, to give some nourishment, & frequently also stimulant, in order to prevent collapse. If in spite of this precaution

*Bartholin & Reil's *Tristia des Malades des Enfants*.

†Carmichael *Diseases in Children* 1892 p. 53.

©H. Knoch *Lectures on Children's Diseases Syd Soc. Trans.*

heart failure takes place, injections of Ether, hot bottles, & other remedies may be necessary.

Haemorrhage from the bowel, & other complications, should be treated on the same lines, as those employed in older patients.

When children are very restless, a luke-warm bath, 90-93° Fahr: is often followed by comfort & sleep. In cases in which the delirium is noisy, Chloral Hydrate given by the mouth, or as an enema is recommended (Henoek)

As already stated, Convalescence is usually rapid in children. It is during this period, however, that the greatest supervision must be exercised, to prevent the child taking unsuitable food, as the appetite is frequently voracious.