Clinical Observations on Infantile Diarrhoea.

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A general practitioner can hardly remain long in private practice before becoming impressed by the frequency with which Diarrhoea and its associated conditions occur among the Infantile portion of his patients. This fact may be still further accentuated by local influences, season of the year, & so on, all tending to increase his cases of Infantile Diarrhoea. Also, the difficulties met with in endeavouring to treat successfully obstinate cases of this complaint often impress him with the necessity of devoting special study to their various features.

Imbued therefore with this idea, & having devoted special attention to this class of cases, I propose to give some observations I have

made in private practice upon them, together with a brief record of examples of the various conditions which have occurred in the course of my daily duties.

Here I may say that my observations will be confined entirely to the medical aspects of the complaint, while I shall wholly discard noticing the diarrhoea which arises from intussusception, volvulus, hernia, & other surgical conditions.

Further, as the term "Infant" is generally used to include children of 5 years of age and under, I shall likewise use it in this sense.

I shall record my observations under the following heads:-

I. Etiological considerations.

II. Associated signs & symptoms.

III. Treatment.

IV. Examples drawn from clinical experience.

These classifications, associated signs & symptoms, &c, being based entirely on my own experience, must necessarily be very imperfect, & contain many omissions, but I trust that such as may be written here will be found to be fairly accurate, and that the Thesis may be approved by the Medical Faculty.

I. Table of Etiological considerations.

1. Constitutional: (a) Rachitic.
   (b) Syphilitic.
   (c) Tubercular.
2. Acquired: (a) Impure water.
   (b) Defective sanitation.
   (c) Errors in diet:-
      (i) Defective cleanliness of apparatus.
      (ii) Improper and indigestible food.
      (iii) Excessive feeding.
   (d) Dentition.
   (e) Chilling of the body.
   (f) Worms.

I. Etiological Considerations.

These may be roughly divided into two groups, viz.

1. Constitutional. and
2. Acquired.

I. Constitutional:

The three types most commonly met with in practice under this head are:

1st. Rachitic,
2nd. Syphilitic,
3rd. Tubercular,

and I have given them in the order in which they have occurred to me in relative frequency - the rachitic the commonest, the tubercular the rarest.

These will be discussed and illustrated by clinical examples later.

II. Acquired:

In studying some of the chief causes of Acquired Infantile Diarrhoea, it is well to remember that at the outset we are supposed to be dealing with an organically healthy gastro-intestinal tract. Further, that various extraneous agencies, and more especially bacteria, are brought to bear upon this system, which in the newly-born is so liable to become affected through its delicacy, & from the fact that these organs are fulfilling their functions for the first time, while the gastro-intestinal nervous apparatus in infants, in common with the rest of the nervous system is extremely sensitive. Therefore the infantile gastro-intestinal tract is peculiarly susceptible

to the influence of any kind of irritative material, so that when this latter acts upon the probably otherwise healthy organ, we have a disordered and excessive function on the part of the intestinal glandular apparatus, or of the intestinal neuro-muscular system, inducing a copious watery secretion of certain glands, whilst checking the secretion of digestive glands, and causing powerful intestinal contraction, all producing that condition of which Diarrhoea is the prominent symptom.

I now consider some of these irritative influences which I meet with as producing Acquired Infantile Diarrhoea.

(a). <u>Impure Water</u>:

During the late summer and the early autumn months of 1895, an epidemic of Infantile Diarrhoea existed in Burnley, where I have gained most of my experience. There was thus ample opportunity for observing these cases. The chief cause of this epidemic was directly traceable to the water-supply at this period. And thus it occurred:

There had been a spell of very dry weather round about this district for several weeks in the early summer. The reservoirs supplying our portion of the town had not been cleaned for some time. The supply was getting low, & there was a considerable

deposit of débris at the bottom of each reservoir. In late summer heavy rains began to fall, and coincidently with this the epidemic of Infantile Diarrhoea broke out. The cause of this, as given by the Medical Officer of Health for the borough, Dr. Dean, was that the heavy rains had stirred up this sediment existing in these reservoirs, and which was thus supplied in the drinking-water of the specially-affected locality. This water was of a light brown tint, slightly turbid & shewing a slight sediment on settling, with a disagreable taste and especially disagreable smell. Further, it was reported that this sediment consisted chiefly of crustaceous

debris, which contained organic putrescent matter. This contaminated water was as a rule taken in this state into the system, for there exists among the general public considerable ignorance as to the necessity of boiling the suspected water, while filters were rarely seen altho' these latter appear to be a doubtful benefit.

Here then were all the irritative elements required to produce Infantile Diarrhoea.

As further proof, those parts of the town not supplied by these reservoirs were affected by this epidemic to a much less extent. At this period the death rate of Burnley was among the highest of large English towns, ranging usually from 27 or 28 to 36 or 37 and occasionally higher, per 1000, while of this

†† Observations by Dr Ballard. q.v.
'Hygiene and Public Health', by
Louis C. Parkes M.D. 3rd Edition,
pp: 448 - 453.

number the mortality among children and infants averaged about 70 per cent of the whole, and among these by far the large majority of deaths were registered under Diarrhoea.

So that from what I have remarked about the susceptibility of the infantile gastro-intestinal tract, one is scarcely surprised to discover that the epidemic was so fatal.

The extent and fatality of this epidemic may have been aggravated by the Period of the Year at which it occurred, viz late summer, therefore at a time when the soil at a depth of 4 feet arrives at a certain temperature which is supposed to favour putrefactive changes, whose products find their way into the infantile digestive tract, & produce what is termed Summer Diarrhoea. ÷

(b) Defective Sanitation:

When from this cause we have sewer gases floating about in the air in closely confined dwelling houses, which gases are loaded with micro-organisms, we may conclude that these latter gain access to the water and so to the infantile digestive tract. As far as my experience goes, I have found that diarrhoea resulting from this cause is much more prevalent where the houses are crowded together, and more especially where they are built in flats, each flat containing its own water-closet, situated either off the common stair, or more usually in some dark, evil-smelling & ill-ventilated hole on the flat itself. Such for example is

the style of sanitary service of a large proportion of the houses inhabited by the poorer classes in Dundee, where during a brief residence I came across several cases of Infantile Diarrhoea due to this cause.

On the other hand, Defective Sanitation as a cause of Infantile Diarrhoea I have found to be comparatively rare in Burnley, the reason I think being that the houses of our patients have been built mostly in very recent years, are not built in flats, and as a rule have the water-closets detached completely from the dwelling-house, and placed in the small back-yard.

Personal cleanliness also exerts an influence in producing

Infantile Diarrhoea, and thus it is more frequent among the poorer classes, where the infants not so often washed, have a grimy skin choked with dirt, and clothed in filthy evil-smelling garments, often scanty at the best.

(c) Errors of Diet:

(i) Defective Cleanliness of Apparatus:

Cases of Infantile Diarrhoea due to Errors of Diet, are, like the poor, unfortunately always with us, irrespective of season of the year, local influences, & such like. Indeed, apart from epidemics such as I have recently mentioned, it seems to me that the majority of cases of Infantile

Diarrhoea are due to this powerful factor. Obviously this arises from daily, even hourly, opportunities allowed for deranging the infant's digestive tract at each meal. Thus, looking at the more common ways in which this is done, one is struck by the comparative absence of Diarrhoea in <u>breast</u>-fed children, and its greater frequency among <u>hand</u>-fed, and more especially among <u>bottle</u>-fed children. It may occur among breast-fed infants where the mother's health is low, or where she has been taking certain drugs, such as mercury, but I have not found these cases common.

The greater liability of bottle-fed infants arises of course from the

impurities conveyed to the milk before it reaches the stomach. I have repeatedly gone to such a case, examined the bottle from which the infant is sucking, and found it sour in smell and taste. This is the result of fermentation, produced by micro-organisms which have gained access to the milk, such as Bacterium Lactis, Bacterium Butyricus, and other, and whose products pass into the intestine inducing the violent peristaltic and excessive glandular secretion of Infantile Diarrhoea. These bacteria get there because the ordinary feeding bottle is not thoroughly purified and scoured with boiling water daily, — because, and this is important inasmuch

as mothers as a rule overlook it, I say because the teat, india-rubber tube, and stopper are not also daily purified, — and lastly because the milk itself has been contaminated before being put into the feeding bottle.

To know these three points is to guard against or to correct them, and I intend to say a few words about the usual methods of doing so later on.

The liability of <u>hand</u>-fed infants to receiving a contaminated and fermented food does not appear to be so great, for there is as a rule less chance of the milk becoming infected before the child swallows it. Yet cases arising from this cause are not infrequent.

(ii) From Improper and Indigestible Food:

This is a very common cause of Infantile Diarrhoea. The food may not be intrinsically bad, but rather ill-adapted to the infant's age and capabilities of digestion. This cause comes into play often very soon after birth, and arises from the fact that ignorant or opinionated nurses feed the infant in great part entirely upon starchy food, such as arrowroot, corn-flour, and the like, and which often pass undigested through the bowels, for the salivary glands do not develop until 3 or 4 months after birth. These undigested foods ferment, and so cause Diarrhoea. Hence there are a great variety of patented infantile foods

in the market.

Then it is a very common mistake here and elsewhere to feed infants on that favourite bread and milk sops, or 'pobbies' as they are termed in Lancashire. Usually in my cases a stock of this was made in the morning for the day, so of course towards evening in the warm weather the milk would become sour. This appears to be gross carelessness, and it is fostered by the habit of 'baby-farming' which exists so extensively in these large manufacturing towns. Here as a rule when a girl gets married, she continues to go to the cotton-mills, weaving, winding, & such like. As soon as she is able after confinement, she

returns to the mill, both from inclination and necessity, for here she is among her companions while at the same time bringing in a welcome addition to the weekly wages. Hence she leaves her infant in charge of some grand-dame, who probably takes charge of three or four infants in the same way. Naturally such a guardian does not take a mother's care of the children, and often feeds them on "pobbies" made once a day. Then again children left under such a charge are very liable to eat all sorts of indigestible articles, when not watched, or else given to pacify fretful children.

Again, it is a very common mistake here as elsewhere to feed infants on a 'bit of what we 'ave', given quite irrespective of its suitability. Thus, bread thickly covered with butter, called here 'a booter', fat bacon, tea, pastry, and especially cheese, find their way into the child's stomach, setting up Dyspepsia and Diarrhoea.

From the length of time during which this factor has been at work, often many months, I have often found difficulty in bringing the gastro-intestinal tract into a healthier state. This is because we have passed the stage of excessive function of the neuro-muscular apparatus, and have arrived at the stage of

gastro-intestinal catarrh, obviously a more difficult condition to deal with.

(iii) Excessive Feeding:

It is very common to find parents feeding infants at all or any hours of the day, or it may be habitually over-feeding the infant, both of which factors essentially derange the intestinal tract, leading to more or less chronic Infantile Diarrhoea. This over-feeding is usually done with best intentions, to produce a fine & healthy child. A simple regulation of the amount and quality of diet is often sufficient to set the child right.

Then of course there

are the great variety of indigestible foods, such as unripe fruit, sweets, & other unwholesome articles, which at some time or another furnish us with cases of Infantile Diarrhoea.

(d) Dentition:

This is a powerful factor in causing Diarrhoea. But one should exercise care in excluding other possible causes before coming to the conclusion that it is caused by teething, for in most cases the mother is ready with the diagnosis that the Diarrhoea is due to teething.

Undoubtedly one may conclude that dentition indirectly leads to Infantile Diarrhoea, in so far as it

marks a period of development accompanied by a change of diet, or addition of articles to the diet, many of which are very indigestible to a delicate stomach.

Then dentition may act solely in a reflex way through the nervous system, deranging the neuro-muscular intestinal apparatus. This is born out frequently by the diarrhoea yielding with the eruption of the troublesome tooth or teeth.

(e) Chilling of the Body:

This as a cause of Infantile Diarrhoea occurs usually in the summer, and is more common in tropical climates, where I have lived most of my life (hadal). The child

becomes over-heated, drinks copiously of cold water, and colic and acute diarrhoea result after the sudden lowering of the temperature. How this occurs I cannot say, unless it be that the contact of the cold water with the heated intestines stimulates the latter to violent peristalsis and glandular secretion.

(f) Worms:

Lastly, I have found Diarrhoea occurring as a prominent symptom among infants affected with worms unknown to the parents. The Diarrhoea however is usually overshadowed by the other symptoms of worms.

II. Table of Associated Signs and Symptoms.

1. Countenance.
2. Cry.
3. Attitude.
4. Gestures.
5. Skin.
6. Shape of the head.
7. Fontanelle.
8. Sleep.
9. Temperature, pulse, and respiration.
10. Condition of the mouth: (i) Teething.
    (ii) Thrush.
    (iii) Tongue.
11. Vomiting.
12. Eructations.
13. Colic.
14. Discharges: (i) mode of onset.
    (ii) Frequency.
    (iii) Amount.
    (iv) Character.
15. Abdominal Examination: (i) Inspection.
    (ii) Palpation.
    (iii) Percussion.

II. Associated Signs and Symptoms.

It is most essential that these should be studied in conjunction with Infantile Diarrhoea. It is not sufficient to know that a child is simply suffering from Diarrhoea, and forthwith to order a stock remedy, if one is to meet with any degree of success in treatment. It is by attending to these Associated Signs and Symptoms I have in most cases been enabled to discover the special cause operating, and to direct my treatment against that cause.

In addition to ascertaining from the mother what symptoms are present, I make a practice of observing the presence or absence of

the following conditions:

1. <u>The countenance</u>:

This may shew the lines of Jadelot, indicative of abdominal affection. These form roughly a circle, two lines curving outwards and downwards from the alae nasi to the angles of the mouth, and two lines curving downwards and inwards from the angles of the mouth to the genal tubercle — the nasal and genal lines respectively. I find these constantly present in the acute or severe cases, so attach some importance to them.

Again, in severe cases I notice the sunken eyes, sunken cheeks, pale or livid-coloured lips, filmy eyes, and general lividity of the countenance,

all indicative of collapse, and warning one to give a grave prognosis.

2. Then the <u>Cry</u> is next noticed, prolonged, loud & shrill if there be much abdominal pain; or a continual wailing, whimpering, & whining in the more chronic cases, both these essentially differing from the respiratory and meningeal crys.

3. <u>Attitude</u>:

These infants generally require to be nursed a great deal, the upright position seeming to give them most relief. They strenuously object to lie on their stomachs, as this apparently increases their pain. In marked collapse, they lie perfectly still and are best left so if possible.

4. Gestures:

Where there is severe pain in Acute Infantile Diarrhoea, the legs are drawn up sharply and kicked out again violently, often with the muscles in a state of more or less spasm. While if convulsions are about to supervene, as I have often watched in very severe cases, there is the clenching of the hands, turning in of the thumbs, jerking of the arms and legs, and often squinting.

In troublesome dentition, the child's fingers or anything it can lay hold of, are put into the mouth, from which saliva may be dribbling.

In this connection, I wish to mention how

frequently I have noticed Yawning occurring in the very severe cases with marked collapse and the child lying very still. I have very rarely seen recovery follow where Yawning is present, so I look upon it as indicative of a very grave prognosis.

5. The Skin:

Examination of which is of great value in Syphilitic Infantile Diarrhoea, where I have had beautiful examples of such cases in all stages of the eruption.

The pale, unhealthy looking, and clammy skin of rachitic diarrhoea should be observed, especially in contrast to the clear and bright complexion of a strumous child, where we may also find scars of old glandular abscesses in

evidence.

Then there is the drawn and pinched skin, covering little more than bone, - the drawn and wizened face, sights I have not readily forgotten, of infants suffering from the mal-nutrition of Chronic Diarrhoea. Such cases frequently exhibit excoriations and eczema about the buttocks, from constant irritation.

6. <u>Shape of the head</u>:

I notice the broad forehead, prominent frontal bones and marked ante-posterior elongation of the skull, which taken with the "rickety rosary", enlarged ends of bones, and their curvature, point to Rachitic Infantile Diarrhoea.

7. The Fontanelle:

This is a very valuable associated sign in Infantile Diarrhoea, especially where there is extreme collapse, where the fontanelle is much depressed, probably owing to drain of fluid from the system, and being a valuable indication for increased stimulation.

Where the infant is very noisy and cries a great deal, the fontanelle bulges - this being negative in its value, i.e. as excluding a graver condition.

Then in rachitic diarrhoea, notice the abnormally open and wide fontanelle, with defective or delayed ossification of the cranial bones.

8. The Sleep:

This is disturbed in nearly all cases. The child tosses about, is fretful & sleeps only in snatches, & which

is unrefreshing. It is most gratifying to notice the return to calm and prolonged sleep which accompanies gradual recovery. This has been a comfort to me many a time.

9. <u>Temperature, Pulse, and Respirations</u>:

I find the Temperature fluctuates, and varies with the state of the patient. Where the latter is restless & fretful, especially if he or she be at all feverish, then the Temperature is raised. In one case, of Rachitic Infantile Diarrhoea, I found the Temperature considerably raised, and a few hours before death rose to 105·5°F.

In Collapse however, with lividity and coldness of the body, the Temperature falls rapidly. I do not rely

strongly, however, on the temperature in these cases, as it so readily fluctuates that it is necessarily often deceptive.

The Pulse and Respirations are universally increased, in my experience, especially if feverishness exists. In collapse, in severe cases, the pulse becomes very weak, almost imperceptible, while the respirations are hurried and shallow from weakness of exhaustion.

These latter again are urgent indications for the active or increased use of stimulants.

10. <u>Condition of the mouth</u>:

(i) <u>Teething</u>: here of course the gums are swollen and inflamed, and very hot, while the peccant tooth may or may not be felt beneath the mucous membrane. This is

readily ascertained, for I find that infants will always allow me to feel their gums, for it seems actually to soothe the latter when they are gently rubbed.

When the infant refuses to be fed with the spoon, I always examine the gums.

(ii) <u>Thrush</u>: This is very commonly present in Infantile Diarrhoea. Perhaps only one or two patches will be seen, or I have found the inside of the cheeks, the gums, tongue, & fauces covered with the Oidium Albicans. A very large percentage of my cases showed this more or less. So often do the mothers remark to me that the 'Frog' (!) has 'gone through' the infant, when there is some eczema or excoriation about the anus.

(iii) Tongue: where dyspepsia exists along with the Diarrhoea, the tongue as a rule is dirty, furred, and dry, usually indicating the necessity for a purge to clear away any irritating or indigestible food.

On the other hand, the tongue is red, papillae prominent, and often raw, where diarrhoea alone exists, and more especially if there be any feverishness present.

II. Vomiting:

Occasionally this is in the form of pyrosis, when the infant brings up more or less sour and watery fluid from its stomach.

Then in very young infants it is not so much vomiting, as regurgitation, which occurs, especially

in the more severe cases. Thus instead of the child retaining its food, all or the greater part of it regurgitates, either pretty much the same as when the food was taken, or more or less digested. Apparently the stomach in these cases is so irritable, or the gastric catarrh is so pronounced, that it refuses to retain the food. At the same time the infant will often refuse food, knowing of the discomfort which follows.

Again, in other cases this regurgitation appears to be a physiological safety-valve, regulating the quantity of food taken to the needs of the organ. It is a

common thing to hear a mother say that her infant is in the habit of "posseting" regularly, and she thinks nothing of it until with the onset of the Diarrhoea it becomes excessive and then comes under our notice.

Then in older infants we have vomiting pure and simple, where the undigested food or irritant matter is expelled as such, or mixed with green bile. If the vomiting occurs once or twice, I look upon it as salutary. Should it occur frequently during the course of the diarrhoea, it is more serious and must be specially dealt with, lest it adds greatly to the weakness of the child, or tends to become chronic,

when like Chronic Diarrhoea it is far more difficult to deal with, for like all bad habits which have been long in developing, it requires a correspondingly long time to be restored to its normal state.

Then there is that form of vomiting which is purely functional. Thus in cases of Infantile Diarrhoea due to worms, the stomach appears to be perfectly healthy, yet from some reflex nervous effect the vomiting occurs and continues more or less until the cause is removed.

12. Eructations:

These I frequently notice in the course of

the Infantile Diarrhoea, and of course proceed from the lactic and butyric and other fermentations causing the Diarrhoea.

13. Colic:

Of more importance than the former are the griping and colicy pains so frequently accompanying those forms of Diarrhoea due to the consumption of indigestible food, and which until it is expelled gives rise to colic. Here the child is very irritable, cries a great deal, the cry being sharp and prolonged, kicks its legs about, and resents abdominal pressure, while keeping its recti rigid. The bowels may be tender from the severity of the diarrhoea, when the treatment for the latter always gives relief.

14. Discharges:

I make a point of following the excellent old rule of personally examining the discharges themselves, and which frequently gives me an indication of the progress of the case, and also of the cause hence of the treatment to be pursued in that special case.

In this connection I proceed systematically and enquire into:

(i) Their mode of onset.
(ii) The frequency of the motions.
(iii) Their amount.
(iv) Their character.

(i) Mode of Onset:

The Diarrhoea may come on suddenly or gradually. In the Acute and Severe cases the child is seized with a copious Diarrhoea coming

on so speedily that even in a few hours it is utterly prostrated and collapsed.

Or, the looseness may come on irregularly, varying in intensity until it becomes so frequent and severe as to necessitate special treatment.

On the other hand, in the more chronic cases it may have begun as an acute attack which has never been entirely checked. Or it may have come on more or less insidiously but surely, until the patient comes before one in a state of more or less well marked mal-nutrition, with the wizened face, shrunken skin and body familiar in these chronic cases of Diarrhoea.

(ii) <u>The Frequency of the motions:</u>

These again vary. In the severe cases I have seen an infant soil a napkin almost as soon as it was put on, and this continuing until the treatment began to take effect. In this way the child will soil 24 or more napkins in the 24 hours, for there appears to be a constant liquid stream coming away all the time. It is in such a case as this that erythema about the buttocks has to be dealt with, the parts being irritated by the continual moisture.

Again, the stools may vary in frequency from day to day - one day having several loose motions, then

confined for a day or two, and again relaxed, and so on.

Or, the looseness of the bowels may occur at some particular time of the day. I have found this commonest before noon, ceasing markedly during the latter part of the day.

Again, this may occur in relation to meals, the mother saying that the infant's food runs through it, more or less undigested, when there are perhaps no more liquid motions until some more food is taken.

All these variations I constantly meet with.

In the more chronic cases where the Diarrhoea has begun insidiously, the motions may begin with 2 or 3 in the 24 hours, these gradually increasing to half

a dozen or far more in the 24 hours, when after weeks or even months from its commencement, the infant is brought to one suffering from mal-nutrition of Chronic Diarrhoea, with often an excoriated and erythematous condition about the buttocks.

(iii) Amount of the Discharges:

This varies with the severity of the case.

In the cases of Acute Diarrhoea, the motions are frequent, copious, and liquid. These were the characteristics of my cases which occurred during the epidemic of the Summer of 1895. This as a rule does not continue for longer than 36 to 48 hours, otherwise the infant becomes utterly collapsed, and by that

time a change for the better must have occurred if the infant is to rally. Should no improvement then occur, the infant is rapidly carried off, hence the very large mortality of this epidemic last Summer, and which I have already stated.

These cases were in my opinion typically those of <u>Cholera Infantum</u>.

These infants, from being plump and healthy, in 24 hours or even less became totally collapsed, exhausted, with faces drawn and pinched, sunken fontanelle, and filmy eyes, and frequently excessive vomiting — altogether very appalling cases.

On the other hand, the Amount of the Discharges

may be small, though frequent, in the chronic cases - and these are the cases which give rise to no further thought until long persistent and seriously affecting the child's health.

(iv) Nature of the Discharges:

There are variations here again. In the Acute cases, the motions from being normal will suddenly become more liquid and abundant, at first of a natural colour, then as the flow of bile grows less they become brownish green and watery, at the same time acquiring a more offensive smell, which becomes more marked as the case goes on. Then in my worst cases last

summer., there followed copious dirty brown or sometimes yellow evacuations, extremely liquid, along with the stage of collapse. This is the progress of their character in the acute and severe cases.

Again, the motions may at first become semi-solid and lumpy, and contain partially digested food, and especially unsuitable food, which may of itself be the cause of the Diarrhoea, and the latter ceasing when these undigestible articles are expelled.

Or, the motions may still be semi-solid and copious, but of a bright yellow colour, becoming paler and more liquid

as the case goes on, and with a not particularly offensive smell. This appears to be the usual course in the milder cases.

In Chronic Diarrhoea, the stools at first are simply abundant, without any alteration in their nature. Gradually however they become semi-solid and ultimately liquid, while they loose their natural colour, become lighter, lumpy, and very offensive. This offensive smell I have particularly noticed in Rachitic Infantile Diarrhoea, and look upon it as a most important diagnostic sign.

These chronic cases may further develop mucus

in the stools, and even blood may be present in a long-standing case.

In this way by attending carefully to these four points regarding the Discharges, I often get valuable indications as to the cause of the diarrhoea, and the progress of the particular case.

15. <u>Abdominal Examination</u>:

This is done systematically by the methods of Inspection, Palpation, and Percussion.

In some cases, where the abdominal muscles are rigid and tense, the results are of little value, otherwise this examination is very useful.

In the moderately severe cases, the abdomen when palpated is tender, pressure

causing pain, while if the stomach be filled with the intestinal matter the note on percussion is dull, but resonant over the other parts of the abdomen, especially after much purging.

In my cases last summer of severe Infantile Diarrhoea, the abdomen was retracted, and very tender to the touch, while resonant all over.

In the more chronic cases, on the other hand, the abdomen often appears full and swollen, especially over the stomach, which very frequently here is enlarged. This is especially the case in Chronic Diarrhoea where the Child has been habitually over-fed.

Then again in very Chronic cases, the abdomen shares in the general emaciation, and is very shrunken, while I have even seen here coils of intestine in motion beneath the surface.

Examination of the abdomen is also of value in Rachitic, Syphilitic, or Tubercular Diarrhoea, as shewing the general marked prominence and fully of the belly in the first named, or the enlarged liver or spleen of the second, or the enlarged glands or matted intestines of Tubercular Infantile Diarrhoea.

III. Table of Treatment of Infantile Diarrhoea.

A. Prophylaxis.

B. Acute Diarrhoea: (i) Dietetic.
(ii) Hygienic.
(iii) Medicinal.

C. Chronic Diarrhoea: (i) Dietetic.
(ii) Hygienic.
(iii) Medicinal.

III. Treatment of Infantile Diarrhoea.

A. Prophylaxis.

The prophylactic measures to be observed here are of great importance not only to the specialist, but also to the general practicitioner, who so often meets with and is consulted upon these cases many of which are so intractable. Further, the measures to be mentioned here as prophylactic must be pursued in the active treatment of the cases if they have not been already brought into play. These measures are chiefly matters of common sense applied

to the management of infants, yet there seem to be many mothers and nurses who either through ignorance, pre-existing opinions, or carelessness neglect or refuse to adopt these simple measures.

There is firstly the great question of <u>Hygiene</u> applied to infant life, neglect of which in many cases is the source of Infantile Diarrhoea.

As regards the infant itself, it should of course be kept as clean as possible, bathed regularly daily, preferably at bed-time, for I think there is less risk then of chilling the body, as the rooms are much warmer than in the morning,

while the child is put straight to bed after the bathing, thus avoiding the risks of draughts, insufficient clothing, &c.

Then the 'doubles' and napkins should be changed frequently, especially when the Diarrhoea is established, and where I have so often found sour and evil smells coming from these or other parts of the clothing, which all minimise the infant's chances of recovery. In the vomiting often accompanying the Diarrhoea, the intensely disagreable smell of the vomit remains on the infant's clothes if these are not kept scrupulously clean.

The clothing should be warm, though not heavy.

generally mothers and nurses have sufficient discretion upon this point, but still one meets with errors on either side of the necessary amount to be worn. There is one grave mistake which is common here at least, and that is that when a child begins to walk, in 9 cases out of 10 the napkins are removed and nothing is substituted at first even though it be the depth of winter. Thus the child's legs and thighs are left utterly unprotected and it sits down on cold steps &c so that a chilling of the body results leading often to an attack of diarrhoea. Thus a covering of some sort

should be ordered, especially in winter, when I recommend the use of flannel drawers.

As for the child's surroundings, fresh air is of course the most important factor, in removing and destroying microbes, as also does abundant sunlight, especially important in the pale and pasty complexion of the constitutional condition of rickets.

The temperature of the rooms should be equable as far as possible, for the little things are particularly susceptible to its changes. It is common enough to see an infant placed in a room between open doors and windows with a draught playing over it,

or to see the room filled with moisture during the weekly washing while the crib is in one corner, or to find the child taken from a warm room upstairs to a cold bed-room and cold bed, all of which often lead more or less directly to Infantile Diarrhoea.

On the other hand, when the infant suffers from Diarrhoea or any other ailment the other extreme occurs. How often have I found such a child wrapped up in blankets, held in front of a huge fire in a closed room and the perspiration streaming off the body, tending to weaken it still further.

Hence judgment and common sense should be exercised here.

Then of course it is obviously most important to correct any defects of sanitation which may exist, such as blocked up escape pipes, leakages &c, all spreading sewer gases through the air and frequently leading to Diarrhoea among Infants.

All these Conditions of Clothing, Hygiene, Sanitation, &c, apply chiefly to the working classes among whom I practice, and are every-day errors to be met and corrected.

There are other prophylactic measures however, which are neglected by rich and poor alike.

Chief of these is the attention to be paid to the <u>water</u>. This is so fertile a source of Infantile Diarrhoea, and the prevention so simple, that one is surprised at the number of cases due to impure water. The remedy of course is to <u>boil</u> the water and to keep it free from contamination thereafter. The custom of Filtration of the water is rapidly being abandoned by medical men, as the filters after a while appear to become storehouses for the various bacteria. Hence I never recommend filtration.

Had the precaution of boiling the water been

generally adopted in Burnley last autumn, I do not hesitate to say that the epidemic of Infantile Diarrhoea then existent, with its appalling mortality, would have been greatly diminished in its extent and severity.

By far the most important prophylactic measure, however, in the prevention of Infantile Diarrhoea, is the <u>Feeding of the newly-born.</u> Therefore I shall consider this more carefully.

It is of great importance for every physician to be acquainted with the methods of feeding Infants, not only because of the frequency with which he

is consulted upon this point, and because he must be able to recognise diseases resulting from dietetic disorders, but also in appealing to his amour propre, for many fall into discredit with their want of success in dealing with this class of infantile ailments, to say nothing of the mental worry in the case of the man who must learn by sad experience.

Firstly, then, it is universally admitted that in most cases a mother's milk is the best possible natural food for her infant, always supposing the mother to be healthy, and taking due precautions as to her diet and otherwise.

no one however who has been in practice will fail to notice how comparatively infrequent this is when employed in its entirety. For this there are many reasons. Thus, very commonly the mother has little or no milk in her mammae, or at least insufficient to rear the child on,— or the mother may have plenty of milk but, as occurs in these large manufacturing towns, she goes to the 'shed' to weave from 6·30 a.m. to 5·30 p.m. coming home for meals at 8·30 a.m. and 12·30 p.m. when the child is fed, and the latter has therefore to be fed otherwise also,— or it may be that for personal reasons a woman may not wish to suckle

her child even though there is a copious supply of milk, as occurred to me recently in the case of the wife of an inn-keeper, who naturally did not wish to suckle her child, - or, again, accidents such as mastitis may happen, and not so infrequently either in my experience, to stop feeding from the mother's breast.

From one or other of the fore-going reasons, therefore, one must resort to <u>Artificial Feeding of the Infant.</u>

Of course there is the chance offered of a wet nurse, but British matrons are not greatly enamoured of this even where the patient's circumstances permit of it, and among

the working classes it is quite out of the question as a rule. Wet nurses are more widely employed abroad than in Great Britain, while in the maternity hospitals of Paris and elsewhere there are wards exclusively for infants fed by wet nurses.

Failing therefore the mother's milk or a suitable wet nurse, we must resort to <u>Artificial Feeding</u>.

From ignorance, errors of diet, or mismanagement, many infants suffer at some time or another from gastro-intestinal trouble, which is bound to affect the whole nature of the child, so that if it survives it will emerge from infancy

stunted or enfeebled, as I have frequently observed in asking after the early history of such children.

How, for the Artificial Feeding of Infants some form of animal milk, without the admixture of farinaceous articles, is their essential food for the first few months of life. Why is this? Because this essential food should approach as near as possible the composition of human milk, the natural food, compatible with the readiness of procuring it. Cow's milk most nearly fulfils these two conditions, with its nitrogenous, carbo-hydrate, fatty, and extractive materials, & water, along with its abundance and cheapness.

† Hygiene and Public Health. Louis C. Parkes. London. 1892. pp: 352 et seq.

Having then selected Cow's milk as the essential food for infants, the first difficulty, and a great and important one, is to prevent its contagion by the numerous bacilli floating about in the air, the effect of which is to induce its fermentation so that vomiting and severe Diarrhoea result. This cause is not always appreciated by mothers or nurses, who ascribe the Infantile Diarrhoea to some other food which may have been added to the milk, or to the milk 'turning sour' after the infant has swallowed it. According to Louis Parkes (‡), milk when exposed absorbs gases, and is a nutrient medium

for low forms of organismal life; so that decomposition occurs, with butyric, acetic and other fermentation in the stomach, and Infantile Diarrhoea results.

Again, the cow's milk may be passed undigested in curds by the infant, which is due in part to the fact that the flocculi of the curd of cow's milk are much coarser and denser than the flocculi of the curd of human milk, as I have roughly contrasted samples of each precipitated by weak acetic acid, when the human milk deposits far finer flocculi than the cow's milk.

We must get over these two difficulties

‡ Article on "Infant Feeding", in British Medical Journal, December 7th 1895, p. 1402. by Sir William Priestley, quoting from M. Chauvin of Paris.

of fermentation and dense coagulation first by preparing the milk, then preventing it from future contamination.

The popular method of preparing the milk, even among medical men, is to boil it, but this has distinct disadvantages.

1st of course sterilizes the milk but, further, boiling

1st, coagulates some of its albumen, and renders the flocculi of the curd firmer, tougher, and more indigestible, ÷,

2nd, renders it of course free from any acidity, which is an important cause of intestinal peristalsis, so giving rise to the popular idea that boiled milk is

binding. Of course this may be of service in the violent peristalsis of Infantile Diarrhoea, but this result is more readily effected in other ways, as will be shewn,

3rd, boiled milk is unpalatable and I sometimes find difficulty in getting children to take it,

4th, there are certain living cells in the milk, and when the latter is taken unprepared, these cells are absorbed by osmosis, and are a vital principle in building up the tissues. By boiling the milk, we destroy these cells, and thus it occurs that infants fed continuously upon boiled milk are

‡ See Article on "Changes in Boiled Milk," by J. L. Kerr, in British Medical Journal, December 14th 1895, p. 1491.

‡ See Article on "Infant Feeding," by Sir William Priestley, in British Medical Journal, December 7th 1895, p. 1402.

wanting in vigour, and shew a lowered vitality. ÷

Now, these four objections may all be disposed of, if we employ the method used by M. Budin of Paris, (÷) and which I now regularly employ. It consists briefly in <u>immersing the clean and stoppered dish containing the milk, in a pan of boiling water for three quarters of an hour.</u> The result is

1st, to sterilize the milk without boiling it, the boiling point of milk being higher than that of water, while the heat is great enough to kill most germs,

2nd, to retain unaltered the flavour of the milk,

3rd, instead of coagulating the casein, it

breaks up the curd into finer and more minute flocculi, and will therefore much less readily pass undigested through the bowels in Infantile Diarrhoea, as this finer curd is more easily broken up and absorbed.

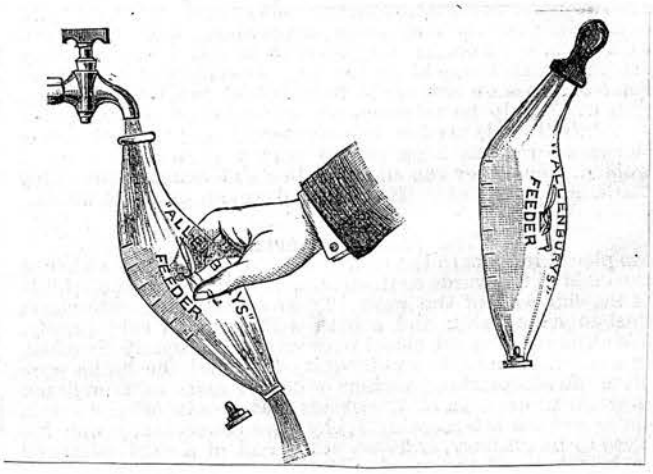
Theoretically then, and practically also from my experience, this seems a typical mode of preparing milk for an infant. Then, according to individual opinion, we may dilute this prepared milk or not as we please, with boiled water, barley water, &c, before giving it to the infant. It has been my custom, followed with good results, to mix the sterilized milk with two parts of boiled water, for the first month, gradually

cutting off the water until the infant is taking pure milk at the fourth month.

But this is not all. We must insist on the extreme cleanliness to be observed with the infant's feeding apparatus. My custom is to recommend the use of two feeding bottles, tubes and teats. One is to remain in a solution of Bicarbonate of Soda, while the other is in use. The bottles are thoroughly scoured out with hot water before use, the water being driven through the tube and teat also, so that the whole is thoroughly cleansed. These precautions are especially important in summer, when fermentation so rapidly occurs in the various parts of the feeding apparatus

if this is not well cleansed. It is a very common thing to find a sour smelling bottle and tube in the hands of an infant suffering from Infantile Diarrhoea.

The ordinary feeding bottle with its treacherous long tube is in general use here, but I prefer to order the form of feeding-bottle patented by Allen and Hanbury, and shewn below.



Its advantages are

(1) that it can be thoroughly cleaned,

(2) that it contains a

short mouth-piece in place of the long tube, and which is broad and readily cleaned,

(3) that it is fitted with an india-rubber valve which allows air to get in and no milk to exude, which saves the infant from accumulating wind on its stomach,

(4) the absence of the long tube ensures the infant greater attention, as the bottle cannot be laid at its side, but must be held in the nurse's hand,

(5) it is graduated, thus accurately estimating the amount of milk the child should get.

Now, in some cases infants are apparently unable to take Cow's milk in any form, either vomiting it, or causing

looseness of the bowels as it passed curded through the latter. Where it has been given a thorough trial under my direction, and has still proved unsuitable, I fall back upon the Anglo-Swiss Condensed Milk, which is sterilized and said to form finer flocculi on coagulation, using it in the proportion of 1 part to 20 of water at first, gradually increasing it to 1 part to 10 of water. Infants fed on this continuously, however, become fat, soft, & flabby and unhealthy looking, so that other diet should be introduced as the case permits and the infant grows older.

Sometimes there is an intolerance of milk in

any form, by itself, so here we must use some accessory food with it, not a purely farinaceous diet, which is often indigestible and not sufficiently nourishing.
There are an infinite variety of Infant Foods in the market, all more or less farinaceous, but of which I have had little experience.
After the pure milk or Condensed milk, my sole resources are Horlick's malted milk, and lastly Benger's Food, which is made with milk and is bland and nourishing. I have not so far met with a case in which the pure milk, Condensed milk, malted milk, or Benger's Food, have not suited after a proper trial. But whatever is tried in these

cases of obstinate vomiting and diarrhoea, must be persisted with, for they are precisely the cases in which one food after another has been rushed at, no one being given a proper trial, for naturally almost any food will disagree at first when the stomach and bowels are in this condition, and which can only be remedied by giving a careful and thorough trial to one food at a time.

I come now to speak about the treatment of Infantile Diarrhoea itself, under its headings of Acute and Chronic respectively.

Acute Infantile Diarrhoea: Dietetic and Hygienic measures:

I am called in to a case of this kind, and after diagnosing if possible the special cause, and ascertaining the exact state of the patient, order the child to be fed absolutely on milk, sterilized as I have said, and boiled water, in the proportion of one part of milk to two parts of water, increasing the amount of milk as the gastro-intestinal tract becomes more soothed. At the same time, if the case be very severe, I order the addition of Lime water to the milk, which latter assists in neutralising

the acidity and thereby lessening peristalsis, while it also renders the flocculi of the curd finer and more digestible.

Should there be much vomiting with the Diarrhoea, I order the addition of barley water to the sterilized milk, and in the same proportions as the boiled water.

Now, as the Diarrhoea begins to abate from its acuteness, I order the addition of cream to the sterilized milk, which assists very materially in strengthening the infant. I use it in the proportion of one table-spoonful of cream to eight or ten table-spoons-ful of milk.

Again, when the Diarrhoea is still less

acute, but where there is now considerable weakness, I add raw beef juice to the cream and milk. This appears rather unpalatable, but I have never found any trouble in getting infants to take it. It is extremely nourishing and it is wonderful to watch the rapid improvement of strength which usually follows its continued use, while it appears to be very stimulating also. This raw beef juice is best prepared by employing steak, mutton, or chicken, finely minced, and in the proportion of four parts of meat to one part of cold water, stirred well up and allowed

to soak for half an hour. The juice is then expressed through muslin, thus obtaining all the nutrient matter concentrated. This should be made twice in the 24 hours, as it does not keep well especially in the warm weather. From two to three ounces of this raw meat juice are given during the 24 hours, along with the sterilized milk and the cream. This diet further is of great use during convalesence as I have often proved.

Where time or trouble cannot be given to making the raw beef juice, I order <u>Brand's Essence of Beef</u>, half to one tea-spoonful several times a day.

The important point about the administration of the diet, is to give food frequently and in very small quantities if necessary at a time. The gastro-intestinal tract is so irritable that it resents any but a very small amount of food at a time, hence even a tea-spoon-ful retained is better than a table-spoon-ful rejected.

This is my dietetic treatment of the milder cases of Acute Infantile Diarrhoea.

Where the diarrhoea is more severe still, as were the cases occurring to me last summer, then in addition to the former measures there is the necessity for

free stimulation. Here my sheet anchor is the best pale old <u>French Brandy</u>, and in my experience this must be given freely. Thus for an infant three months old I order 30 drops of brandy in two tea-spoonsful of warm water every two or three hours, and more in proportion to the child's age. Failing this brandy, the best <u>whiskey</u> should be used in the same proportions.

The effects following this administration of spirits are

(1) a strong stimulating effect, valuable in keeping up the strength while the irritant is being eliminated, and other remedies are given

time to act,

(2) an anti-fermentative effect, antagonising the irritant products of fermentation,

(3) a sedative effect, lessening intestinal neuro-muscular peristalsis, soothing the nervous system, and when given freely in the doses which I employ often induces sleep, this being especially valuable where in the state of extreme collapse there is a tendency to convulsions. The brandy therefore also increases the sedative effects of any drugs employed, and I look upon it as a most valuable remedial agent in these severe cases.

Now, where from scruples existing parents refuse to

let even the youngest infants have spirits, and such occurrences are unfortunately not uncommon, I resort to two up to five minims of Ether every two or three hours for an infant a few months old, though not with such good effect as the brandy.

Should great collapse supervene in these severe cases, extreme measures must be used. I order the child to be placed in a warm bath containing a little mustard, kept in for a few minutes, then thoroughly dried, and put to bed between warm blankets, administering brandy before and after. Should time and circumstances permit, I

superintend this operation personally. It frequently revives even the most desperate cases and raises a sub-normal body temperature.

If the infant is too weak for the warm mustard bath, I order warm blankets and two or three hot water bottles or bricks to be placed alongside of it.

Where there is distressing vomiting, I employ enemata of two tea-spoons-ful of brandy with four table-spoons-ful of beef tea. These are generally hopeless cases, however, and unless improvement follows in a few hours, I find the case as a rule proves fatal, for the bowel also becomes so

irritated that it expels even the small nutrient enemata.

In these cases where enemata are used, I aid the infant by hypodermic injections of 10 minims each of brandy and of water for a child one year old, to which I add 3 or 4 drops of ether where the child is 3 or 4 years old.

Where these measures are employed the case is generally a hopeless one, but still the infant should be given every chance, as there is always the hope that the irritant matter will be expelled and improvement occur.

Of such measures as intra-venous injection of

saline fluid, copious enemata of water to wash out the bowel, and such like, I have had no experience whatever.

(iii). Medicinal Treatment of Acute Infantile Diarrhoea:

Much of our success here is due to knowing,
α) what drugs to give,
β) how to give them, and
γ) why they are given.

Taking this last statement first, the following are the great objects I aim at accomplishing by the use of drugs, and which I look upon as of the utmost importance as they form the basis of all rational and scientific treatment. They are:-

Ist, a Preliminary Purgation, where I can trace the Diarrhoea to some dietetic error, and when I believe there is irritant matter in the intestine.

IInd, to neutralise acidity resulting from fermentation.

IIIrd, to soothe the irritated intestine, and check intestinal peristalsis.

IVth, to carry out the antiseptic theory, so prevalent at the present day, for removing noxious micro-organisms from the infantile gastro-intestinal tract.

Now, we must go carefully about the fulfilment of these four great objects, for there are difficulties in the way. In the first place one must remember how drugs

readily act upon infants, such for example as opium, which one would naturally employ for the relief of Infantile Diarrhoea.

Again, I am often disappointed in finding that a certain drug will prove quite successful in one case, and will fail in another.

Then there is that great bug-bear of young practictioners, the <u>dosage of infants</u>. There are various rules given for one's guidance, but I have to my cost found that golden experience is the only reliable one to depend upon, and until that was gained I used the old rule of giving an infant one year old one twelfth, approximately, of the adult

dose, and so on in proportion. This is a simple and easily remembered method. Should there be any doubt, I give rather less than more.

Again, I employ chiefly those drugs whose composition is best known, and whose qualities and mode of action are best understood.

Then the drugs should be as palatable as possible, lest much difficulty be found in their administration.

Lastly, the bulk of the drug should not be great. Thus, charcoal powdered is a remedy for infantile Diarrhoea, but it requires to be given in such large bulk that it is not generally employed.

Firstly, then, where there is viriant matter in the intestine, with an absence of

collapse, I order a dose of Castor-oil, a tea-spoon-ful for a child one year old, to be given forthwith. In a few hours the following powders are given:

℞

Pulveris Alterativi gr $\dot{\text{I}}$
tales $\dot{\text{VI}}$

Sig. one powder to be given night and morning.

(for a child 6 – 12 months old.)

This Alterative Powder is composed as follows:

℞

Sodii Bicarbonatis gr 2/5
Hydrargyri cum Creta gr 2/5
Pulveris Ipecacuahnae Compos: gr 1/5
m, ft: pulv:

This powder is kept made up in quantity, and I give one grain for a child one year of age or under, half a grain if under three months, two grains if between one and two years old, or three grains

of between 2 and 5 years of age.
I have found from experience that there is not much latitude beyond this range of dosage. Less than these doses has little effect, while more may be disastrous, thus to mention one of my cases where I gave a five months old infant two grain doses of Pulvis Alterativus, and was recalled suddenly to find the purging more severe, with intense colic, and some collapse, after two or three powders had been given. Such lessons are not readily forgotten.

Observe now this Alterative Powder. It is small in bulk, palatable, & readily administered. Each drug in its composition has its special object.

Thus, the Bicarbonate of Soda is an anti-acid, and therefore

antifermentative, while being a vehicle, small in amount no doubt and not very active, but very convenient all the same.

The Grey Powder and Dover's Powder are of course the active ingredients, and are both useful in allaying the vomiting if present. The primary use however of the Grey Powder is to assist in clearing out any irritant matter remaining in the intestine, then to purify the canal and exert its alterative effect on the bowel.

The Dover's Powder is a valuable sedative to the inflamed bowel, checking peristalsis and lessening glandular secretion. I always order one of these powders to be given night and morning, so

that a child one year old gets 2/5 of a grain of Dover's Powder in the 24 hours, which is equivalent to about 1/20th of a grain of Pulvis Opii.

These powders I order always for the first few days at least in my cases of Infantile Diarrhoea, and thus I hope to at least partially fulfil my three first objects in its treatment, viz

Ist, Preliminary purgation,

IInd, Neutralising acidity,

IIIrd, Soothing intestinal irritation and checking intestinal peristalsis.

But there remains the last great object to complete the scientific treatment, viz

IV, the employment of gastro-intestinal antiseptics, in Acute Infantile Diarrhoea.

This embraces a very wide

field, and there is still much discussion and difference of opinion as to the best way in which it should be carried out, and the most suitable drug or drugs to be used. When such difference of opinion exists we may be sure that we have not discovered a perfectly suitable drug, each practictioner now using the special drug which in his experience has given the best results.

A number of drugs are or have been used to diminish the septicity of the gastro-intestinal tract, but most seem to me unsuitable for one or another reason.

Thus <u>Carbolic Acid</u> is used, but this is not only unpalatable but possesses

far-reaching toxic effects.

Perchloride of mercury also has been used, but this again is so toxic that it is not a favourite.

Powdered Charcoal is used by some, but its bulk is so excessive that it is unsuitable for infants.

Iodoform is recommended by some, but its strong smell and toxic properties have placed it in disfavour.

Creasote, Salicylate of Soda, Salicylate of Bismuth, B-naphthol and other fancy preparations, Calomel, and other drugs are variously used, but except for the last mentioned, Calomel, I have no experience whatever of the fore-going, and even the Calomel I rarely employ, preferring to use the mercury in the form of the Grey Powder.

The two drugs upon which from experience I rely, to produce Antiseptic effects, are

Bismuth Subnitrate, and Resorcine.

How, when do I use the one or the other of these? I find that where there is much vomiting accompanying the Diarrhoea, and where I believe the stomach to be producing the ferments, resorcine produces excellent effects, as it is readily soluble and acts at once upon the various organisms in the stomach and upper part of the ~~stomach~~ intestine, and soon allays the vomiting. The adult dose of this drug is from 2 to 20 grains, as given in the Edinburgh University Materia Medica Class,

but I have found little benifit from using less than two grain doses even for the youngest infants. A great advantage of this drug is that it is rarely toxic in doses less than one drachm, while it is sweetish and very palatable. It must however be a fresh preparation which is used. So I have never given less than two grains to the youngest child with any good effect. Thus, 2 grain doses are given 4 to 6 times in the 24 hours, depending on the severity of the case, to a child under one year of age. After 24 to 36 hours I find that the motions become less offensive in smell, more solid, and above all much less frequent, and

ultimately in most cases of this Acute Diarrhoea, the frequent motions cease within 48 hours or thereabouts. I then stop administering the drug gradually, and cut it off altogether as the motions get firmer, say at the end of 3 or 4 days, for after this resorcin binds them excessively.

I prescribe Resorcin thus:

℞

Resorcin gr $\overline{XX}$

S-acc: ust: ♏ $\overline{V}$

Aq: ad ℥i

Sig. ʒi every 4 hours.

(For a child one year old).

The Burnt Sugar is of course added simply to impress the parent, who among these classes has little faith in a clear watery-looking solution.

On the other hand, where there is no vomiting, but simply the profuse Diarrhoea, with intestinal colic, and where therefore I believe the organisms to be chiefly in the intestine, I order

Bismuth Subnitrate.

This drug is not readily soluble in the stomach, but undergoes chemical changes in the intestine, so that an acid is produced, along with the sulphide of Bismuth, as evidenced by the black motions. I have therefore in these suitable cases employed Bismuth Subnitrate, and with gratifying results in most cases. Where it has failed has been in those cases of acute and severe

‡ See British Medical Journal,
14th December 1895, p: 1483.

diarrhoea, with a profuse watery discharge, so rapid that one can hardly see how any drug would relieve the condition.

My belief in the antiseptic power of Bismuth Subnitrate has been further strengthened since the publication of valuable experiments with it by Surveyor and Vaughan Harley,† and from which I draw conclusive evidence of its antiseptic properties, and its value therefore in Infantile diarrhoea.

Bismuth Subnitrate is also a mineral astringent, thus enhancing its value in this Diarrhoea. One requires however to administer the drug in fairly large doses, for I have had such unsatisfactory results from

giving it in too small quantities. Thus for a child one year old I order 4 to 5 grain doses every 4 hours with excellent effect in these Acute cases, and even go up to 10 grain doses every four hours for a child 3 or 4 years old.

Thus

℞

Bismuthi Subnitratis gr XL
Pulveris Acaciae gr XX
Aquae Cinnamonis ad ℥ ij ss

Sig. ℥ ij every 4 hours.

Shake the bottle.

(for a child one year old).

Instead of Bismuth Subnitrate, I have sometimes used Bismuth Carbonate, though not with such good results. One is however thus enabled to prescribe Soda Bicarbonate with the Bismuth Carbonate, hence

I often employ Bismuth Carbonate. When Soda Bicarbonate was mixed with Bismuth Subnitrate, such an evolution of gas occurred that the cork was usually blown off the bottle before the latter left the surgery.

The Carraway or Cinnamon water used as a vehicle aids antisepsis and is especially valuable where there is abdominal colic.

In this way I hope to have fulfilled my four great objects in the treatment of Acute Infantile Diarrhoea, viz

I st Preliminiary Purgation,
II nd Neutralising Acidity,
III rd Soothing intestinal irritation and checking peristalsis,
IV th Employment of Antiseptics.

There are of course numerous variations and additions to this treatment, but as this clinical study is based entirely upon my own experience and results, they are beyond the scope of my remarks.

I now pass on to my treatment of

Chronic Infantile Diarrhoea.

The chief causes leading to this condition seem to be either some gross and persistent dietetic errors, or some constitutional condition, such as tubercle, rickets, or syphilis.

Further, these cases seem to occur chiefly after one year of age, in marked distinction therefore to the more Acute forms

of Infantile Diarrhoea.

These Chronic cases are often so intractable and troublesome, that it is well worth a little expenditure of time and trouble to arrive at their successful treatment:

(a) <u>Dietetic</u>:

There is to begin with usually some grave dietetic error to be corrected. In these cases the Diarrhoea has generally begun insidiously and gradually increased until it becomes so prominent a Symptom that the mother's notice is specially drawn to it and the child is brought under our care.

My first object again is clear out the child's bowels thoroughly with a purgative, preferably castor oil.

Then I place the child absolutely upon milk, prepared according to Budin's method, i.e. placed in a vessel which is immersed in a pan of water, the latter boiled for three quarters of an hour, and then diluted or not according to opinion with boiled water.

This suggestion is often met with by the remark "Oh! I've tried that already." But these are precisely the cases where nothing has been tried, for an over-anxious parent has rushed from one food or patent diet to another without giving any single one a proper and careful trial, and so really leaving the child worse than before.

I insist then upon this

sterilized milk being regularly given, and the child fed on nothing else for a week or a fortnight. At first the motions continue to pass undigested curd, but this soon lessens and in a few days or a week often disappears. Should the child be emaciated, as these often are from continued mal-nutrition, I speedily add cream to the milk, and finally raw beef juice. This mixture of <u>prepared milk, cream, and raw beef juice</u> is most nourishing, besides being unstimulating to the intestine, a most important point where the bowel is so irritated. This mixture should be given frequently,

and in very small quantities. After a week or more, I begin cautiously to add mutton broth, chicken broth, and such like, and latterly boiled fish and easily digested diet. Of course the amount of food taken must be regulated, for fear of too much being given.

(3) Hygienic:

Clean clothing, sunlight, and above all warmth of the body, especially from the abdomen down, is insisted upon, for the impoverished blood is unable to keep the body warm. Then when possible the infant has to be taken out daily into the fresh and mild air, while warmly clad.

(f) Medicinal:

After the preliminary purge has operated, there are two indications, viz

1st Sedatives, and

2nd Antiseptics.

These differ from their employment in the acute cases in that their use must be persisted in. The bowel by this time is chronically inflamed and irritated and requires a correspondingly longer period for recovery by any means employed.

For a sedative, I use Opium in the forms of Dover's Powder, giving 1 to 2 grains daily of the Pulvis Ipecacuanhae Comp., half night and morning, to a child 2 years old. This is persisted in for

a fortnight or longer, by which time with other means employed the Diarrhoea shews signs of yielding or disappearing.

Along with this the steady employment of some antiseptic is my last indication. Here again I use Resorcin, in 3 to 4 grain doses three times a day, for a child 2 years old, which in a few days usually will reduce the frequency of the motions to 2 or 3 in the 24 hours, remove their foul smell, change their greenish colour, and make them firmer. The Resorcin is not to be cut off suddenly, but carefully and gradually diminished

in amount, until the Diarrhoea has been completely checked.

I have found this drug of more service in Chronic Infantile Diarrhoea than Bismuth Subnitrate, why, I cannot say. Perhaps I did not use large enough doses of Bismuth - 5 grains every 4 hours to a child 2 years old being my usual dose. In these cases I have often found the value of the Bismuth Subnitrate enhanced by the addition of a vegetable astringent, the one I use being <u>Tincture of Catechu</u>, in 5 minim doses, thus:

℞

Bismuthi Subnitratis gr XL
Tincturae Catechu ♏ XL
Aquam Carui ad ℥ j ♏
Sig. ℥ ij every 4 hours. Shake bottle.

this for a child 1 to 2 years old. This is a very unsightly looking mixture, but none the less efficacious on that account.

The essential factor however in this treatment of Chronic Infantile Diarrhoea, is to persist carefully and for some time with whatever means we employ until we get an improvement. These cases are often so stubborn that the parent's patience becomes exhausted, and it is only her confidence in her medical adviser which leads her to persevere until improvement sets in.

These dietetic errors appear to be far the most frequent cause of Chronic Infantile Diarrhoea, hence

I always eliminate this factor first.

Again, worms are a frequent source of more or less Chronic Infantile Diarrhoea. When this is diagnosed, I give the infant a spare liquid diet for 24 hours, then either Santonin, if Thread worms are present, or Filix mas in capsules, thus concealing its objectionable taste, if Tape worms are present — I say these are given fasting on an empty stomach early in the morning, and followed in 2 hours by a smart purgative dose of castor oil, then breakfast an hour or two after the oil. This almost invariably succeeds in expelling the worm. This is repeated

twice or thrice on every third morning, according to the number of worms present. When the Diarrhoea has been thus checked, I give an Iron Tonic to correct the anaemia.

I have had no experience of Chronic Diarrhoea resulting from the presence of any save the Tape and the Thread worms.

Looking at the constitutional causes of Chronic Infantile Diarrhoea, a very prevalent one in the public mind is Tubercle. I am often told that a child is suffering from 'Consumption of the Bowels', but am very dubious in accepting this, let alone the principle of not allowing your diagnosis to be made by

† See British Medical Journal, September 21st 1895, p. 717.

your patient, without your own confirmation. Much discussion during the last few years has taken place over this subject. The general opinion seems to be that abdominal tubercle is relatively more frequent in children under 5 years of age than in older people. Still, we are inclined to run to the extreme of calling many of these cases tubercular, as is emphasized by J. W. Carr in a short paper,* read before the British Medical Association in August 1895. Still I have met with at least one undoubted case of tubercular diarrhoea, which I shall mention later.

Here my treatment is again Dietetic, Hygienic, and Medicinal.

Dietetic: There is to be no suspicion whatever about the impurity or otherwise of the milk. This must be prepared by Budin's method. It should be given pure from the very first - for these children are so emaciated that they can stand it thus. Then in a few days cream is added, and in a fortnight raw beef juice also, to the milk. If the child's stomach can stand it, which is not always the case, I order the addition to the milk of mutton suet melted and squeezed through muslin.

Hygienically: The child should be kept out as much as possible in the warm fresh air, with abundance of sunlight,

kept scrupulously clean, and above all warm, especially over the legs and abdomen.

Medicinally: I employ the Bismuth Subnitrate and Tincture of Catechu mixture thrice daily, steadily for a fortnight or longer, as I find this the most efficacious. Then as the diarrhoea improves cut off the Catechu gradually. At the same time Cod Liver Oil is rubbed into the abdomen several times daily, and covered with flannel. This is also continued for weeks. In convalescence, Kepler's Malt Extract, or some emulsion of Cod Liver Oil is to be given.

In Syphilitic Diarrhoea, and here there is rarely

any doubt as to the cause, I give mercury in some form, usually as the Hydrargyrum cum Creta, and this as contained in my favourite Pulvis Alterativus containing also Soda Bicarbonate and Pulvis Ipecacuanhae Comp:, giving 1 to 2 grains daily of Grey Powder, with 1/2 to 1 grain daily of Dover's Powder, to a child 2 years old. This is continued until the diarrhoea ceases, when I cut out the Dover's Powder and give the Grey Powder alone for some weeks. The <u>Liquor Hydrargyri Perchloridi</u> I also use in these chronic cases, especially where the eruption and diarrhoea tend to persist. I give it with excellent effect

in 10 to 20 minim doses thrice daily to a child 4 or 5 years old. Experience has shewn me that the administration of this drug must be continued for weeks after the cessation of the diarrhoea, otherwise the latter comes on again very speedily and becomes very troublesome.

For the Chronic Diarrhoea associated with Rickets, where we have the distended abdomen, foul smelling stools, and typical skeletal manifestations, careful dietetic and hygienic measures along the lines I have already laid down, are of primary importance. All starchy food is to be excluded, the child fed exclusively

on sterilized milk, with perhaps the addition of a little lime water daily. In a few days more nourishment in the form first of cream, then of raw beef juice, are added gradually to this diet.

Fresh air, sun-light and bodily warmth are most essential.

Medicinally, I order first a preliminary purge, and follow this up with the following antiseptic and astringent mixture:

℞

Bismuthi Subnitratis ℥j
Tincturae Catechu ℥j
Misturam Cretae ad ℥iij

Sig. ℥j every 4 hours. Shake bottle. (For a child 1 year old).

Note here the introduction of the Chalk mixture, materially aiding my objects, as I believe.

how, in all these cases of Chronic Infantile Diarrhoea, when the latter is checked, we have not completed our treatment, for the children are as a rule weak, flabby, and anaemic. Hence I follow it up with an Iron Tonic, usually the Syrupus Ferri et Quininae et Strychninae Phosphatum (Easton's), giving 10 minims thrice daily to a child 1 to 2 years old. This is easily born, palatable, and very efficacious.

This concludes my treatment of Infantile Diarrhoea itself, but I must now briefly speak of the treatment of the more common of the Accessory Conditions so frequently accompanying the Diarrhoea, viz

1. Teething.
2. Thrush.
3. Vomiting.
4. Colic.
5. Convulsions.

1. Teething:

Experience alone gives us the necessary indication for lancing the gums, for I have done this too soon and the flesh has grown over the gums again, to say nothing of the mother's alarm when the lancet is produced. Of late, I have rarely lanced a gum, having found that by rubbing and scratching the mucous membrane with the finger nail sufficient laceration is caused for the eruption of the tooth, while the

jagged wound resulting less readily heals over, to say nothing of the removal of the mother's alarm. Strange to say, this rubbing and scratching of the gum seems to soothe most infants who will allow me to do this most contentedly.

2. Thrush:

This I treat by painting the patches 4 or 5 times daily with the following solution:

℞

Acidi Boracici ʒi
Glycerini ʒi

Sig. The Lotion to be applied by means frequently. Small camel's-hair brush also. Under this and the other treatment the thrush soon disappears.

3. Vomiting:

When this becomes so severe as to need special treatment, and when no food of any kind will remain on the stomach, absolutely nothing but drinks of warm water are ordered for 24 hours or so. This has a wonderful sedative effect on the stomach, and moreover is a food also for a short time, especially valuable where there is much watery discharge. Then the warm water is also antiseptic, weakening the action of the poison.

At the end of about 24 hours, very small quantities of sterilized milk are cautiously added to the water,

and gradually increased as the stomach bears it better as it will then do if recovery is going to occur.

The Dover's Powder which is given is also of value in allaying the vomiting, as well as the Resorcin, when combined with the other measures.

4. Colic:

Careful dietetic measures, warmth of feet and body, and particularly warm fomentations over the abdomen, which I always use in preference to heavy poultices, are among the remedies I employ for this.

Then 10 to 20 drops of Brandy in warm water every 2 or 3 hours till relieved, together with

the Aqua Cinnamoni, and purge, generally succeed in relieving the infant.

5. Convulsions:

When these appear in the course of Acute Infantile Diarrhoea, I generally form a grave prognosis. I employ a warm bath, with sufficient mustard in it to make the nurse's arms tingle after 3 or 4 minutes, dry the child thoroughly & place it between warm blankets, & follow up with.

℞

Potassii Bromidi gr $\overline{XVI}$.
Chloral Hydratis gr $\overline{VIII}$...
Glycerini $\overline{3}$ ss
Aquam ad $\overline{3}$ j

Sig. $\overline{3}$ j every 3 hours. (for a child 1 year old)

This is gradually broken off as the convulsions begin to pass away, which unfortunately in my experience is not often.

This concludes my remarks on the Treatment of Infantile Diarrhoea.

IV.
Clinical Cases of Infantile Diarrhoea drawn from personal experience.

The following records are abstracts from notes made during and after the occurrence of the various cases.

I shall here follow my Table of Aetiological Factors in selecting and recording these cases, and which Table was composed as follows:

A. Constitutional:

1. Rachitic.
2. Syphilitic.
3. Tubercular.

B. Acquired:

1. From impure water.
2. From defective ventilation.
3. From defective food:
   a) Want of cleanliness in apparatus.
   b) Improper food.
   c) Excessive feeding.
4. From dentition.
5. From chilling of the body.
6. From worms.

IV. List of Cases of Infantile Diarrhoea here recorded.

Case I. Rachitic Infantile Diarrhoea.
" II. Syphilitic (a) Acute.
" III. " (b) Chronic.
" IV. Tubercular.
" V. Due to Impure water (a) mild.
" VI. " " (b) Severe.
" VII. Due to defective sanitation.
" VIII. Due to defective cleanliness of feeding apparatus.
" IX. Due to improper food.
" X. Due to excessive feeding.
" XI. Due to dentition.
" XII. Due to worms.

Case I.

Rachitic Infantile Diarrhoea:

J. M., a boy, aged 13 months, was brought under my notice as suffering from Diarrhoea. This had been going on for about 10 days, and was gradually getting worse. Examination shewed: Jadelow's nasal and genal lines well marked, child wailing and fretful, legs drawn up. Skin clammy, very pale and glazed with perspiration. Temperature, pulse, and respirations all slightly raised. Forehead large, prominent, square-shaped. 'Rickety rosary' on ribs well marked, with enlarged ends of long bones. Anterior fontanelle wide and prominent. Sleep poor since onset of diarrhoea. Tongue red. No teeth,

altho' 13 months old. No vomiting or eructation. Motions: now averaging 8 to 12 in the 24 hours, very liquid, greenish, each fairly copious, and above all extremely offensive, the smell remaining for long in the room. Abdomen: markedly distended – mother said child always had a big belly latterly – and tender on palpation, tympanitic, especially over stomach. No enlarged spleen detected.

This had always been a delicate child and much spoilt, especially with its food, receiving plenty of starchy food, such as potatoes, arrow-root and the like, and had been brought up since

he was two months old on patent foods, chiefly nellis's and neave's. He had been kept much inside, as his lungs were supposed to be weak. He had suffered from capillary bronchitis at the age of 7 months and had never been strong since.

The treatment employed was to place the child strictly upon pure sterilized milk, with a few tea-spoon-fuls of lime water to the pint of milk - to have the napkins frequently changed, the child kept warm, and warmly clad. A purge of Castor Oil was given, and this was followed by this mixture:

℞
Bismuth: Subnit: ʒi
Tinct: Catechu ʒi
Mist: Cret: ad ℥ii
Sig. ʒi every 4 hours.

As the child was rather feeble, a tea-spoon-ful of Brandy four times a day in warm water was given.

The Progress of the case was that in less than 48 hours the motions became less frequent, though still very liquid, and much less offensive. the child being quieter and sleeping better. After a few days the motions became firmer, 2 or 3 in the 24 hours, and yellowish. Cream, and then raw beef juice were next added to the milk. The child was

taken out into the fresh air and sun-light daily, and at the end of a fortnight the motions became almost natural, firm and blackish (from the Bismuth subnitrate). Easton's Syrup in 10 minim doses thrice daily was next given.

The child now began to thrive, and when last seen, about six months after, was greatly improved in bodily health, and though the evidences of rickets had not completely disappeared, he had not suffered again from diarrhoea.

Case II.

Syphilitic Diarrhoea:

(a) Acute:

Infant, aged 4 weeks. I attended mother in confinement. mother had had several miscarriages, and lost another infant from a similar disease, she thought.

The infant was perfectly natural in appearance when born, though small and weakly. When 3 weeks old, it began to suffer severely from diarrhoea, and coincidently a copious syphilitic rash began to cover the body. There were a dozen or more motions in the 24 hours, almost every napkin changed being soiled; they were very liquid, yellow, and rather offensive. Then conjunctivitis

with purulent secretion was manifested, along with running at the nose and "snuffles". The edges of the mouth became fissured. Excoriations appeared around the anus. In a few days the skin became distinctly tinged with yellow, while the liver and spleen were both enlarged. The diarrhoea could not be checked, but became more frequent, the infant vomiting almost everything taken, save a little brandy. On the fourth day from the appearance of the eruption and diarrhoea the infant passed into convulsions, and died early on the fifth day.

The following treatment was adopted: Sterilized

milk (one part) and boiled water (two parts) - the mother had no breast milk - Constant warmth to the body, and every attention a trained nurse could give was given - also one tea-spoonful of brandy in warm water every 2 hours. Also

℞

Sod: Bicarb: 2/5 gr
Hydrarg: cum Cret: 2/5 gr
Pulv: Ipecac: Comp: 1/5 gr
M ft pulv. tales XII

Sig. one powder every 3 hours.

The eyes were bathed with a solution of Boracic Acid. Sanitary Rose Powder (containing Boracic acid) applied over anus.

As the infant vomited so excessively, 3 grain doses of Bismuth Subnitrate every 3 hours were given, to which was added

Potassium Bromide, in 1 grain doses, when convulsions supervened.

All measures were of no avail, from the severity of the attack, which I think precluded the possibility of any treatment being successful.

Case III.

Syphilitic Diarrhoea:

(B) Chronic:

A. S., girl, first came under my notice at age of 15 months. Since birth of child mother had shewn manifestations of syphilis, and was being treated for such.

The infant was peevish and fretful, undersized, and was then suffering from 'snuffles', while there were fissures about the

mouth, and a condylomatous patch at the anus, the buttocks being excoriated, due to the persistent Diarrhoea from which the child suffered, and for which she was brought under my notice. The motions had been free and copious, and were increasing in frequency, becoming more liquid, yellowish, and rather offensive. No skin eruption was manifest. Both liver and spleen were enlarged.

My treatment embraced judicious dieting, good hygienic measures, especially cleanliness and warmth of body. Medicinally, 15 minims of the Liquor Hydrargyri Perchloridi were given thrice daily, while the condyloma and anal excoriations were

dusted several times daily with

℞

Hydrarg yri Subchloridi
Sanitary Rose Powder (Woolley) ad ℥ss
Sig. The dusting powder.

I have found this Sanitary Rose Powder (of Jas. Woolley & Sons, Manchester) most valuable in many acute cutaneous affections in infants. It is a preparation of Boracic Acid and is antiseptic, while it does not cake on the skin.

Under this treatment the Diarrhoea ceased in about two weeks, the motions becoming firmer, darker in colour, much less frequent, and comparatively inoffensive, while the condyloma and excoriations healed up splendidly. I then cut off the Liquor Hydrargyri Perchloridi, and

gave Easton's Syrup. The Diarrhoea however began again in a few days, so I resorted to the Liq: Hydrarg: Perchlor:, and continued this for several weeks after the cessation of the Diarrhoea - finally passing again to Easton's Syrup.

When I last saw the infant, 4 or 5 months after, there had been no further Diarrhoea, the Condyloma had disappeared, and the infant was thriving and growing.

This and other similar cases have shewn me the importance of continuing the mercurial treatment some time after the cessation of the Diarrhoea.

Case IV.

Tubercular Diarrhoea:

This case, an infant 2 years and 4 months old, came under my notice suffering from Chronic Diarrhoea. The child was fretful and peevish, with deeply marked Jadelow's genal and nasal lines, was restless, kicking its legs about, very weak and emaciated, with a drawn and wizened countenance, and invariably spent much of the night whimpering. The temperature was raised, as also respirations and pulse. The child had a cough for some weeks previously and was now suffering from right basal phthisis, and always of course swallowing its own sputum. I emphasise this

fact to place the diagnosis beyond question, in my mind. The tongue was red, papillae prominent, with patches of thrush. Vomiting sometimes, not always, present. motions brownish, very liquid, and offensive, & ranging from 6 up to 12 or more in the 24 hours. The abdomen was very distended, in contrast to the general emaciation, and a firm mass was palpated to the left of the umbelicus, about the size of a large walnut. I could not say whether this was an enlarged gland, or a matted peritoneal deposit. There appeared to be much tenderness over this spot.

The child was so weak and emaciated, that this along with the phthisis,

made it rather a hopeless case from the outset.

My treatment consisted in careful dietetic measures, viz, Sterilized milk, to which cream was added, and then raw beef juice, the latter however being vomited, as also was the melted suet which I tried. The body warmth was maintained carefully. Then 1 grain of Pulv: Ipecac: Co: was given thrice daily, along with 20 minims of Angier's Petroleum Emulsion, which has here been found of enormous value in all tubercular cases, as may be testified by the large amount we use in spite of its expensiveness. This the infant retained, and did not appear to loose ground. Injection of Cod

Liver Oil daily was also rigidly employed. Lastly, a tea-spoon-ful of brandy was added thrice daily. The Dover's Powder soothed the child, allowed it to sleep, and held the Diarrhoea in check fairly well, but when stopped the Diarrhoea began again. This went on for about six weeks, when the Parents removed to a neighbouring town.

I learnt that about a month after this the infant died from "Consumption of the Bowels."

This is one of the very few cases in which I felt justified in making a diagnosis of Tubercular Diarrhoea, altho' no Post mortem was ever performed.

Case V.

Diarrhoea due to Impure Water:

(a) Mild:

A. M., a girl, aged 4 years, was in good health 2 days before coming under my notice. The weather was sultry, the child active and perspired freely, so was thirsty and drank copiously from the kitchen tap of the foul and contaminated water supplied to that part of the town last summer.

The Diarrhoea started the afternoon before I was called in. The child was now crying, fretful, legs drawn up, skin cold, temperature sub-normal, pulse and respirations raised. Tongue dirty. No vomiting. Motions: very copious and liquid, yesterday brownish and semi-solid but today

lighter and more watery, and had had 8 or 10 motions since starting. The abdomen was tender on pressure and seemed to give much pain. No food or other possible source of the Diarrhoea could be found, save the impure water, and the prevalence of the epidemic.

The treatment employed was pure sterilized milk, with a little lime water given to each cupful of milk, and given warm, in small quantities frequently. The body was kept warm, while dry hot flannel cloths were continuously applied over the abdomen.

Powders of Hydrarg: cum Creta 1/2 a grain, and Pulv: Ipecac: Co: 1 grain, were given night and morning, along

5 grain doses of Bismuth Sub. nitrate and 5 minim doses of Tincture of Cardelus, every 4 hours. There was no necessity for a preliminary purge.

Under these measures the frequency of the motions rapidly diminished, and they became firmer until by the fourth day they had become quite natural and the infant practically well again.

This however was a very favourable case, for a strong constitution, a limited amount of irritant taken, and early treatment, all combined to a speedy cure.

Unfortunately, many of my cases, due to this cause were much more severe and were fatal, of which the following is one.

Case VI.

Diarrhoea due to Impure water:

(B) Severe:

R. D., an infant aged 3 years, was taken severely with diarrhoea in the morning. He was in fair health previously. I saw him first the same evening. He exhibited the usual symptoms of Infantile Diarrhoea, but suffered also from vomiting, nothing staying on his stomach. His motions were copious, very liquid, not particularly offensive, an light brown. He had six or seven since morning. No cause could be found save that he had drunk freely of the foul water from the tap, the evening before.

I employed sterilized milk and boiled water, in equal parts

wrapped the body in warm blankets, and kept a hot dry flannel over the abdomen to relieve the colic.

Powders of 1/2 grain of grey Powder plus 1 grain of Dover's Powder thrice daily, with Bismuth Subnitrate (4 grains) and Tincture of Catechu (4 minims) every 4 hours.

Next morning I found the child much worse, the diarrhoea had continued almost as profusely and was now very watery, the stomach had retained nothing except the Bismuth and Catechu mixture, and hot water. The fontanelle was depressed, the limbs cold, face drawn, lips blue, body perfectly quiet, but the child yawned frequently in a most distressing manner. The temperature was 95·4°F.

I at once placed him in a warm bath with mustard, where he was kept for 7 or 8 minutes, and given brandy and hot water. I then took him out, rubbed him dry, and laid him between hot blankets. One tea-spoonful of brandy every hour was ordered. The temperature rose to 99° Farth this, and the infant revived somewhat.

I was called up early next morning to find the child extremely collapsed, far more than before, the diarrhoea continuing, and the body cold and pulse almost imperceptible.

Nothing was of any avail and the child died from exhaustion about noon, within three days from the onset of the Diarrhoea.

most of my cases due to this cause were between these two extremes, altho' on the whole the mortality was large, as I mentioned some time since.

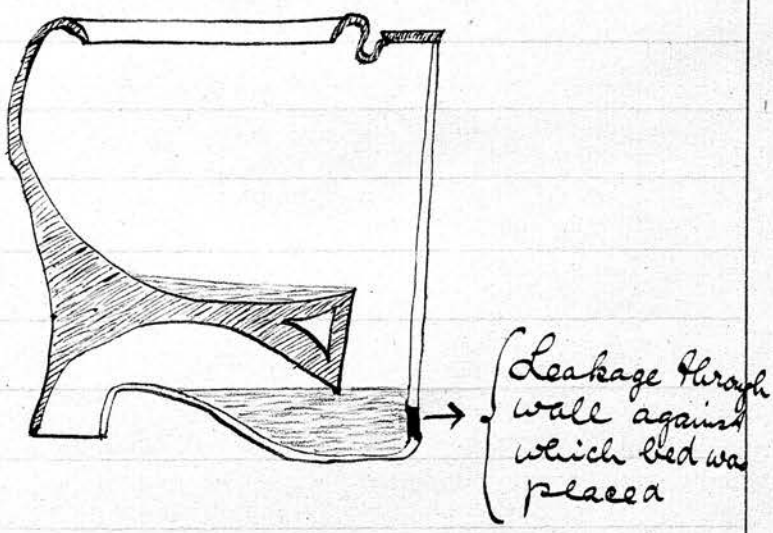
Case VII.

Diarrhoea due to Defective Sanitation:

A typical case of this kind occurred to me while in Dundee.

I was called in to see a boy, 4 years old, suffering from Diarrhoea and Sore throat. The diarrhoea was not severe, but chronic and persistent — 5 or 6 motions daily, liquid, brownish, and offensive. The sore throat was a septic one. He also suffered from morning headaches, as did the other members of the family.

There was no doubt whatever as to the cause. After a careful examination, I found the following to account for the diarrhoea: The bed in which parents and child slept was placed against a wall which was damp and saturated with moisture. This was found to proceed from a leak in the wash out water Closet on the other side of this wall, as shewn here —



Of course the trap from which the leakage occurred

always contained some refuse, so that the moisture which percolated through the wall was loaded with sewer gases. Hence the diarrhoea in the infant.

Of course these conditions were speedily rectified, the infant placed in another room altogether, and sent out into the fresh air when possible. Sterilized milk, then Benger's Food were given, with Bismuth Subnitrate and Catechu every 4 hours. The throat and mouth brushed with Boracic acid and Glycerine. Under this the diarrhoea soon ceased, and Easton's Syrup for Anaemia was given. When I last saw him he had entirely recovered and was thriving.

Case VIII.

Infantile Diarrhoea due to defective Cleanliness of feeding apparatus:

R. S., a boy, aged 4 months, was affected with persistent Diarrhoea. He had been fed on the bottle for 2 months, the mother's milk failing. Jaundice, genal and nasal lines were present, the infant was fretful and peevish, puny, thin, sleepless and restless, & very pale. The mouth was covered with thrush, tongue dirty and furred. Latterly, the infant had vomited frequently during the day, the vomit consisting of sour curded milk. Motions: greenish, abundant, partly liquid and partly lumpy with more or less undigested milk, of a strong offensive smell, and

at first were only 3 or 4 in the 24 hours, but latterly had risen to 7 or 8 in that time. There was erythema around the anus. The child was warmly clad and pretty well cared for. The infant was now fed on cow's milk. It was dry and close weather, and the milk was given unprepared and mixed with water in the proportion of 3 of milk to about 1 of water. An ordinary feeding bottle was used, with long tube and teat. There was only one bottle in use, and this was daily washed so they said. The stopper, tube and teat were rarely washed. When called in, I found the child smelling from the sour milk vomited onto its clothes. The feeding apparatus smelt sour, and

the milk tasted quite sour, fermentation therefore proceeding actively here, and obviously being the origo malis.

I ordered: that another feeding apparatus should be procured, (Allen & Hanbury's Patent not having been produced then), that the one not in use should remain soaking in a solution of Bicarbonate of Soda, and tube, teat, stopper, and bottle thoroughly scoured with water just before use. The bottles were necessary as the infant refused spoon diet. The milk was next to be sterilized as usual à la M. Budin, and mixed with one third the amount of boiled water. Thorough purity was thus obtained.

A preliminary purge of castor oil was next given, followed by powders of Pulv: Alteratiu: (Sod Bicarb + Hydrarg: c Cret: + Pulv: Ipecac: Co:) 1 grain night and morning, while 5 grain doses of Bismuth Subnitrate plus Pulv: Acaciae and Cinnamon water were given every 4 hours.

After two days the vomiting ceased entirely, but the diarrhoea continued off and on for about a fortnight. At the end of this period the motions became firmer, less frequent, more natural in colour, and inoffensive, no curded milk whatever appearing.

When I saw the child some two months after he was in excellent health and doing well.

Case IX.

Infantile Diarrhoea due to Improper Food:

J. A., aged 12 months, girl, came under my notice suffering from Chronic persistent Diarrhoea. She had never been fed on the breast. For the last eight months she had been fed entirely on farinaceous food, chiefly Nellis's Food, with arrowroot and cornflour at times.

When I saw the child she was pale, fat but very flabby, sweated profusely, with a broad forehead and wide fontanelle. She was irritable and peevish, and very restless at night. She was an only child and much spoiled, and given farinaceous food entirely because she

took this with acidity, while refusing milk. Moreover, the Mellin's Food was made with water because the mother said it vomited the milk. The motions were very offensive, liquid containing lumps and undigested food, and greenish in colour, while there were 6 or 8 or more in the 24 hours.

My treatment was firstly to have the Mellin's Food made with milk, the latter gradually increased, till finally sterilized milk alone was used. I had some difficulty in getting the mother to do this, but succeeded by persistence. Latterly, cream and then raw beef juice were added to the milk with excellent effect. Abundant fresh air, sunlight and warm clothing

were ordered. One grain doses of Hydrarg: cum Creta & Pulv: Ipecac: Co: each were given every night at bed-time, along with a mixture of Bismuth Subnitrate (5 grain doses) and Mistura Cretae, every 4 hours.

This treatment was quite successful and in 3 weeks the child was put upon Easton's Syrup, 5 minims thrice daily, and soon began to improve bodily.

About 4 months after this the child developed bronchitis and 'flew' emphysema, which we operated upon and drained. I saw this infant only the other day and she was marvellously improved and quite free from Diarrhoea.

Case X.

Infantile Diarrhoea due to excessive feeding:

M. T., an infant girl, aged 2 years, came under my notice suffering from Diarrhoea.

The history of the case was that the mother had been in weak health and had gone to the country to recruit, leaving her child under a kindly meaning neighbour's care, for some 3 months, during which time I discovered that the child had been systematically over-fed through ignorance, upon bread, arrowroot and other starchy foods, as well as milk and beef gravies, besides getting something of what was going at the table during the meals of the others.

The child's state now was that she was plump and well-nourished apparently, but irritable and peevish, with a capacious appetite. The skin, chiefly of the face, neck, and back, was covered with an eczematous eruption. The tongue was foul and dirty, but no dental trouble and no thrush. Occasionally vomiting occurred, but this was not frequent. Motions: abundant, liquid, greenish, offensive, from 4 or 5 to 8 or 9 in the 24 hours - having increased in frequency during the last week or ten days.

The stomach appeared enlarged and tender, and the whole abdomen distended.

The cause here was obviously excessive feeding. In

The treatment adopted was to place the child on Sterilized milk and barley water in equal parts, giving about 3 pints in the 24 hours, along with occasional drinks of whey. All other food was absolutely cut off.

A good purge of Castor Oil was given, followed by 1/2 a grain of Dover's Powder with 1 grain of Grey Powder, night and morning - along with a mixture of 5 grains of Bismuth Subnitrate with Cinnamon water every 4 hours.

Under this treatment the child rapidly gained ground, began to rest better, the motions becoming gradually less frequent, firmer, and to loose their offensive smell. The eczematous eruption proceeding from the intestinal trouble, and

was only directly treated by cleanliness, daily use of warm bran baths, and the absence of all soaps to the skin, and soon shewed a marked improvement, and finally all disappeared in about 3 weeks. A very little beef gravy was added to the milk, along with a limited amount of farinaceous food. In a fortnight the diarrhoea had completely stopped and the child was running about outside, making a complete recovery.

This same child unfortunately died in the following winter within three days of an attack of double lobar pneumonia.

Case XI.

Diarrhoea resulting from dentition:

The cases due to this were numerous in my experience, at least where I could not account for the Diarrhoea in any other way save this.

R. C., an infant 1/4 months old, was endeavouring to cut its lower molar teeth. The gums were inflamed and swollen, the teeth could be felt in the gums, the tongue was foul and dirty, and the saliva dribbled freely away. The child was continually thrusting its fingers or its ivory teat into its mouth, and cried and fretted a good deal. No vomiting had occurred. Motions: partly liquid and partly lumpy, greenish, very

offensive, abundant, and reaching from 5 or 6 to 8 or 9 in the 24 hours. The abdomen was tender, otherwise appeared natural. The diarrhoea had been going on for several days, and I was called in partly on this account and partly on account of the child screaming and suffering from "fits".

Therefore my treatment consisted in ordering at once a hot bath with mustard, and to continue the warmth between blankets. The child was to be fed on sterilized milk. 20 minims of brandy in warm water every four hours. preliminary purgation with castor oil, and the following mixture internally:

℞

Potas: Bromidi: gr XL
Sod: Bicarb: ℥ss
Bismuth: Carbonat: ℥ss
Aq: Cinnamon: ad ℥iij

Sig. ℥ss every 3 or 4 hours.

Lastly, 1/2 a grain each of Dover's and of Grey Powder thrice daily.

The teeth were not sufficiently forward to allow of lancing the gums. I merely rubbed the gums with my finger-pulp, and left instructions for this to be continued. This appeared to soothe the infant, who readily permitted it.

For two days little improvement occurred, and I was getting uneasy, for the convulsions continued though not so frequent or so severe. Hot baths, brandy, warmth, and Potassium

Bromide were sedulously continued. On the fourth day, by dint of rubbing the gums and eventually lacerating the mucous membrane with my finger nail, the eruption of the lower molars was effected. From this time the child steadily improved. The Diarrhoea now began to yield, and in another 3 or 4 days the motions were 2 or 3 in the 24 hours, firm, dark, and inoffensive. No more convulsions had occurred since the fourth day, and the child made an excellent recovery.

This case along with many others have impressed me with the necessity of visiting frequently and regularly such cases and all sharp infantile troubles.

The infant's condition changes so rapidly, and a few hours may effect so great a change that they can hardly be watched too closely, more especially as at these times they may require frequent changes or additions to the treatment.

This last case was a very severe one while it lasted, but by careful nursing along with frequent medical attention, symptoms were combated, and a successful issue resulted.

I have mentioned <u>Chilling of the Body</u> as a cause of Infantile Diarrhoea, but altho' I am always on the look out for it, especially in the

summer, I have never been able to attribute the diarrhoea specially to this cause, altho' in many cases it has been a minor factor. Still, I have always been able to find some more direct and powerful cause in these cases.

Case XII.

Infantile Diarrhoea resulting from Worms:

Such cases seem to me important, insomuch as the true cause may be overlooked, and the diarrhoea continue.

J. R., a girl, aged 2 years, was brought under my notice suffering from persistent and chronic diarrhoea. No suspicion of the presence of worms

existed in the parent's minds, for only some of the classical symptoms were present. The child was nervous, slept badly, and was failing in nutrition. There was no picking of the nose, grinding of the teeth in sleep, voracious appetite, or scratching at the buttocks. Hence worms were not thought of.

Pain was complained of over the abdomen.

Motions: extremely offensive, very liquid pea with lumps, but no worms had been noticed. She now had 8 or 10 motions in the 24 hours, these having increased during the last week.

As a preliminary step, I ordered a dose of castor oil, the motions following to be closely watched. The

mother at once discovered the presence of the Oxyuris Vermicularis.

My treatment then consisted in placing the child on a meagre liquid diet of sterilized milk alone. Then 4 grain doses of Bismuth Subnitrate with some Cinnamon water were given every 4 hours. At night 2 grains of Santonin were given, and followed early next morning by more castor oil. This brought away large numbers of Thread Worms. This powder and purge was repeated twice again, at intervals of three days. The worms disappeared to a large extent, the child rested better, altho' the motions continued liquid but less offensive and less frequent.

There continued to be some irritation remaining at the end of a week, so I myself gave the child ~~an~~ rectal injection of 5 ounces of Strong Infusion of Quassia. This was retained, and shortly after gave 2 grains of Santonin, and followed this by more castor oil. This effectually removed all the worms, and within three days the Diarrhoea had ceased, the motions becoming firm non-offensive, and dark.
The child being anaemic was now given

R̸

Ferri Sulphatis gr vi
Syrupi ʒii
Aq ad ℥vi

Sig. ʒss t.d.s

When I last saw her, she had improved immensely and was doing well.

Altho' I have met with cases of Tape and Round worms causing Diarrhoea in Infants, yet in no case was the Diarrhoea a prominent symptom, being slight, easily rectified, and requiring no special treatment.

This concludes a brief study, drawn from clinical experience, of a complaint which occurs so largely in general practice. As I said before, it is based solely on my own observations, and naturally there must be many imperfections and omissions

in the study, yet I trust these are not so great as to debar me from obtaining the high degree of Doctor of Medicine of Edinburgh University.

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April 13th 1896.
