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Thesis for Graduation as a Doctor of Science in the Department of Public Health
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by
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A few facts and their remedies connected with the subject of Infant Mortality

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To select a subject upon which to write a Thesis from the very wide range of Sanitary Science may appear especially easy; but on further consideration, and observing the novelty of the whole subject together with the very proper and numerous diversities of opinions on every branch of Sanitary Science - it will be seen that difficulties crowd in on every side and render the task a difficult one.

There are however some subjects which have furnished...
facts, about which there cannot be much diversity of opinion, and it is therefore with one of these subjects that I propose to deal. Previous to the passing of Mr. Stanifield's Public Health Act of 1872 - it was not compulsory on the part of Corporate bodies to appoint Medical Officers of Health so that the observations on the Vital Statistics of the Country were but little known. Excepting to a very small proportion of the Community who took the trouble to peruse the Annual Reports of the Registrar General. When however Mr. Stanifield's Public Health Act (1872) became law, and every Corporate body, whether acting as an Urban or a Rural Sanitary
Sanitary Authority - was compelled to appoint duly qualified and registered medical practitioners as officers of health. The aspect of affairs was altogether changed. Regular returns of births + deaths from the local Registrars were forwarded to each medical officer of health, and from which he writes his report for his own authority. It is not my intention in this paper to dwell upon the imperfections of this system. In confining itself only to the deaths instead of also to a correct register of native sickness - as doubtless must soon be included in the returns made to an officer of health - by the medical practitioners of the district or locality.
under the jurisdiction of the Sanitary Authority — but it is in reference to that portion of the returns which relates to the various causes of death occurring in children under the age of one year — that I wish especially to remark.

No medical officer of health can peruse these returns without being struck with the enormous number of children dying annually under the age of one year from causes which in the majority of instances may be considered preventable — I allude to convulsions, debility from birth — enteric disease — atrophy — diarrhoea. These appear to be the causes which are destroying so many of our little ones. I hope to be able
to show that by attention to nature's laws, many of these deaths might be averted.

In the first place then I must refer to the following abstract of returns taken from the Registrar General's last Report for the year 1874. But before doing so it will perhaps be as well to quote some of the observations of M. Kirborn of Belgium— who has
devoted considerable time and attention to the subject of infantile
mortality. This observer states that the rates of mortality in
children during the first year of life in the principal countries of
Europe are as follows:
Out of 1,000 children, there die
Scotland: 156
Belgium: 186
France: 216
Spain: 226
Italy: 254
Russia: 311
Denmark: 156
England: 170
Holland: 211
Russia: 220
Switzerland: 252
Austria: 303
Bavaria: 372
Causes of Death at different periods of life in the year 1874 in England.

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All ags.</td>
<td>Under 1 year</td>
</tr>
<tr>
<td>Convulsions</td>
<td>15,253</td>
<td>12,450</td>
</tr>
<tr>
<td>Tabes Meningitica</td>
<td>3,777</td>
<td>2,010</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>11,140</td>
<td>7,705</td>
</tr>
<tr>
<td>Want of Breast Milk</td>
<td>772</td>
<td>767</td>
</tr>
<tr>
<td>Inanition of Infancy</td>
<td>535</td>
<td>530</td>
</tr>
</tbody>
</table>

Syphilis       | 2,000 | 770 |               |

Grand Total - all ages both sexes 59,730
      " under one year 43,147
From this vast array of figures it will be seen that nearly 60,000 persons of all ages are dying from Convulsions, Tapes Meteorica, Diarrhoea, Want of Breast Milk, Inanition of Infancy, & Syphilis. Of this number no less than 43,147 are deaths occurring in children under the age of one year from these diseases alone. Convulsions + Diarrhoea Contributing 35,613 of 43,147 deaths.

I believe that many of these tender little lives might in all human probability have been spared by due attention to Cleanliness, Proper Nursing, & proper feeding. Indeed as one can have observed, the statistics of Infantile Mortality throughout
the Country without being surprised that year after year so many young lives are sacrificed to Causes which are in a great Measure under our Control. I allude more especially to Convolusions, Diarrhoea, and the wasting diseases of Children.

It is calculated that over 40,000 children (under 1 and above 13 years) die annually in England from improper feeding, in only two diseases—namely, Convolusions and Diarrhoea. Certainly the Statistics in Scarborough fully bear out this Fact. I have assigned three Causes for this fearful Mortality, namely—Want of Cleanliness, Improper Nursing, and Improper Feeding. In reference to Cleanliness—
of these poor little creatures but rarely have a Bath—excepting on a Saturday night. Instead of having a warm bath night before, to put on clean clothes is almost the exception instead of the rule. Too their dirt. Their dirty rags serve as happy combination to form an additional covering to nature's skin which has been entrusted to the quack tender care of the younger parents. But it is more in reference to the two last causes that I write especially to allude Improper Nursing.

In nearly four
large towns in England, as well as in one fashionable sea-side re-
... so much extra assistance is required in the hotels and lodging houses - with the tempting bait of high wages - that mothers are induced to leave their children under the care of others who have little or no interest in them; as soon as the maternal influence is withdrawn, so soon does the child begin to waste. In a very great many instances, die. Unfortunately the Sanitary Act does not provide for this class of persons who only temporarily take care of children - their mothers being alive. But it does provide for those termed nurse or illegitimate children by an Act of Parliament passed on the 25th July 1872, entitled "An Act for the Better..."
Protection of Infant Life

I am sorry however to state that I have as yet failed to discover any record or statement of the beneficial (or otherwise) working of this Act in any town in England, indeed the Metropolitan Board of Works the "local authority" for the Metropolis reports that during the year 1875 in their whole district the total number of houses registered was only five, they were authorized to receive only eleven infants — the Superintending Architect observes in his report "that until this Act shall be amended, it seems impracticable to obtain any satisfactory observance of its provisions regarding the registration of Nurses".
What has been done to contract the fatality arising from improper nursing?

I believe the City of Paris was the first to establish a society for the protection of infant life, and so encouraging were the results, that soon afterwards a "Ladies Sanitary Association" was established in London, with equally good results, with immense benefit to the poorer classes. In Paris in one year alone, out of 1682 infants committed to the care of the association—the society only took sixty, or less than 4 per cent; whilst the mortality amongst infants sent out to nurse in the provinces, was about 60 per cent.
with such results - there is no wonder that the attention of those benevolently disposed should be aroused - and institutions rapidly spring up throughout the Country in most of our large towns under the name of the Creche, which are now doing good work.

So convinced was I of the benefits of such establishments that with the assistance of a few liberally inclined individuals, I have succeeded in establishing a Creche in Scarborough, with results far exceeding our most sanguine expectations indeed. I think I cannot do better than give the numbers of admissions into our Scarborough Creche since its opening in May 1873.
Admissions into the Scarborough Creche since May 1873

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1873</td>
<td>May to Nov.</td>
<td>652</td>
</tr>
<tr>
<td>1874</td>
<td>May to Oct.</td>
<td>807</td>
</tr>
<tr>
<td></td>
<td>1875 + 76.</td>
<td></td>
</tr>
<tr>
<td>1876</td>
<td>May to Apr.</td>
<td>983</td>
</tr>
<tr>
<td></td>
<td>May to Oct.</td>
<td>1980</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4422</td>
</tr>
</tbody>
</table>

So well did the Committee of this Institution find it answer that in 1875 it was determined to keep it open during the whole year instead of from May to November as originally intended.
It is somewhat early to speak of any imaginary influence of it in lessening an infantile death-rate, but when I come to discuss the question of diarrhoea from improper feeding, I shall have a few remarks to make bearing upon our Céèhe; suffice it to say that at first when opened being a novelty very few mothers could be induced to send their children—popular prejudice had to be overcome. Now however the difficulty is for mothers to obtain admission for their children. Perhaps it may not be considered out of place to introduce into this Thesis the Rules which we framed for the Guidance of our Nursery—
Rules of the Scarborough C"èche

1. The Nursery will be open every day (except Sundays) from 7 a.m. to 7:30 p.m.; on Saturdays until 2 p.m. A fine of a penny will be charged for every half hour that any child is left at the Nursery after the time of closing.

2. Only the children of married persons, or widows, or widowers, will be admitted.

3. One clear day's notice must be given at the Nursery before any child is left for the first time.

4. No child shall be admitted under one month or above 3 years of age.

5. The charge for one child is Sixpence a day (including food), and Threepence for every additional child from the same family; on Saturdays the charge will be half price. Infants whose mothers come to nurse them are charged half price.
- Rules Continued -

6. The money must, in every case, be paid before the child can be left at the Nursery.

7. Children are expected to be sent clean and neat.

8. No child will be admitted who is suffering from any infectious disorder, or has been brought from a house infected with any Contagious Complaint. Nor will any child above the age of 3 months be received at the Nursery who has not been vaccinated.

9. No gratuity is allowed to be given under any circumstances to the Matron or Assistant.

It will be observed that only the children of married persons...
are eligible for admission, but as the rate of mortality in illegitimate children is so far in excess of those born in wedlock, it has always been an important consideration why this particular class should not also share the benefits of the Creche? There would be no necessity to discuss this question at all, if the Infant Life Protection Act (to which I have already alluded) did its duty. One strong argument however against the admission of illegitimates is that it would be a premium for immorality that the hard working and industrious parents would be unable frequently to obtain admission for their legitimate
offspring - But as this Establishment (t in speaking of it) I of course include all the rest which are conducted on similar principles) was started not only for the proper nursing but also for the proper feeding of children it naturally leads me to discuss the next portion of the subject

namely -

Improper Food as a fruitful source of Infantile Mortality -

Perhaps nothing tends so much to bring the helpless babe to an untimely end as the administration of improper food on the part of those who have the care of children. This arises not only from ignorance as to the kind...
of food, but also as to methods of administration — In this respect, the English might most judiciously adopt the system so successful by their neighbours over the Tweed.

Dr. Stark — The Registrar-General for Scotland has drawn special attention to this question in his Fourteenth detailed Annual Report — from which I gather that the English are in the habit of stuffing their babies with foodment, almost from Birth (the poorer classes usually within one month after birth), while the Scotch, except in cases where the mother is delicate, or the child is not nursing, wisely give nothing but the mother's milk until the child begins
to cut its teeth. The English practice occasioned the deaths by Convulsions of 23,198 children under one year of age during the year 1868 out of 786,858 births. In other words: one death from Convulsions in every 34 of the children born during the year in England. In Scotland during the same year, only 312 infants under one year of age fell victims to Convulsions out of 115,514 children born during the year; in other words, one death from Convulsions in every 370 children born during the year.

Another observer (Dr. B. Clarke) who wrote some very able articles in the "Food Journal" (now I am sorry to say a defunct periodical)
for March 1st September 1873 states, that considerably over 20,000 infants die annually in England from Convolusions only from being fed with food 'victuals' before they begin to cut their teeth. But another fact not less important is connected with Dr. Sturkie's statement, namely, that if this number of infants die annually from Convolusions in England from this cause, it is more than probable that an equal if not a greater number die annually of diarrhea from the same cause; and statistics quite agree with this suspicion; for the death rate from this disease is more than double in England, what it is in Scotland.
Having been in 1868 as high as 138 in 100,000 living in the former,
only 66 in the same number living in the latter. I believe I have no doubt the majority of medical men will agree with me that one reason why spoon diet causes diseases in children previous to dentition is, that the food given is at once swallowed by the toothless infant, so that it is very imperfectly mixed with the saliva; on the other hand, the act of sucking causes the saliva to flow, and at the same time to mix with the food. The more slowly the food flows, the more perfectly is mixing effected.

In alluding to spoon diet, I mean farinaceous food.
This food (Farinaceous) is especially liable to lactic fermentation, without giving out the evidence of change which milk affords, and the result is that the stomach fills with fatty products - which often bring an early end to the infant's existence by inducing a fit of Convulsion and rendered still more certain by the "pointer" which prevents distension. If Convulsions are, or are not induced, diarrhea frequently arises in consequence, which is equally fatal in its effects. But if frequently, may very frequently happen that upon questioning the mother as to the diet of her child - the Medical man is told,
"Oh it has the same as we have Sir" - meaning of course. Meat - vegetables. Fish too - indeed only recently a mother brought her child from Crewe, but before committing it to the care of the matron of the institution - very properly asked upon what her child would be fed - upon being answered that food that was the principal commodity - she passed her child saying - "I'll have none of that stuff - my barn is accustomed to something better - more substantial than that - she always has a bit ofkippered herring at a drop of beer. Then we have one meal "no wonder..."
at the sad fatality amongst the little ones with such parents. Thus far in our Scaboro' Creche I have observed that during the prevalence of infantile diarrhoea in the summer months when the children were brought to the nursery, they rapidly recovered from this affection, but generally had a recurrence of the attack on the following Tuesday, as consequence of improper feeding when at home on the Sunday. Being convinced that improper food is the most fruitful source of danger to these little ones, it will not be naturally asked — What is the most proper food for infants? As this subject for some time
occupied the attention of the Fellows of the Obstetrical Society of London. I feel I cannot do better than present you with the result of their observations and suggestions, in a pamphlet which they issued on infants' diet, in which it is stated that:

1. Provided the mother or wet nurse has plenty of milk, it is in good health, the infant requires, she should have no other food but the breast milk until about the sixth month.

2. When the mother has not milk enough to nourish the child, other food may be given, especially during the night. This should
“Consist of the best milk, with one-third the quantity of warm water (previously boiled) added.

3. After the child has cut its front teeth, it should have one or two meals a day of some light food, such as bread + milk, or nursery biscuits. Gradually increased until the child is weaned.

4. Meat, potatoes, and food such as grown up people eat, are often given to young infants; this kind of food, + all stimulants, are entirely unsuitable, & are common causes of diarrhoea, + other troubles.”

With reference to hand-feeding.
it is stated that:

1. If the infant must be brought up by hand, the chief rule to remember is that the food should resemble, as closely as possible, the milk provided for it by nature.

2. Milk, milk only, should be used for this purpose; asses or goats' milk is best, but cows' milk will in general do sufficiently well.

3. Two-thirds of pure and fresh milk, with one-third the quantity of hot water added to it, the whole being slightly sweetened, should be used.
4. Milk diet alone should, as a rule, be given until the child begins to cut its teeth, when other food may be gradually commenced as before recommended. When milk is found to disagree, other food should be given under medical advice.

5. Most of the mortality from hand-feeding arises from the use of arrow-root, corn flour, and other unsuitable kinds of food, which consists of starch alone. Contain no proper nourishment and should not be used as substitutes for milk.

Since adopting this dietary in our Scarborough Creche there has
been a decided improvement in the health and appearance of those little ones who have been the regular recipients.

There is one other point to which I must refer, namely, the striking number of deaths registered under the head of Tabel Mesenterica. According to the Registrar General's Return already alluded to, 2,777 children died from this particular disease in the year 1874. 1 of this number, 2,010 were under the age of one year. The old adage looked upon every child with a swollen belly as a victim of it, indeed the same impression appears to prevail in the minds of many.
medical men of the present day who return so many certificates of death under this particular head. Most writers of recent date who have specially studied this subject, agree in stating that this disease is rare under the age of 3 years. (See Dr. Eustace Smith's work on the Wasting Diseases of Children, page 267.)

Many of those who have made these questionable returns suppose that if a child is losing flesh and has a large abdomen that mesenteric disease is assumed to exist—forgetting that such conditions are frequently met with in very young children—when suffering from Rickets—or even from simple indigestion arising...
From ineritable food - or unwhol
some conditions surrounding the
child - now as the death rates
of young children furnish a very
dilercite test of sanitary cir-
cumstances it cannot be too
distinctly recognized that a high
local mortality of children
must also necessarily denote a
high local prevalence of those causes
which determine a degenerative
race: it therefore behoves all
medical men to exercise the greatest
care in washing out their certificates
of death. This remark in this
disease especially, applies most
forcibly to all our sea-side resorts
and fashionable watering places
for accepting the definition of Dr.
Ireland (Physic: Physic) that allowing
for diversities of structure & function.

Acute Hydrocephalus - Phthisis Pulmonalis - & Tabses Mesenterica.

may respectively be regarded as the ordinary results of the same morbid tendency, manifesting itself in the three great cavities of the body - the Cranium - the Thorax - and the Abdomen. We may most properly call Tabses Mesenterica - Abdominal Consumption. The word "Consumption" naturally frightens every one - it is not likely that parents will take their families to those places which have recorded rates of excessive infantile mortality from this cause - which must form a very strong reason for the exercise of greater caution in granting Certificates of health.
There are yet three remaining causes of infantile mortality in my table to which I have not alluded namely: Want of Breast Milk, Intoxication of Infancy, and Syphilis. These causes alone are destroying something like 1,000 children annually under the age of one year, but are dependent more upon the health of the parent than upon defective surroundings affecting the child. The former of these, Want of Breast Milk, arises in many instances from mothers not wishing to nurse their children, because it would deprive them (the mother) of many external pleasures, and also because it in too many cases is not considered "fashionable" for some mothers to
nurse their legitimate offspring. Such ladies should never contemplate matrimony, unless they intend to discharge their duties faithfully and honestly - without detriment to their children - very frequently want, or rather the absence of breast milk arises from intemperate habits on the part of the parents, as also from unhealthy occupations. These causes can in the majority of instances be remedied by the attention to the ordinary laws of nature - by cleanliness and sobriety. Over 1,000 deaths are ascribed to the perinatal period of infancy. Here again the parents are in many instances at fault - for by their leading a reckless course of life - by breaking down their constitutions with strong
drinks - by living in unhealthy atmospheres - in over-crowded dwellings - in fact by living in a manner diametrically opposed to that which nature has ordained it is not to be expected that the offspring of such parents can be other than unhealthy - as such, are ushered into the world - to make as speedy an exit - should how - ever they survive and struggle through a scrofulous childhood - it will only be to realize an abortive puberty and perhaps to beget a still less likelier brood than themselves - less capable of labor and even less capable of education.

Syphilis has destroyed nearly 1500 children under the age of one year. There can be no doubt
whatever that these tender and innocent little lives have been sacrificed to the lives of their parents. The law has provided the best antidote in its power, by the passing of the Contagious Diseases (Women) Act. In my opinion the only fault of this Act is, that it is not sufficiently extended. Every strong efforts have been put forth for the repeal of this Act—but all the statistics thus far have clearly proved—that where the Act is most rigidly enforced there is less detected prostitution and less Syphilis.

In concluding this Thesis, I would suggest as a great born to this, as well as to future generations, that life Tables should be constructed...
From observations will made

The First: of children nursed by their

Mothers.

The Second: of children brought up by

Hand.

The Third: of children nursed by

Foster-Mothers.

These Tables if accurately made

would enable us at once to concentrate

our attention upon any one given

point, as a Cause of Infantile Mortal-

ity, and to provide a remedy.