Dietetics in Relation to Infant Mortality.

Graduation Thesis

by

Robert Laurie M.B.C.M.

1881.
The question of the excessive mortality among infants has long allured the attention of medical men, statisticians, and others interested in mortality returns, and various causes have been assigned, and theories propounded, to explain the extraordinary death-rate among the infant population of our country.

This matter is not only demonstrated by collective statistics embracing the whole country, or extending over any particular length of time, but, we find it corroborated, and emphasized by individual experience of medical practitioners in general.

It is true that—among these, a higher death-rate may, and does obtain in different districts according to the class of the population, and their habits, and surroundings.
May influence the Morbidity returns, but, taking any given district, even of the most favourable type, the fact still remains that the Infant Mortality is still disproportionately large, and to any observer, who enquires into this condition of matters the fact also is evident that much of the Mortality is due to causes which are, to a great extent, of a preventible nature.

It is to some of these preventible causes I am now about to point, from Clinical Observations and Experience extending over five years within this district.

It may be as well to premise that the District of the town of Derby is which this Experience has been gained, is situated upon a clayey Soil, is thickly populated chiefly by the artisan class, most of whom are employed in Railway workmanship—such as carriage and wagon-building.
and other branches of industry necessarily connected with so large a company as the Midland Railway. Many, too, are workers at large iron foundries. These are the chief industries, and the men as a rule are in receipt of fair wages and the married women are as a rule occupied at home in domestic duties. The ladies are great staples of domestic manufacture calling for the employment of a large amount of female labour as is the case in the neighbouring towns of Nottingham.

The houses are well built cottages each with garden space behind. The streets are all of good average width. The chief part of the district having sprang up within the last ten or fifteen years the drainage and paving are good, and the sanitary arrangements are efficiently conducted by a well-appointed
Sanitary Authority, by which means all outbreaks of zymotic diseases are at once investigated and promptly dealt with, while all nuisances in the shape of foul smells are enquired into and corrected.

It is from these causes, chiefly, that our death-rate is so low as compared with many other large towns. Even though a good deal of opposition, through ignorance, has to be combated in dealing with nuisances, and diseases of an infectious or contagious character.

In taking the infant population and its relation to the death-rate, we find that it is not in a spasmodic or intermittent manner, as is the case in the occasional outbreak of zymotic disease in the form of an epidemic which, especially in such forms as Measles and
Scutaria) affect more particularly the infantile population, that the high death rate in this class is so constantly maintained, but it is in the steady and persistent number of deaths due to causes as distinctly preventible as those of a dynamite nature, but more constant in their prevalence such, for example as, Ignorance, Maternal Neglect and, more particularly, Improper Feeding. This is more especially to be noticed in the case of newly-born infants and of those up to one year old—plainly, the period when the most important growth changes are taking place and, during which, the Child should be placed in the most favourable conditions, both as regards Hygiene Surroundings and Nutrition.

This subject is no new one, and we find decided
Opinions expressed by many eminent authorities on these points.

Liebig, in his pamphlet, on "Food for Infants," makes the extraordinary but nevertheless true, statement, that "the usual farinaceous foods given to infants, are the cause of most of their diseases and half their deaths."

Pavy, in his "Food and Diseases," says, "Articles of a farinaceous nature, such, for instance as bread, biscuit powder, baked flour, cakes, and the variety of biscuit, and preparations sold at different establishments, which enter extensively into general confectionery use, must be looked upon as foreign to the diet of infants of a tender age; constituted as great a part, as these articles are of a principle—starch—which has
No existence in milk, and which "requires to undergo a special kind of digestion to get it for absorption. It is probable that the digestive organs are not adapted at this stage, "properly to meet the demand that is made upon them when these substances are consumed, "...... all authorities concur in condemning them as improper for use at such a period."

Statistics also go to prove this fact. Even though, in various countries the percentage may vary, in the Mortality of Early life, yet in all cases, even in the most favourable, it seems to be excessive.

In some parts of Germany the Mortality of Infants under one year was recently as high as 25½ to 30 percent of the total births, and in England 15 percent, and while the
Infantile Mortality is higher in manufacturing districts, and lower in those which are agricultural, and varies in different parts of the same country. It is evident that the death rate, in all cases, is dependent in part on causes which are remediable and among which the chief are causes due to the points under discussion.

This is evidenced by the fact that the mortality under one year in England has fallen from 15 percent in 1872 to 13 percent in 1882.

That artificial feeding of infants is a great factor in the question is also readily determined when we enquire into the statistics of Foundling Hospitals, where, by necessity, the infants are chiefly hand-fed, and where also the
Death-rate is most excessive, even after excluding all causes which are more particularly exhibited in such cases, as heredity and exposure. The mortality in these institutions varies, as the following statistics will show, according as the children are starchy, hand-fed or suckled by a wet-nurse.

Lyons 33.7 percent—wet-nurse
Paris 50.3
Rennes 63.9—hand-fed.

Mr. Gaillard gives the following illustration:

"At Paris, in the Department of Deux-Sèvres, of 153 township, 54 died between the ages of one day and 12 months, or 35 percent, which is a higher proportion than that presented at Paris. At X—of 244 newborn infants, 197 or 80 percent, had died by the end of the first year, struck by the enormous n
difference between this case of mortality, and that afforded by the Hospices at Portiers and Parthenay, I determined to investigate its cause. I ascertained that in the Hospice as much attention is paid to the children, and the nurses are under oversight, as at Portiers and Parthenay. But at — none of the children are suckled, but all are fed...... I have been assured by many persons connected with the institution, that the fearful mortality just mentioned can be attributed to no other cause than the practice if not sucking the children......and the only measure by which they could reduce the mortality was the having recourse to sucking the children by wet nurse.
In Berlin, a practice is carried out which would, if enforced in this country, furnish us with most interesting, and instructive statistics, by which, in the case of all deaths of infants under one year, it is required that the medical attendant should state, on the death certificate, whether the child had been brought up at the breast only, on some kind of artificial food. And the returns show, that of 10,274 children dying under the age of one year, 7646 had been brought up by hand, and 2628 at the breast, or nearly three-quarters of the whole had been the subjects of artificial feeding.

It is not, however, merely the artificial feeding in itself which is responsible for such fatal issues, but the kind of
of food employed, and the manner in which the food, even though the best substitute for the breast milk, is prepared. In many houses, personal cleanliness is by no means a prevailing virtue, and it is not, therefore, to be wondered at that such matters as the preparing and administering of food to infants should be carried out in a careless manner. This is especially the case where the infants are bottle-fed. Here we have to contend with the products of decomposition in the bottle itself, and even if that be pretty well cleaned, the tube is a prolific source of poison, at seldom, and in many cases never, being properly and systematically cleaned out. The consequence is that putrescent matter is sucked
up by the child; fermentative changes take place in the
stomach; as consequence, and
 diarrhea, and other disorders
are the result; another evil of
the bottle system (that is where
long tubes are employed) is
that the child is laid down in
its cot with a well filled bottle,
and is allowed to suck as
it may without the supervision
of the mother or nurse, which
is so essential. But in by
far the majority of cases
where artificial feeding
is had recourse to, either
entirely or as an adjunct
to the mother's milk, under
the impression that the child
is not satisfied with the
breast milk, there is the great
tendency to the employment
of solid food, and solid it
is in more senses than one.
Among the chief adjuncts this

employed, are those belonging to the Starchy Class of foods, and it is a well received dictum that in early infant life the digestive organs are equal to dissolving and assimilating foods of this kind, that the Saliva — an important agent in later life in acting upon the Starchy elements, is at this period deficient in that Diastatic Action which, to so great an extent, effects the sugar-transformation of Starches both before and after its reception in the Stomach. It is evident that, though it is possible that the Intestinal secretions, more especially those of the Pancreas may, even at this early age possess the Diastatic action, yet much mischief may occur from the presence of undigested and undefeasible matters both in
The Stomach and in the Intestines and in many cases this is a prolific source of Convulsions being set up from the presence of these particles of undigested materials.

It is also proved from clinical observation that these particles pass through the Intestines intact and that Murch is readily discovered in theolini evacuations of Children fed in this manner.

We may further consider this question in support of the general statement already advanced, under the following divisions.

1. In its general aspect.

   as viewed from statistics affecting the whole country.

2. In a more special aspect as viewed from the
results in one individual
town and practice.

3. Deducing reasons for the
    consideration already
    advanced under 1 & 2.

Chapter I.

The general aspect as viewed
from statistics affecting the
whole country.

F. For this purpose I have taken
for the basis of investigation
the valuable observations
of the late Dr. Parre.

In the following table
he shows the annual
number of deaths among
children under one year of
age, to every 1000 births,
in the undermentioned large
towns, from all causes
and from eleven specified
causes.
Annual number of deaths of children under 1 year of age in the 3 years 1873-5 to every 1000 births

<table>
<thead>
<tr>
<th>Boroughs</th>
<th>All Causes</th>
<th>Accidental</th>
<th>Starvation</th>
<th>Disease</th>
<th>Deafness</th>
<th>Convulsion</th>
<th>Drowning</th>
<th>Inflammation</th>
<th>Starvation</th>
<th>Asthma</th>
<th>Paralytic</th>
<th>Fetal</th>
<th>Effeminate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portsmouth</td>
<td>145.9</td>
<td>130.9</td>
<td>28.0</td>
<td>3</td>
<td>63.0</td>
<td>3.0</td>
<td>32.2</td>
<td>21.5</td>
<td>24.2</td>
<td>11.7</td>
<td>22.7</td>
<td>6.1</td>
<td>11.0</td>
</tr>
<tr>
<td>London</td>
<td>157.1</td>
<td>135.6</td>
<td>31</td>
<td>1</td>
<td>83.6</td>
<td>3.6</td>
<td>20.4</td>
<td>18.6</td>
<td>31.9</td>
<td>13.8</td>
<td>25.0</td>
<td>10.4</td>
<td>4.0</td>
</tr>
<tr>
<td>Wolverhampton</td>
<td>166.0</td>
<td>140.9</td>
<td>24.1</td>
<td>5</td>
<td>69.1</td>
<td>1.1</td>
<td>22.0</td>
<td>30.4</td>
<td>31.2</td>
<td>9.4</td>
<td>26.4</td>
<td>10.2</td>
<td>4.4</td>
</tr>
<tr>
<td>Sunderland</td>
<td>167.6</td>
<td>147.5</td>
<td>15</td>
<td>0.6</td>
<td>7.3</td>
<td>3.2</td>
<td>21.3</td>
<td>28.2</td>
<td>25.4</td>
<td>6.4</td>
<td>39.4</td>
<td>13.6</td>
<td>6.6</td>
</tr>
<tr>
<td>Oldham</td>
<td>180.1</td>
<td>150.9</td>
<td>3.0</td>
<td>1</td>
<td>6</td>
<td>7.5</td>
<td>4.8</td>
<td>16.4</td>
<td>26.0</td>
<td>36.2</td>
<td>11.8</td>
<td>27.3</td>
<td>16.3</td>
</tr>
<tr>
<td>Norwich</td>
<td>183.4</td>
<td>161.8</td>
<td>0.6</td>
<td>-</td>
<td>9</td>
<td>2.0</td>
<td>27.2</td>
<td>22.9</td>
<td>28.8</td>
<td>6.9</td>
<td>63.0</td>
<td>8.6</td>
<td>-</td>
</tr>
<tr>
<td>Salford</td>
<td>183.9</td>
<td>157.7</td>
<td>9.0</td>
<td>1</td>
<td>7.4</td>
<td>2.2</td>
<td>31.5</td>
<td>25.0</td>
<td>27.7</td>
<td>9.1</td>
<td>32.4</td>
<td>10.3</td>
<td>6.6</td>
</tr>
<tr>
<td>Sheffield</td>
<td>186.1</td>
<td>148.8</td>
<td>1.6</td>
<td>3</td>
<td>2.6</td>
<td>6.5</td>
<td>5.2</td>
<td>31.0</td>
<td>33.0</td>
<td>36.9</td>
<td>8.0</td>
<td>10.4</td>
<td>12.5</td>
</tr>
<tr>
<td>Birmingham</td>
<td>187.0</td>
<td>160.0</td>
<td>2.0</td>
<td>2.4</td>
<td>7.2</td>
<td>1.6</td>
<td>33.9</td>
<td>13.4</td>
<td>28.3</td>
<td>7.1</td>
<td>39.7</td>
<td>14.1</td>
<td>10.0</td>
</tr>
<tr>
<td>Newcastle upon Tyne</td>
<td>190.6</td>
<td>164.5</td>
<td>3.0</td>
<td>2</td>
<td>7.5</td>
<td>2.6</td>
<td>24.4</td>
<td>37.7</td>
<td>24.5</td>
<td>13.9</td>
<td>37.9</td>
<td>12.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Manchester</td>
<td>192.9</td>
<td>157.4</td>
<td>3.1</td>
<td>2.1</td>
<td>6.5</td>
<td>2.9</td>
<td>28.7</td>
<td>28.1</td>
<td>31.3</td>
<td>9.0</td>
<td>33.9</td>
<td>11.1</td>
<td>7.7</td>
</tr>
<tr>
<td>Nottingham</td>
<td>199.5</td>
<td>184.8</td>
<td>3.9</td>
<td>1</td>
<td>9.6</td>
<td>3.2</td>
<td>27.7</td>
<td>32.1</td>
<td>25.4</td>
<td>18.4</td>
<td>47.0</td>
<td>16.8</td>
<td>1.6</td>
</tr>
<tr>
<td>Leeds</td>
<td>201.1</td>
<td>162.7</td>
<td>2</td>
<td>2.6</td>
<td>5.5</td>
<td>3.5</td>
<td>30.9</td>
<td>26.2</td>
<td>32.4</td>
<td>9.8</td>
<td>32.2</td>
<td>16.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Leicester</td>
<td>217.3</td>
<td>203.1</td>
<td>2.8</td>
<td>1.1</td>
<td>6.0</td>
<td>4.1</td>
<td>52.5</td>
<td>31.6</td>
<td>23.1</td>
<td>11.8</td>
<td>50.7</td>
<td>16.6</td>
<td>8.8</td>
</tr>
<tr>
<td>Liverpool</td>
<td>218.9</td>
<td>191.2</td>
<td>6.1</td>
<td>9</td>
<td>9.0</td>
<td>2.2</td>
<td>31.9</td>
<td>28.6</td>
<td>39.4</td>
<td>12.6</td>
<td>37.7</td>
<td>10.6</td>
<td>8.2</td>
</tr>
<tr>
<td>Mean</td>
<td>185.3</td>
<td>157.5</td>
<td>2.9</td>
<td>1.8</td>
<td>6.7</td>
<td>3.0</td>
<td>29.3</td>
<td>26.9</td>
<td>29.3</td>
<td>10.4</td>
<td>32.8</td>
<td>12.4</td>
<td>2.0</td>
</tr>
</tbody>
</table>
From this Table we find that, by far the largest proportion of deaths occur under the heads of Diarrhea, Convulsions, and Diphtheria.

If we take the mean we find that of the eleven causes producing a mortality of 139.5 per 1000 births, 91.0 or about three fifths are accounted for under the above mentioned three heads leaving only 68.5 or about two fifths to be distributed under the remaining eight heads which include such important diseases as affections of the lungs and those of tuberculous origin.

Again, taking the mean from all causes we find of these 185.3 91.0, or nearly one half, are accounted for under the three causes stated above.

This has a peculiar significance in relation to the subject under
discussion, when we find that Dr. Parke, in explanation of these figures makes the following

interesting and emphatic statement.

"Some of the principal causes are improper and insufficient food, bad management, use of Opiates, neglect, early marriage, debility of mother."

It is remarkable and also instructive to compare the infant mortality of Scotland with that of England.

"Scotland," says Dr. Parke, "compares most favourably with England, in its infant mortality, and the excess in the number of deaths from convulsions, diarrhoea, pre-mature birth, and atrophy accounts for nearly the whole difference in the high rate of mortality in England compared with
that of Scotland. E.G.

Number of Deaths for 10 years 1861-70

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Scotland</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Convolutions, from Disease</td>
<td>108320</td>
<td>119430</td>
</tr>
<tr>
<td>From Convolutions, from Disease</td>
<td>5801</td>
<td>6156</td>
</tr>
</tbody>
</table>

The births for the same period being

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Scotland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>750000</td>
<td>1120771</td>
</tr>
</tbody>
</table>

The average annual death rate of infants in the above decade being

<table>
<thead>
<tr>
<th></th>
<th>England</th>
<th>Scotland</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Convolutions, Disease</td>
<td>27.8</td>
<td>15.9</td>
</tr>
<tr>
<td>From Convolutions, Disease</td>
<td>5.2</td>
<td>5.5</td>
</tr>
</tbody>
</table>

per 1000 Births

The cause of this high mortality

of infants in England compared

with Scotland is supposed

to be due to bad feeding.

This bad feeding again is due principally to neglect,

mismanagement, and ignorance - causes which Dr. Farr accuses
as an explanation of the high figures in the table already given. It is also seen more clearly when we compare the infant mortality in different towns taken in conjunction with the character and trade of the towns from which the returns are made, with the special object of arriving at the condition and occupations of the women.

In towns such as Sunderland, Wolverhampton, and Newcastle on Tyne, where the iron and coal industries are carried on, and where early mariners are in excess, we find the mean number of deaths under the three specified causes to be 89.2. See Table 20.1.

In the hardware towns such as Sheffield and Birmingham, where few
Women are employed in factories, we find the mean to be 80.7.

But in such towns as Oldham, Norwich, Salford, Nottingham, Leeds, Liverpool, and Manchester, where the women are more or less employed away from home in the main manufacture of textile fabrics, we find the mean to be at 20 a figure as 99.9. And the probable cause of this high mortality is maternal neglect, and consequent bad feeding.

The following tables (also copied from Dr. Parre) will throw further elucidate the points under discussion and more especially the relation of the occupations of the women to the mortality of their children.
<table>
<thead>
<tr>
<th>Towns</th>
<th>Females aged 20 years &amp; upwards</th>
<th>Number engaged in</th>
<th>To every 1000 living the proportion employed in</th>
<th>Infant Mortality 1873-5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Textile</td>
<td>Household</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>Ockham</td>
<td>32843</td>
<td>11178</td>
<td>15961</td>
<td>346</td>
</tr>
<tr>
<td>Nottingham</td>
<td>27171</td>
<td>6758</td>
<td>12439</td>
<td>269</td>
</tr>
<tr>
<td>Manchester F. Salford</td>
<td>15019</td>
<td>22750</td>
<td>81245</td>
<td>152</td>
</tr>
<tr>
<td>Leicester</td>
<td>27677</td>
<td>3368</td>
<td>15017</td>
<td>122</td>
</tr>
<tr>
<td>Leeds</td>
<td>72719</td>
<td>6776</td>
<td>47873</td>
<td>93</td>
</tr>
<tr>
<td>Norwich</td>
<td>25884</td>
<td>1478</td>
<td>13847</td>
<td>58</td>
</tr>
<tr>
<td>Portsmouth</td>
<td>31504</td>
<td>21460</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>London</td>
<td>1032419</td>
<td>585576</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Causes of Death</td>
<td>Mean Death Rate per 1000 in 15 Towns</td>
<td>Death Rate per 1000</td>
<td>The 7. Eerste Manufacturing Town</td>
<td>See Table Note II</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------</td>
<td>---------------------</td>
<td>----------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>All Causes</td>
<td>185.3</td>
<td>157.1</td>
<td>194.0</td>
<td>+34.9</td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>2.9</td>
<td>3.1</td>
<td>3.2</td>
<td>+0.1</td>
</tr>
<tr>
<td>Whooping Cough</td>
<td>1.8</td>
<td>1.1</td>
<td>1.6</td>
<td>+0.5</td>
</tr>
<tr>
<td>Influenza</td>
<td>6.7</td>
<td>8.3</td>
<td>6.4</td>
<td>-1.9</td>
</tr>
<tr>
<td>Measles</td>
<td>3.0</td>
<td>3.6</td>
<td>3.2</td>
<td>-0.4</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>29.3</td>
<td>28.4</td>
<td>31.9</td>
<td>+11.5</td>
</tr>
<tr>
<td>Convulsions</td>
<td>26.9</td>
<td>18.5</td>
<td>27.4</td>
<td>+8.9</td>
</tr>
<tr>
<td>Lung Diseases</td>
<td>29.3</td>
<td>31.9</td>
<td>28.1</td>
<td>-3.8</td>
</tr>
<tr>
<td>Tubercular Pneumonia</td>
<td>10.4</td>
<td>13.8</td>
<td>10.5</td>
<td>-3.3</td>
</tr>
<tr>
<td>Astrophy</td>
<td>34.8</td>
<td>20.5</td>
<td>40.9</td>
<td>+20.4</td>
</tr>
<tr>
<td>Premature Birth</td>
<td>12.4</td>
<td>10.4</td>
<td>13.8</td>
<td>+3.4</td>
</tr>
<tr>
<td>Suffocation</td>
<td>2.0</td>
<td>4.0</td>
<td>0.5</td>
<td>-3.5</td>
</tr>
</tbody>
</table>

24.
Chapter II

Among special aspects as viewed from the access of one individual town and practice.

Taking the Report of the Registrar-General for the year 1885 we find that the total deaths of children under one year of age to 1000 births in the town of Derby is 150. This as compared with Preston 233, Blackburn 209, and Nottingham 180, places Derby in a most favourable position. Bristol alone having a lower rate 149.

It is interesting to note that in a pamphlet printed by Dr. Rigby on the causes of high death-rate in Preston, Dr. Rigby ascribes a large proportion of the deaths to the fact that the mother's work in mills, and as a

25
consequence, bringing forth, and
rear, indifferently, a puny
and drunken offspring.)
In taking the mortality in
my own practice I find, that
during the last five years
102 children under one year
of age have died from all
causes, and of these, 51,
or exactly one half, come
under the heads of Diarrhoea,
(not including that form
prevalent in the summer)
Convulsions, and Atrophy.
The proportion being-
Diarrhoea 12. Convulsions 16
and Atrophy 23. The deaths
from Atrophy numbering nearly
as many as those from
Diarrhoea and Convulsions
Combined. These too, are cases
in which an improper
Dietary has been employed
or where neglect and mis-
management have been
evident. But, as has already been indicated, the town of Derby, and especially the district in which these observations were made, is not one in which any textile manufacture forms the staple trade of the town, and, as a consequence, comparatively few married women are found attending factories and so neglecting their infants; hence neglect is not so much a factor in this case as the employment of improper food. This I have proved to be the case in by far the majority of those deaths especially coming under the head of Atrophy. Almost every case has a similar history. The mother, or her friends, suppose that the breast milk is not satisfying enough, and hence recourse is had to food of other kinds, the
Chapter III

Reasons for the Considerations already advanced in Chapter 1 + 2. We have already presumed that the chief causes of this excessive death-rate come under the heads of Convulsions, Diarrhea, and Asthenpy, and that the most common exciting causes of these again are the employment of improper and insufficient Food.

This arises from the deficient knowledge of the methods of bringing up children; the natural food being either insufficient in quantity or perverted in quality, or the employment of articles which are unsuited for infantile Digestion.
1. The natural food may be insufficient in quantity or
  improper in quality.
  This may be due to causes operating during the period of
  intra-uterine nutrition whereby the
  fetus is badly nourished, and
  that too at a time when developmental
  changes are taking place of
  such an important nature. The
  foundation, as it were, of the
  whole superstructure being then
  laid.
  This deficiency or defective
  intra-uterine nutrition may arise
  from-
  (a) The debility of the mother
  This may arise apart from any
  actual disease but may be in its
  turn the result of malnutrition
  in her early life.
  (b) National insanities, of
  which the chief may be alcoholic
  excess and the almost equally
  pernicious habit of excessive
Sea drinking.

(5) Bad Hygiene surroundings, and a bad and deficient diet or irregular meals of inferior nutritive power. These all reduce alike the health of the mother and the Fetus.

These same factors in the same mother are still in operation after the birth of the Child, and it is more particularly with this period that we would wish to deal.

The Mammary secretion, and consequent nourishment of the Child is still affected by the same causes which were operating during the intrauterine period. It is plain that many Children are born, already in a delicate condition suffering from a defective development owing to this inferior prenatal nutrition. These Children, from the first, have neither the power of assimilating food, nor is the food supplied of a good or
beneficial quality. These children often die early—sometimes lingering on for a few weeks, or perhaps a few months, but never making any growth; their condition being from the first a retrogressive one.

Ignorance and neglect, often accelerate this, for in many cases proper means are not taken, either through poverty or indifference; (or, as in the case of such destitute manufacturing towns as Nottingham, where the mothers are employed all the day away from home) to bring up the infant with properly-prepared substitutes for the mother's milk. Among the working-classes the best of all substitutes—a good wet nurse—is as a rule impossible to be obtained, while, with reference to other preparations, such, for instance, as that recommended
by Dr. Franklin, are too elaborate
to reduce them to carry it out.
That indiscretions in the diet
of a suckling woman affects
the condition and quality of
the milk secreted, is a fact
attested by daily experience.

It is true that some women
may seem to be able to indulge
in a most indiscriminate form
of diet, not only while pregnant,
but also during the lactation
period without any very
apparent serious detriment
to the fetus or child, but
such indiscretions must, and
in fact, do, greatly interfere
with true nutrition in the
majority of cases. It is well
known that many women are
compelled to restrict their diet
when nursing, to certain classes
of food, for the reason that
experience has taught them
that certain forms of diet
produce palpable and readily demonstrated disorders upon the child, bringing on violent attacks of pain, followed by motions of an altered character. These cases are easily recognized and the necessary corrections at once effected. But there are also cases of this class where no such self-evident relation exists between cause and effect, where, upon inquiry, the child does not appear to suffer directly, or in a noticeable manner from the milk of the mother, and where the milk also appears to be plentiful, and good in quality, but still the child seems to be wasting, the motions are green, and of a peculiar character and constiency, and no remedies are able to alter the condition of things. One of many cases
will illustrate this.

C. C. was a well-nourished child at birth. The parents were both healthy, the mother especially so, the milk was plentiful and of good quality, the child thrived for the first two months on the breast milk but it seemed rather suddenly to take on an atrophic condition, nutrition seemed to be arrested, the motions became altered in character, and the general condition became one of wasting and malnutrition.

The usual remedies were tried to restore the stomach and intestines to their normal condition. The milk seemed good and plentiful, there was no special discomfort after the ingestion of the milk, but still the child failed to benefit by it.

This state of things persisted...
until it was found that
the mother was very fond
of "Blackberries," and had
been indulging in pies made
of that fruit. This diet was
discontinued and, almost
at once, the child improved
in condition and speedily
regained its former weight
and character. Not only
as indigestions of this nature
affect the whole system, by
causing atrophy, but diarrhoea
re-appears in many cases, the
undigestible food acting as
an irritant in the intestines.
Convulsions too, from a similar
cause — the presence of irritant
matter in the stomach and
bowels — are often onset with.
These causes, combined often
with bad hygienic surroundings,
make it a marvel, not that so
many, but that there are not
more, who succumb to these
Deleterious influences
2. Where the milk may be good
both in quality and quantity,
or it may be otherwise, but where
suckling is too frequent or where
there is over-suckling.
Here again we find the same
causes at work: that Convolusions
Diarhoea and Atrophy begin
largely as the result of these
habits.
The practice of suckling,
without any attention to the
length of interval between the
periods, is one almost as
pernicious as that of using
improper artificial food.
The mother uses the breast
not only as the means for
nourishing the infant, but
also as a means for stilling
the child's cry, a cry which
is often due already to some
disturbance in the stomach.
The almost constant, or too
frequent admission of fresh supplies of food into the stomach (as would be the case in an adult) brings on infantile indigestion, an undue acidity becomes manifest, and constipation is set up, first in the stomach, which is indicated by a frequent and persistent vomiting, then in the intestines, as is evidenced by the occurrence of a catarrhal condition, bringing on diarrhoea.

3. It is however when we come to consider the question of the employment of artificial foods, more especially of the starchy class, that we find the connection between these, and the fatality among infants the most conclusive.

We have it on the authority of Hibig that the usual farinaceous foods given to infants are the cause of most of these.
diseases and half their deaths. These deaths we have already
remarked come chiefly under
the heads of Convulsions, Deformity
and Atrophy.
If we inquire a little more
closely into these three points,
we shall be able to state
as unequivocally in each case
as that of Leibey in speaking
more generally.
(a) Convulsions,
we find on referring
to Table 1 that in period
births die from Convulsions. This
may, and no doubt, does, include
Convulsions from other causes
than that under discussion
but we must note that very
most of the cases certified under
this head as other cause was
assigned whereas such a
cause as 'Drowning' a very
prolific source of Convulsions
is accounted for in other columns.
we have also the statement of D. Parce lire comparing the
death-rate of infants in Scotland
and England that the chief
causes of the difference are
convulsions and diarrhoea, and
that these are accounted for
by Bad feeding.

Irouseau, (Vol. p. 344) in speaking
of the causes of convulsions, says,
"Indigestion is one of their
most frequent causes. Whether
due to too excess in the quantity
of food as when the child is
given, too much milk which
is good in all respects, or,
whether it is the consequence
of the use of coarse food
which is not adapted to
the age; the digestive capabilities,
and the individual disposition
of the child; as when infants
at the breast are fed at too
early an age on thick
panadas, on haroits, on
Culitis or on Potatoes..."

"The timely administration
of an emetic and of a purgative
enema has been known to stop
Convulsions due to embarrassment
of the intestines."

This is amply confirmed
in general practice by all
who care to pay any attention
to this matter. The general
answer to the question "How
is the Child fed?" being "on
bread and milk or brandy
(water under the impression that-
cows milk is incompatible
with breast milk, when
the Child is also suckled)
"Arrowroot," or "with bits from
what we eat ourselves."

The wonder is that more
do not succumb to this
treatment by an attack of
Convulsions, before there is
time for the more chronic
affections: diarrhoea and atrophy.
to certain. It is nevertheless, the fact that many children do withstand the immediate fatal results of this method of dieting, and it is thus that we find even a still greater number fall victims under the head of—

(b) Diarrhoea.

In indigestible food, not having acted so intensely upon the nervous system as to produce convulsions, the continued passage along the bowels of undigested matter must be a source of constant irritation to the mucous membrane, and thereby set up a catarrhal condition, which, in time, ends in diarrhoea.

This may happen from the earliest period of the life of the infant, for in many cases, children are fed upon a most heterogeneous diet from
birth, but more commonly, does this occur, when, after a few months feeding at the breast, the mother, either rightly or wrongly, is under the impression that her milk is not satisfying enough, and she has recourse to artificial food as an adjunct to the breast milk. The evil does not lie in the employment of artificial food per se, but in the form of food used—too often of a pharmacological nature.

Dr. Dave, medical officer of health for Brighton [with his presidential address in the Section of Public Medicine—Annual Meeting of the British Medical Association, Aug. 1861] gives some interesting statistics on this question—

of 582 deaths from diarrhoea at all ages recorded by him in 7 years, 433 were of children under one year of these 392
Children were fed more or less artificially. 126 dying under 3 months, 207 between 3 and under 8 months, 39 between 8 and under 10 months and 20 between 10 and 12 months.

"From these facts," says Dr. D'Arcy, "it may be deduced that improper feeding and improper nursing, even when mothers nurse their children, are unmistakably the principal causes of infantile mortality from diarrhoea. This too is the case after excluding that form of diarrhoea prevalent in the summer months, which I have endeavoured to do in compiling my own statistics."

(E) These are, however, a still larger number of infants, who, not being carried off by the more acute methods of convulsions or diarrhoea, still, being under the same conditions, succumbed to the effects of an improper diet, through atrophy.
Returning again to Table No. 1, we find that under this head, the mean mortality is 34.8 ranging in individual towns from 63.0 in Norwich, and 50.7 in Leicester, to 22.7 in Portsmouth. Here then, we have one of the most important causes of the enormous death-rate among infants. It may arise from the various causes already enumerated, as where the mother's milk is alone employed, but is in insufficient quantity, or where quantity is equal to the demand but the quality is deficient, or again where both quantity and quality are good, but the method of suckling be at fault, where the child is applied to the breast each time it cries. In many cases, a sufficient time not elapsing for the previous meal to be digested. In this way, the...
Digestive functions are being constantly employed; with the result, that irritation, derangement, diarrhoea and atrophy are set up; this too, being aggravated by the mother herself whose milk speedily deteriorates, by the constant drain made upon the mammary glands.

In addition to these causes, there is of course the frequent employment of artificial food already noted.

It is important for perfect nutrition that tissue-change should be rapid and thus especially the case in young children, in whom development and growth are so marked. Dr. Ernest Smith (p 20. W. v. de. Diseases of Children) on this point remarks "In rapid change it is indispensible that no recoupees impediment should exist to the free exhalation of
the tissues, ....... Starches, and sugars into which the starches are converted by digestion, have a greater affinity for oxygen than albuminuricums; they therefore tend to approximate the oxygen which is required for the removal of waste materials, and so prevent the proper changes from taking place for this reason alone...

.... they form a very unwholesome diet for a young child."

But, in addition to this we have already seen that there is inability on the part of the digestive organs, of a young child to assimilate these materials. Hence, cases of steady emaciation will constantly be found to be due to these methods. Some children are fed, even from birth, with foods of the starchy class, and as a

46
Consequence, many soon die, or if purchased they are of a particularly robust constitution, they may linger on in a weakly and sickly condition until some intercurrent disease carries them off.

The symptoms, in most cases, are very similar, commencing with evidences of discomfort on the part of the child, owing to the indigestibility of the food. The stomach, failing to make use of this food, gets rid of part by vomiting, hence, we, in most cases, find sickness, the vomited matter being sour and offensive. This being accompanied by vomit, and audible eructations; while some of the food is got rid of in this way, some passes into the intestines and this becomes putrid, as is proved by the offensive evacuations these too.
are characteristic for they consist of large and solid white masses, or else there may be a condition of diarrhoea, in which we find a green putty-like matter coming away, mixed with profuse watery discharge. Under these conditions the body wastes rapidly, every organ of the body being called upon to supply the elements essential to the maintenance of life, which ought to be supplied in a proper food until the supply can no longer be forthcoming, then death from starvation is the result.

Many cases of this kind, are classed under the head of Tuberculosis or Consumption of the Bowels but, though many points are in common between the two diseases, yet a careful examination will enable us to discriminate a marked
difference, both in the onset, and in the progress of the disease. Even granting however, that a full and true return has been made of the deaths from Atrophia pure and simple the percentage is excessively large.

In conclusion, it remains only to enquire into the methods that may be adopted to reduce this large death rate.

To sum up:

Some of the chief causes are due to:

(a) Ignorance on the part of the mother, both as regards the management of her own health during pregnancy and during the lactation period, and also of the method of feeding the infant, either with breast milk or where it is necessary to employ some artificial form of diet.
(6.) Neglect, too, comes in as one of the chief factors, as does also the fact that in many textile manufacturing towns the workers are away from home all day.

As will be gathered from the foregoing pages, the chief causes lie not in the domain of therapeutics proper but, rather, in the region of preventible remedies.

Most, if not all, of the cases shown by malarial, and thereby prevented, before requiring the aid of the physician.

The remedy, therefore, is in my opinion chiefly of an educational character, and it is only the physician who can effect this education. It should be his care when attending any children, to inquire particularly into
The mode, and form, of diet employed, and where there is any irregularity in this respect, to lay down a few simple rules for the guidance of the mother, and to explain to her the reasons for adopting, and the serious consequences likely to ensue if these rules are neglected. Further, it is good practice, when engaged by a patient for attendance in an approaching confinement, to give her a few hints as to her own diet and behaviour, and likewise, after the child is born, to enquire carefully into the condition of the milk, its amount, and its effect upon the child, and advise the mother or nurse, if the child beuckled, as to the frequency which the child should be applied to the
feed, or, if there be absence or deficient quantity of breast milk advise as to the best substitute in each particular case, and endeavour that these hints thence be carried out.

In the case of towns where many mothers are employed away from home or else should be established, proceeded over by intelligent nurses, who have had special training in the methods of rearing hand-fed children.

I have found that these simple hints and methods have borne much good fruit in my own practice. It requires an amount of patience to break down old traditions and prejudices which are so persistently in favour of constant suckling, or artificial.
feeding, but it only requires perseverance, stimulated by the knowledge that by insisting on these primary principles many a life may be saved, and many a child who would otherwise grow up weakly and ill-conditioned only to reproduce his species in a still more weakly condition, and so perpetuate a race ill-fitted to sustain the battle of life—well emerge from infancy, with a strong constitution, and able to take his place among his fellows.

These are considerations which should encourage all medical practitioners, even though at some expenditure of time and trouble to forward a good work which lies at the very foundation of the health of a Nation.
List of Authorities Quoted or Consulted

"The Theory and Practice of Medicine" - Bostowe.

"Clinical Medicine" - Ironscaum.


"Food and Diætes" - Payy.

"Lectures on Diætes" - Roberts.

"The Diseases of Infancy, & Childhood" - West.


"Vital Statistics" - Farre.

"Food for Infants" - Liebey.

"Dictionary of Medicine" - Quinn.
Notes on Lectures on Physiology
Session 1878-79. Prof. Rutherford

Notes on Lectures on Midwifery and the Diseases of Children - Session 1880-81
Professor Simpson

Notes on Lectures on Practice of Physic
Session 1880-81. - Prof. Struan Stewart

Registrar Generals Reports

British Medical Journals.

"The Science and Practice of Midwifery"
Playfair