THE LIMIT OF USEFULNESS OF INFECTIOUS HOSPITALS.

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This title forms at present a much debated subject. One may almost say the trend of professional opinion is towards the conclusion that the usefulness of infectious hospitals is not commensurate with their cost. That may possibly be, but I think the explanation is that too much in the way of stamping out disease was expected from them.

There are certain diseases in which the utility of isolation hospitals is not questioned, such as small-pox, cholera, plague and, up till recently, yellow fever. In these, for the sake of others, isolation is most desirable. Diphtheria is a disease which in this country is usually transferred to an infectious hospital if one is available. I am not sure that this is really necessary, though in cases occurring amid insanitary surroundings it may be an advantage to the individual. But as a rule it is not the diagnosed and notified case of diphtheria that spreads the disease, so much as the undetected scarcely ailing child of school age whose faucies are full of bacilli whilst it mixes freely with its playmates at school. I think cases of diagnosed diphtheria can, if desired, be sufficiently isolated in most homes.

The question of the utility of infectious hospitals, however, turns mainly on the effect, if any, they have had in lessening the spread of scarlet fever, and to this question my remarks will chiefly apply. Isolation in hospital has certain distinct disadvantages in this disease, some of which are unavoidable. For instance, isolation in infectious hospitals under the system usually met with is simply "aggregation," often very much to the detriment of a slight case. There is a distinct liability for the individual sent to hospital to contract infectious diseases other than that for which he was admitted. Cases that have been isolated in hospital far more frequently give rise to what are known as "return" cases than those isolated at home. There are great difficulties in connection with "doubtful" cases sent to hospital and those which have been wrongly diagnosed. Better administration may minimise some of these, but always at greater expense.

Even such disadvantages might be tolerated if we were able to
show that in spite of them, by isolation in hospital we were able to diminish the sum total of scarlet fever amongst our population. But it is said that we cannot do this, that, on the contrary, if we compare any two districts in the United Kingdom in one of which isolation hospitals are available and are used for the majority of cases of scarlet fever, and in the other, there being no isolation hospital available, cases of the disease are treated at home, we shall find that instead of being lessened, more often than not the annual attack rate per 1,000 of the population is slightly higher in the districts using isolation hospitals than in those without them. Such statistics (see Table A) were given by Dr. Wilson in opening the discussion on isolation hospitals at last year's meeting of the British Medical Association at Leicester, and also by Dr. O'Connor (see Table B). Dr. Killick Millard, the Medical Officer of Health for Leicester, who was one of the earliest to express his doubts as to the utility of isolation hospitals for scarlet fever, has published a series of statistics (see Table C) to show that on two occasions, in 1903 and 1904, in that town when the infectious hospital was required for small-pox and no scarlet fever could be admitted—and, what is more, on the first occasion ninety-eight cases of scarlet fever which had been admitted were suddenly returned to their homes in all stages of the disease, yet, as the result of this and the subsequent cessation of treatment in hospital, no abnormal increase of the disease could be shown. Such figures undoubtedly tend to show that isolation in hospital is a failure in stamping out the disease—is not worth the expense; and one gentleman, a paper of whose I accidentally came across, went so far as to recommend that all isolation hospitals for scarlet fever should be at once converted into sanatoria for tubercle cases.

But although we must admit that we have not succeeded in stamping out scarlet fever by isolation, perhaps we may say that the milder type of the disease so commonly seen, may in part be due to it. And in spite of the figures (statistics are often fallacious) I cannot but believe that with our increasing urban population, if in the last twenty-five years we had not largely utilised isolation hospitals, the spread of scarlet fever would have been greater. None of us will deny that scarlet fever is an infectious disease—infectious more or less throughout its course—and it seems to me to stand to reason that for every case we isolate which is not followed by a second case in the same household, we have by isolation destroyed a potential focus of the disease; so that it must be of some use. Dr. W. N. Barlow gives some instructive
CORRECTION.

In the Table on page 543, Vol. VI., April Number, under the heading “Number of houses where further cases occurred,” for the figures “121” substitute “12.”
figures from Bootle of cases treated at home and cases removed to hospital, and the results in secondary cases:

<table>
<thead>
<tr>
<th></th>
<th>Number of cases</th>
<th>Houses infected</th>
<th>Number of houses where further cases occurred</th>
<th>Percentage of houses in which second cases occurred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home cases</td>
<td>133</td>
<td>91</td>
<td>25</td>
<td>27.4</td>
</tr>
<tr>
<td>Cases removed to hospital</td>
<td>220</td>
<td>187</td>
<td>121</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Granting that isolation hospitals have failed to a certain extent in stamping out scarlet fever, in my opinion this is chiefly due to the etiology of the disease not being completely understood.

Scarlet fever may be said to spread in two distinct ways: (1) By direct infection to other persons in close contact, i.e., the other inmates of an infected house; (2) in some indirect manner not yet properly understood. In this second class are included all those untraced cases of scarlet fever which I believe one is correct in saying constitute the great majority of the cases of this disease occurring in urban districts. These untraced cases are usually considered as having been infected by "slight unrecognised cases," or contracted in some public building or conveyance. Possibly this is the true explanation of many, but there are such numbers of these "sporadic" or de novo cases, that I have always felt that the above explanation is insufficient.

Dr. Millard, in one of his papers, says "that probably there are still other causes of which as yet we have no knowledge," but he does not attempt to indicate any.

I would wish to suggest one which, if true, may explain the constant occurrence of sporadic, untraceable cases of scarlet fever amongst our urban population, in spite of all we try to do by isolation; and it would also explain how it is that isolation fails. In the two causes for the spread of scarlet fever given above no mention is made of the causation of the disease by milk. And yet no one, I suppose, would deny that there is such a thing as a milk epidemic. But where the milk supply is the origin of an outbreak it may produce it in two ways: (1) By the milk having become contaminated with the poison of scarlet fever from a pre-existing case; (2) by the introduction of the poison direct from the cow giving the milk, the animal at the time suffering from a constitutional disease, which, besides producing visceral lesions, causes local manifestations in the shape of inflammation and ulceration of the udder and teats. There are now several authenticated
instances of outbreaks due to this second cause in which contamination of the milk from a pre-existing case of human scarlet fever could be absolutely excluded, for example, the outbreak in Marylebone in 1885, where the disease was traced to a milk supply coming from a dairy farm at Hendon in which were several cows suffering from this form of disease, and from which all contact with pre-existing human scarlet fever could be excluded. There have been several other instances, as at Oxford, in Glasgow, and in Camberwell, South London. Two isolated cases in the family of a Staff Officer in Jamaica, West Indies, occurred in my experience, when there was no scarlet fever in the island. The family (there were only these two children) were living far from any one else in the hills; there was no possible explanation of the disease to my mind till the father happened to inform me that in order to provide the children with fresh milk he had recently bought two cows which had only lately been imported into the island from the States. I carefully examined these cows, and one of them certainly had some form of desquamating skin disease of the udder.

It is said that we do not know the micro-organism causing scarlet fever. On the other hand, Dr. Klein—who investigated the Hendon outbreak—says he does; the Streptococcus scarlatinae of this observer obtained from the skin and blood of human scarlet fever produced general infection when inoculated into calves and mice, and the same Streptococcus was recovered from them on cultivation. Further, six milch cows inoculated with this Streptococcus obtained from human sources reproduced the typical symptoms of the Hendon disease in the cows, as the result of the inoculation. Gordon’s researches confirm those of Klein, and he claims that by culture experiments he is able to differentiate it (S. scarlatinae) from the Streptococcus pyogenes.

It may be urged that these facts indicate a prima facie case against milk in the causation of scarlet fever without the intervention of contamination from human sources.

If this be so, the question of the usefulness of infectious hospitals in stamping out scarlet fever turns upon the point whether this disease, as we know it in English towns, is chiefly spread by infection from sick to healthy, or in a way hitherto not sufficiently suspected or understood, as, for instance, drinking unboiled milk. Amongst the characteristics of milk scarlatina are: it is not very communicable from person to person; its incidence is heavier on children, women and young adults; the epidemics are mild and have
a low case mortality. All points which are true of the disease at the present time.

I would venture to suggest that where an epidemic outbreak of scarlet fever occurs, due to the milk supply, it is epidemic because the virulence of the infection present in the milk was more than ordinarily potent or more concentrated than usual. But the ordinary milk supply of a large town is, as we know, a heterogeneous mixture from various sources, and I would contend that quite possibly—even probably—the poison of scarlet fever derived from bovine sources is very frequently present in it in minute quantity. Granting this, there are two possible explanations of the frequent occurrence of sporadic cases of the disease amongst our urban population rather than an epidemic outbreak, viz.: (1) The existence of the poison in the milk supply in a very dilute condition and perhaps not in all samples; and (2) the question of the susceptibility of the individual. I mean, that the poison of the disease in this dilute condition is only capable of causing an attack, and that, a mild form, in persons who are unusually susceptible and at a particularly susceptible age, viz., the age period in children from 5 to 10.

Whether the suggestion I have made as to the more frequent causation of cases of scarlet fever from bovine sources than has been generally supposed is true or not, I feel convinced that there must be some other factor at work besides infection from person to person, to account for the continued failure of our methods of isolation, disinfection, &c., in lessening the spread of the disease. I cannot but think that the milk supply, from what we know of it, in some way or other, is likely to furnish this cause.

In opposition to isolation, except for imported cases, I should like to be able to try, in any given district with a large urban population, the compulsory sterilisation of all milk before it left the dairy. I am certain that in households where it is the rule to sterilise or boil the milk as soon as it is received, there is a much smaller incidence of infectious disease.

The slightly greater incidence of scarlet fever shown in Drs. Wilson and O'Connor's statistics for districts using isolation hospitals over those in which they were not available, might be explained by the fact that in the districts which have isolation hospitals the population is more distinctly urban in character, and in such a district the milk supply is a mixture from a variety of sources, and hence more likely to contain the infection than the supplies of a more widely scattered population.
The isolation of scarlet fever has its uses: except in return cases it limits the spread of the disease from person to person, and in some cases it is beneficial to the individual to be removed from insanitary surroundings and treated in a hospital. That, I fear, is the extent of its usefulness, and for that, it is a very expensive remedy. I do not believe that it will ever eradicate the disease in the way, for instance, that rabies was stamped out, for as I have already said, I am convinced that scarlet fever has, whatever the avenue may be, some other line of attack. The facts seem to point to this being the milk supply. In this connection, why is it that on the Continent scarlet fever is so much less frequent? May not this be due to the habit of the population—in France and Germany—namely, drinking all their milk hot after it has been scalded?

I would not give up isolation, even with all its expense, at least at present, we should only be confusing ourselves by adding another possible cause for the propagation of the disease; but I would pay more attention to the milk supply both at its source and on its entry into the household. As an example, the recent notable discovery of the propagation of Malta fever through goats' milk, the chief milk supply of the island, will be remembered. How much work was necessary before this was established, and how much doubt and uncertainty previously existed as to the main avenues by which this disease was spread.

### TABLE A.

**Dr. George Wilson's Statistics.**

(Collated from the Annual Reports for 1902-4.)

**Mid-Warwickshire Combined Districts' Statistics.**

<table>
<thead>
<tr>
<th></th>
<th>Mean Annual Population</th>
<th>Average Annual Rate of Admissions per 1,000 of Population</th>
<th>Total Number of Admissions in 1904</th>
<th>Percentage of Admissions to Cases Noted</th>
<th>Total Number of Deaths, 1904</th>
<th>Average Annual Rate of Cases Noted per 1,000 Population</th>
<th>Average Annual Rate of Cases Noted per 100,000 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Districts with hospitals</strong></td>
<td>82,020</td>
<td>4.96</td>
<td>803</td>
<td>1,222</td>
<td>65</td>
<td>23</td>
<td>0.003</td>
</tr>
<tr>
<td><strong>Districts without hospitals</strong></td>
<td>57,610</td>
<td>4.80</td>
<td>831</td>
<td>14</td>
<td>14</td>
<td>0.081</td>
<td>1.68</td>
</tr>
</tbody>
</table>
### TABLE B.
**Dr. J. E. O'Connor's Statistics.**
Leicestershire and Rutland Combined Sanitary Districts.

<table>
<thead>
<tr>
<th>Group</th>
<th>Population</th>
<th>Notified cases</th>
<th>Removed to hospital</th>
<th>Percentage removed to hospital</th>
<th>Attack rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I., where isolation hospitals were available</td>
<td>6,862</td>
<td>372</td>
<td>245</td>
<td>66</td>
<td>6.2</td>
</tr>
<tr>
<td>Group II., isolated at home—hospitals as a rule not available</td>
<td>7,060</td>
<td>182</td>
<td>26</td>
<td>14</td>
<td>2.8</td>
</tr>
</tbody>
</table>

### TABLE C.
**Dr. Killack Millard's Statistics.**
Leicester.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of infected houses</th>
<th>Number of houses in which the spread occurred</th>
<th>Number of secondary cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1903—January 29th to July 30th 1904—March 28th to June 30th</td>
<td>241</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>(During both these periods all cases of scarlet fever treated at home)</td>
<td>44</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

These figures show no abnormal increase as compared with periods when the hospital was available and isolation in hospital carried out.

Total: 285 26 31