

Memorandum by Dr R.J. Reece, as to questions raised by Dr Hope regarding his Report on smallpox and smallpox hospitals at Liverpool 1902-03 / (sgd) Richard J. Reece, 6th July, 1905.

Contributors

Reece, Richard James, 1862-1924.
Great Britain. Local Government Board.
Liverpool (England)
London School of Hygiene and Tropical Medicine

Publication/Creation

1905.

Persistent URL

<https://wellcomecollection.org/works/sfgr7k5t>

Provider

London School of Hygiene and Tropical Medicine

License and attribution

This material has been provided by This material has been provided by London School of Hygiene & Tropical Medicine Library & Archives Service. The original may be consulted at London School of Hygiene & Tropical Medicine Library & Archives Service. where the originals may be consulted. Conditions of use: it is possible this item is protected by copyright and/or related rights. You are free to use this item in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s).

**wellcome
collection**

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

successful in preventing the spread of the disease from
them by other means.

An opinion has sometimes been expressed by those
engaged in public health work, that the Medical Department
MEMORANDUM by Dr R. J. Reece, as to questions raised by
Dr Hope regarding his Report on Smallpox and
Smallpox Hospitals at Liverpool 1902-03.

At the desire of the Board I submit comments on
the observations of the Medical Officer of Health upon my
Report to the Local Government Board on Smallpox and
Smallpox Hospitals at Liverpool 1902-03.

Dr Hope in his Report to the Liverpool Corporation
on "The recent outbreak of smallpox in Liverpool" dated
31st December, 1903, stated (p. 28):- "Until within recent

"years there was an impression that a Smallpox
"hospital, however well conducted, must necessarily
"be a source of infection to the district in which
"it is situated, owing to what is known as aerial
"convection, i.e. conveyance of infection for
"prolonged distances through the atmosphere. It is
"important, therefore, that the experience of the
"Liverpool hospitals in this respect should be borne in
"mind, because it shows that in strictly disciplined
"institutions placed as these hospitals are, no
"danger arises from this source."

And in February, 1904, Dr Hope tendered evidence in
a Court of Law to the same effect.

Thus Dr Hope had already, before my inquiries
were begun, denied the existence of spread of smallpox round
Liverpool hospitals due to aerial convection, and had also
stated that the administration of the hospitals had been

MEMORANDUM by Dr. R. J. Hoop, as to questions raised by
Dr. Hoop regarding his report on Liverpool and
Liverpool Hospitals at Liverpool 1902-03.

At the behest of the Board I submit comments on
the observations of the Medical Officer of Health upon my
Report to the Local Government Board on Liverpool and
Liverpool Hospitals at Liverpool 1902-03.

Dr. Hoop in his Report to the Liverpool Corporation
on "The recent outbreak of measles in Liverpool" dated
21st December, 1903, stated (p. 28) -- "Until within recent
years there was an impression that a measles
hospital, however well conducted, was necessarily
"as a source of infection to the district in which
"it is situated, owing to what is known as aerial
"convection, i. e. conveyance of infection by
"prolonged distances through the atmosphere. It is
"important, therefore, that the experience of the
"Liverpool hospitals in this respect should be borne in
"mind, because it shows that in strictly disinfecting
"institutions placed on these hospitals are, no
"danger arises from this source."

And in February, 1904, Dr. Hoop furnished evidence in
a Court of law to the same effect.

Thus Dr. Hoop had already, before my inquiries
were begun, denied the existence of spread of measles round
Liverpool hospitals due to aerial convection, and had also
stated that the administration of the hospitals had been

successful in preventing the spread of the disease from them by other means.

An opinion has sometimes been expressed by those engaged in public health work, that the Medical Department of the Local Government Board should investigate the circumstances of a case in which it is believed that a hospital situated in a populous district and used for the reception of acute smallpox patients during a considerable epidemic, has exerted no adverse influence on the population in its neighbourhood. The Liverpool epidemic of 1902-03, in view of the statement above quoted, seemed to offer such a case; but the first requisite was knowledge of the facts. It was into the facts that I was instructed to inquire, and in particular whether there had been any excess of incidence, as regards smallpox invasion, upon houses situated around the several Liverpool hospitals which had been used for smallpox, during the periods in which those hospitals received smallpox patients.

The result of my inquiry is set forth in my Report. By the publication of the facts obtained by my inquiry, Dr Hope appears to have been placed in the position of having to accept my conclusions as to the existence of "hospital influence" in Liverpool unfavourable to the health of that City, and acknowledge that he had been hasty in 1903, or of attempting to explain away the facts established by my Inquiry, so as to justify in some measure statements in his Report of December, 1903. It is necessary to point out that he had not worked out prior to the publication of that Report the data which were absolutely essential before any pronouncement could properly be made on the question of hospital influence. I have now supplied these data, and Dr Hope cannot find fault with my facts, for my report is little else than a collection and an ordering of facts which

essential in preventing the spread of the disease from
them by other means.

An opinion has sometimes been expressed by those
engaged in public health work, that the Medical Department
of the Local Government Board should investigate the circumstances
of a case in which it is believed that a hospital
situated in a populous district and used for the reception
of acute infectious patients during a contagious epidemic,
has exerted an adverse influence on the population in its
neighborhood. The Liverpool epidemic of 1902-03, in view
of the statement above quoted, seemed to offer such a case;
but the first requisite was knowledge of the facts. It was
into the facts that I was entrusted to inquire, and in
pursuing whether there had been any excess of incidence,
as regards infectious invasion, upon houses situated around
the several Liverpool hospitals which had been used for
infectious patients during the periods in which these hospitals re-
ceived infectious patients.

The result of my inquiry is set forth in my report.
By the publication of the facts obtained by my inquiry,
Dr Hope appears to have been placed in the position of
having to accept my conclusions as to the existence of
"hospital influence" in Liverpool attributable to the health
of that city, and acknowledges that he had been hasty in 1902
or of attempting to explain away the facts established by
my inquiry, so as to justify in some measure statements in
his Report of December, 1902. It is necessary to point out
that he had not worked out prior to the publication of that
Report the data which were absolutely essential before any
pronouncement could properly be made on the question of
hospital influence. I have now supplied these data, and
Dr Hope cannot find fault with my facts, for my report is
little else than a collection and an ordering of facts which

3. The conclusions in the Report are based
were supplied me by Liverpool officials. geographical
Dr Hope's position would have been stronger, in
my judgment, if he had frankly admitted that a series of
important facts had been obtained which were not before him
two years ago. Many of his present observations, it appears
to me, go wide of the main issues involved. It is beside
the mark, for instance, to suggest, without warrant, that I
accuse the Liverpool Hospitals Committee of negligence; that
I "complain" of various things; that there is a difference
of opinion between my official Chief and myself, and that I
condemn the Fazakerley Hospital site for the treatment of
smallpox. And on the main question, Dr Hope has, I think,
failed to reconcile the facts of my report with the view that
none of the Liverpool hospitals exerted an adverse in-
fluence on their neighbourhoods, either by aerial convection
of smallpox or by hospital maladministration. To this I
revert below.

It will be convenient now to refer to the 10
numbered "conclusions" attached to Dr Hope's "Observations."

"Conclusions."

1. On the whole the observations of Dr Reece
relating to the administrative arrangements are indica-
tive of an absence of practical acquaintance with the
sanitary administration of cities.

2. This is further shown by his general reflection
upon the supervision of the whole of the City Hospitals;
but in this latter case he might with but little trouble
have visited these institutions, or at least, by making
inquiries concerning them, have made himself acquainted
with the methods of their supervision.

were supplied me by Liverpool officials.

Dr Hope's position would have been stronger, in my judgment, if he had frankly admitted that a series of important facts had been obtained which were not before him two years ago. Many of his present observations, it appears to me, go wide of the main issues involved. It is beside the mark, for instance, to suggest, without warrant, that because the Liverpool Hospital Committee of negligence; that I "omit" or various things; that there is a difference of opinion between my official Chief and myself, and that I condemn the Penitentiary Hospital also for the treatment of patients. And on the main question, Dr Hope has, I think, failed to reconcile the facts of my report with the view that none of the Liverpool hospitals exerted an adverse influence on their neighborhoods, either by aerial convection of miasma or by hospital administration. To this I revert below.

It will be convenient now to refer to the so-called "conclusions" attached to Dr Hope's "Observations."

"Conclusions."

1. On the whole the observations of Dr Hope relating to the administrative arrangements are indicative of an absence of practical acquaintance with the sanitary administration of cities.
2. This is further shown by his general reflection upon the supervision of the whole of the City Hospital; but in this latter case he might with little trouble have visited these institutions, or at least, by making inquiries concerning them, have made himself acquainted with the methods of their supervision.

3. The conclusions in the Report are based altogether upon a limited aspect of the geographical distribution of the disease. No other aspect of the question has been taken into consideration, and the geographical one to only such partial extent as will enable it to invest the conclusions with an appearance of accuracy.

4. Spot maps, and tables compiled from them, are alone relied upon. The futility of basing conclusions upon spot maps and tables compiled from them alone, is illustrated by a comparison of the smallpox incidence in the Parkhill Hospital area with its incidence in the Netherfield Road Hospital area. The two cases are practically parallel so far as geographical incidence is concerned. The gradations in the incidence of the disease are remarkably similar, and as a basis of statistical argument, the case of Netherfield Road Hospital is a much stronger one than Parkhill, because the observations extend over a longer period, viz : twenty-three months as compared with six months, and relate to a considerably larger number of houses.

5. But there is no reason to assume that Netherfield Road hospital, which was not used for smallpox at all, could have been a source of smallpox infection to the neighbourhood. The presence there of smallpox was due to other causes - the same causes in fact, which gave rise to it in the neighbourhood of Parkhill.

6. In both cases the prevalence of smallpox was due to causes wholly unconnected with either hospital.

7. Referring to Priory Road hospital, the spot maps themselves lend no colour to the conclusions sought to be drawn from them. For more than an entire year the hospital was in full use, and the whole population

3. The conclusions in the report are based
altogether upon a limited aspect of the geographical
distribution of the disease. No other aspect of the
question has been taken into consideration, and the
geographical one to only a very limited extent as will
be made to follow the conclusions with an appearance
of accuracy.

4. Spot maps, and tables compiled from them
are also relied upon. The utility of being con-
clusions upon spot maps and tables compiled from them
alone, is illustrated by a comparison of the number
incidence in the Bethel Hospital area with the
incidence in the Bethel Hospital area. The
two areas are geographically parallel so far as geographical
conditions are concerned. The same conditions of the disease are generally similar, and as a basis
of statistical comparison, the case of Bethel Hospital
Hospital is a more accurate one than Bethel, because
the observation extends over a longer period, viz. 1
twenty-three months as compared with six months, and
relates to a considerably larger number of houses.

5. But there is no reason to suppose that
Bethel Hospital, which was not used for
analysis at all, could have been a source of infection
to the neighborhood. The presence there of
analysis was due to other causes - the same cause in fact,
which gave rise to it in the neighborhood of Bethel.

6. In both cases the prevalence of analysis was
due to causes wholly unconnected with either hospital.
7. Referring to Trinity Hospital, the spot maps
themselves lead no doubt to the conclusions sought.

within a quarter of a mile of it lived in entire security during that time.

8. As the site for the Fazakerley Hospital is one which the Corporation, after due deliberation and consultation with the Local Government Board, purchased for a smallpox hospital with the sanction of the Board, questions affecting its fitness for the purpose are of great importance. The cost of the Fazakerley Smallpox Hospital was about £60,000.

But it is apparent that in dealing with this hospital the gravest mistakes have been made by Dr Reece. It is quite true that a table has been constructed which would ascribe to the Fazakerley Hospital a most damaging influence upon the public health.

The allegation, however, rests on the invasion of two houses within the half-mile circle, with an increase of house invasion in the zone more distant from the hospital. In the first place, these figures are far too small to justify tabulation, and the table constitutes a use of figures which is altogether misleading and improper.

9. Neither the Local Government Board nor the Port Sanitary and Hospitals Committee could assent to the continued use of this institution if the allegations contained in Dr Reece's table are to be regarded seriously.

It does appear that the sole object sought to be served by the table is to lend colour to the preconceived view which is expressed at the outset of the Report.

The committee in its report has stated that it is of the opinion that the hospital should be maintained within a quarter of a mile of its site in order to maintain its security during that time. It is also of the opinion that the hospital should be maintained at the site for the Pennington Hospital in order that the Corporation, after the deliberation and consultation with the local Government Board, should be able to purchase for a suitable hospital with the permission of the Board, questions relating to the fitness for the purpose etc of great importance. The cost of the Pennington Hospital was about £50,000. But it is apparent that in dealing with this hospital the previous mistakes have been made by the Board. It is quite true that the Board has been concerned which would enable the Pennington Hospital to meet the requirements upon the public health. The allegation, however, made on the invasion of two houses within the half-mile circle, with an increase of houses situated in the same more distant from the hospital. In the first place, these figures are far too small to justify legislation, and the Board concludes a use of figures which is altogether misleading and improper.

8. Neither the local Government Board nor the Port Sanitary and Hospital Boards could claim to be concerned with the question of the alleged claim contained in Mr. Hoare's report and to be regarded as a matter of local concern.

It does appear that the Board should be advised by the Board as to land value to be purchased view which is expressed as the subject of the Board.

shows that The Port Sanitary and Hospitals Committee will desire to be satisfied upon this point, and will no doubt confer with the Local Government Board upon the matter.

10. The Committee will, of course appreciate that Dr Reece's Report derived its importance from the official position which he holds, and although it does not appear that the Local Government Board have adopted the Report, or have given official acceptance to it, yet no doubt must be allowed to remain as to the views of the Board and the views of the Committee in the matter.

E. W. Hope."

In the first instance I may dismiss Nos. 1 and 10. No comment is needed. As to what I state in my Report on this matter see pp. 6 and 7, where I mention certain details connected with the administration of the Liverpool Hospitals. I fail to see how a suggestion for a revision of the scheme of supervision can be construed as "suggesting negligence on the part of the Hospitals Committee of the Corporation." (Dr Hope's Observations, p. 5, para. 4). However Dr Hope admits the correctness of my statement and he himself points out "that this trouble is of old standing." (Observations p. 5, para. 2).

No. 3. My report shows the topographical distribution of the invasion by smallpox for the City of Liverpool as a whole, and for the special mile areas around each of the three Hospitals used at one and another period for the reception of acute smallpox patients. Also it shows period by period the time incidence of this house invasion. It is this latter point which is of special importance, as it

The Port Sanitary and Hospitals Committee
will desire to be satisfied upon this point, and will
no doubt confer with the local Government Board upon
the matter.

10. The Committee will, of course appreciate
that Dr Bessie's Report derived its importance from the
official position which he holds, and although it does
not appear that the local Government Board have adopted
the Report, or have given official recognition to it,
yet no doubt must be allowed to remain as to the views
of the Board and the views of the Committee in the
matter.

"W. W. Hope"

In the first instance I may discuss Nos. 1 and 10.
No comment is needed.

No. 2. As to what I state in my Report on this
matter see pp. 6 and 7, where I mention certain details
connected with the administration of the Liverpool Hospitals.

I fail to see how a suggestion for a revision of
the scheme of supervision can be construed as "suggesting
negligence on the part of the Hospitals Committee or the
"Corporation." (Dr Hope's Observations, p. 8, para. 4).

However Dr Hope admits the correctness of my
statement and he himself points out "that this trouble is
of old standing." (Observations p. 8, para. 2).

No. 3. My report shows the topographical distribu-
tion of the typhoid by analysis for the City of Liverpool
as a whole, and for the special districts shown each of
the three Hospitals used as one and another period for the
purpose of such analysis. Also it shows periods
of period the high incidence of this house typhoid. It is
this latter point which is of special importance, as it

(3) Is there evidence that within the several "areas" shows that the opening of one or another hospital for the reception of acute smallpox cases was followed by special incidence of smallpox on houses in its neighbourhood.

No. 7. In the quarter mile area in question there are only 85 dwellings, 80 of which are clustered together on one point near the circumference of the area. Escape of a small group of dwellings of this kind (one house only was invaded by smallpox in the whole period under consideration) does not prove the absence of "hospital influence". When the larger and more populous areas (the $\frac{1}{4}$ to $\frac{1}{2}$ mile and $\frac{1}{2}$ - 1 mile zones) are considered, the excess of incidence of smallpox round this Priory Road Hospital becomes apparent.

Conclusions Nos. 4, 5, 6, 8 and 9 may most conveniently be taken together.

My main work at Liverpool was to get out the data to apply all available means of checking and correcting the collected facts as to the occurrence of cases and the invasion of houses; to determine populations and numbers of dwellings in different areas; to spot maps so that they showed, fortnight by fortnight, all the newly invaded houses in the City; and subsequently to combine these various data as to local incidence of smallpox in relation to the hospital operations. In my report I summarise the questions with which I had to deal as follows :-

- (1) Has the inhabited area within a mile in each instance of hospital suffered more severely than the rest of Liverpool? And, if so,
- (2) Has the exceptional incidence within that area corresponded in point of time (having regard, of course, to the period of incubation of smallpox) to the use of the hospital for the treatment of acute smallpox

cases? And

References to literature on the subjects are given in a footnote on p. 9 of my Report.

shows that the opening of one or another hospital for the
reception of acute malarial cases was followed by special
incidents of malarial fever in the neighborhood.
No. 7. In the quarter mile area in question there

are only 38 dwellings, 30 of which are clustered together on one
point near the circumference of the area. These of
a small group of dwellings of this kind (one house only
was invaded by malarial fever in the whole period under con-

sideration) does not prove the absence of "hospital
influence". When the larger and more populous areas (the
 $\frac{1}{2}$ to $\frac{1}{2}$ mile and $\frac{1}{2}$ mile zones) are considered, the excess
of incidents of malarial fever in this Primary Head Hospital
becomes apparent.

Conclusions Nos. 4, 5, 6, 7, 8 and 9 may most con-
veniently be taken together.

The main work of Liverpool was to get out the data
to study all available means of checking and correcting
the collected facts as to the occurrence of cases and the
location of houses; to determine population and numbers
of dwellings in different areas; to spot maps so that they
showed, for example, by rectangles, all the newly invaded houses
in the city; and subsequently to combine these various data
as to local incidence of malarial fever in relation to the hospital
operations. In my report I summarize the questions with
which I had to deal as follows: -

- (1) Has the malarial area within a mile in each
instance of hospital malarial fever severely than the
rest of Liverpool? And, if so, why?
- (2) Has the exceptional incidence within this area
been accompanied in point of time (having regard, of
course, to the period of invasion of malarial fever)
the use of the hospital for the treatment of acute malarial
fever?

- (3) Is there evidence that within the several "one-mile areas" as they may be termed, dwellings nearer to hospital sustained a heavier incidence of smallpox than those farther away?"

And my conclusions, based solely upon data as to the accuracy of which Dr Hope and I are completely in accord - for obtaining many of them I am of course indebted to him and to his staff, ~~we~~ were :-

"(1) Inhabited areas within a mile of each of the three Liverpool Smallpox Hospitals have suffered more severely from smallpox than the City as a whole,

(2) Exceptional incidence of smallpox within these areas has corresponded in point of time with the use of these hospitals for the treatment of acute smallpox cases.

(3) Broadly speaking, within these hospital areas the dwellings nearer ^{to} the hospital have sustained a far heavier incidence of smallpox than those further away."

The Liverpool experience summarised in the above conclusions is parallel to that met with in London before 1886, and subsequently in a plurality of other instances of provincial hospitals which have ~~seen~~ ^{had} considerable populations in their neighbourhood^{ts}; so that with regard to Liverpool I drew the inference that it supplies a notable example of the "smallpox hospital influence" with which we have become familiar.

In drawing this inference I was of course alive to the consideration that the excess of incidence of smallpox within the hospital areas might have been due merely to the accident that undetected cases, or other causes of spread of smallpox from person to person, had occurred in exceptional number, as a result of mere chance

~~of~~ References to the literature on the subjects are given in a footnote on p. 9 of my Report.

(2) Is there evidence that within the several "cases"

... this "case" as they may be termed, dwelling nearer
to hospital sustained a heavier incidence of malarial
than those further away?"

And my conclusions, based solely upon data as to the country
of which Dr Hope and I are completely in accord - for
obtaining many of them I am of course indebted to him and
to his staff, are:-

"(1) I indicated even within a mile of each of the
three Liverpool hospitals have sustained more
heavily from malarial than the city as a whole,

(2) Exceptional incidence of malarial within these
areas has corresponded in point of time with the
use of these hospitals for the treatment of cases
malarial cases.

(3) Evidently speaking, within these hospital areas
dwelling nearer the hospital have sustained a far
heavier incidence of malarial than those further
away."

The Liverpool experience summarized in the

above conclusions is parallel to that met with in London

before 1888, and subsequently in a plurality of other
instances of provincial hospitals which have been considered
also populations in their neighbourhoods; so that with
regard to Liverpool I draw the inference that it supplies
a notable example of the "malarial hospital influence" with
which we have become familiar.

In drawing this inference I was of course
also to the consideration that the extent of incidence
of malarial within the hospital areas might have been due
merely to the accident that uninfected cases, or other
causes of spread of malarial from person to person, had
occurred in exceptional number, as a result of some chance
referred to the literature on the subject are given in
a footnote on p. 9 of my Report.

in the areas in question at the time when the hospitals were open. Considerations such as these might perhaps have required discussion in my Report if the experience of Liverpool in 1902-03 had stood by itself. But having regard to the notorious occurrence of similar phenomena round many other hospitals in other epidemics, "personal infection" could at once, in my judgment, be dismissed as altogether inadequate to explain the whole of the Liverpool facts. In fact the case is irrelevant to the issue. In short Dr Hope, however, appears to entertain seriously the suggestion that the whole matter was fortuitous. This seems to be his sole argument on the main issue. I understand him to contend that the Liverpool experiences are not instances of true "hospital influence"; that the excess of incidence of smallpox round Liverpool hospitals; the correspondence of such incidence in point of time with hospital operations; and the gradations observed, have had none but accidental relation to the hospitals themselves. I do not think Dr Hope has fortified his contention materially by citing instances where particular individuals living in the neighbourhood of a smallpox hospital probably contracted their smallpox as a result of direct personal communication with an antecedent case. Of course scores of instances could be brought forward in which persons living near a smallpox hospital were in all probability infected independently of it. Living close by a smallpox hospital does not confer immunity from smallpox attack by direct infection - this point is indeed too elementary to need stating. The question at issue is not whether all cases living within a mile of a hospital contracted smallpox from the hospital, but whether the exceptional incidence round the hospital is attributable to the hospital.

in the area in question at the time when the hospital
were open. Considerations such as these might perhaps have
required discussion in my report & the experience of Liverpool
in 1908-09 had stood by itself. But having turned to the
notorious occurrence of similar phenomena round many
other hospitals in other epidemics, "personal infection"
could at once, in my judgment, be dismissed as
altogether inadequate to explain the whole of the
Liverpool facts.

Dr Hope, however, appears to entertain seriously
the suggestion that the whole matter was fortuitous. This
seems to be his sole argument on the main issue. I
understand him to contend that the Liverpool experience
was not instance of true "hospital influence"; that the
excess of incidence of maligo round Liverpool hospitals;
the correspondence of such incidence in point of time with
hospital operations; and the gradations observed, have
had none but accidental relation to the hospital phenomenon.

I do not think Dr Hope has fortified his con-
clusion materially by citing instances where particular
individuals living in the neighbourhood of a maligo
hospital probably contracted their maligo as a result
of direct personal communication with an infectious case.
Of course scores of instances could be brought
forward in which persons living near a maligo hospital
were in all probability infected independently of it.
Living close by a maligo hospital does not confer
immunity from maligo attack by direct infection - this
point is indeed too elementary to need stating. The
question at issue is not whether any cases living within a
mile of a hospital contracted maligo from the hospital,
but whether the exceptional incidence round the hospital is
attributable to the hospital.

It is worth noting also that the instances given by Dr Hope are not particularly convincing. Thus in one series of cases his Staff traced the source of infection of a woman (p. 18 of his "Observations") "Annie Robinson living at No 14 Balkan Street, (which is within 50 yards of Park Hill Hospital Walls)". As matter of fact there were no cases of smallpox in Park Hill Hospital at the time and thus the tracing of the case is irrelevant to the issue. In another series (P.S. Diagram & p. 21 of his "Observations") he traces the infections of certain persons to a single primary case. But the primary case in question was a patient who died suddenly at a house in the $\frac{3}{4}$ - 1 mile zone of Priory Road Hospital at a time when this Hospital was receiving acute smallpox patients and the infection of this primary case is unaccounted for by Dr Hope. It is also useful to recall that Dr Hope stated quite recently at a meeting of the Epidemiological Society that he had succeeded, through the efforts of his staff and with the aid of special powers to which he has referred, in tracing a probable source of infection in "about 1,000 out of 2,082 cases" which occurred in Liverpool during 1902-3. There seems to be here in the balance "unaccounted for" ample margin for cases due to serial convection from the hospitals. But there is also some question ~~in~~ ^{with} regard to the 1,000 cases which he regards as ~~un~~accounted for. In some of these cases, occurring in the hospital areas, it appears to me after study of the detailed lists that, after all, the recorded evidence of contact with smallpox cases was slight, and that it might at least be equally probable that serial convection from the hospital was the real cause. This however can only be a matter for speculation. A further point to be borne in mind is the possibility (not recognised,

It is worth noting also that the instances given by Dr. Hope are not particularly convincing. Thus in one series of cases his staff traced the source of infection of a woman (p. 18 of his "Observations") "Miss Robinson" living at No 14 Balm Street, [which is within 50 yards of Park Hill Hospital, Walsley]. An instance of this nature were no cases of meningitis in Park Hill Hospital at the time and thus the tracing of the case is irrelevant to the issue. In another series (p. 21 of his "Observations") he traces the infection of certain persons to a single primary case. But the primary case in question was a patient who died suddenly at a house in the N. 1/2 - I also saw of Brixley Road Hospital at a time when this Hospital was receiving some meningitis patients and the infection of this primary case is unaccounted for by Dr. Hope. It is also worth noting that Dr. Hope stated quite recently at a meeting of the Epidemiological Society that he had succeeded, through the efforts of his staff and with the aid of special powers to which he has referred, in tracing a specific source of infection in "about 1,000 out of 2,000 cases" which occurred in Liverpool during 1902-3. There seems to be here in the balance "unaccounted for" single margin for cases due to casual connection from the hospitals. But there is also some question as regards to the 1,000 cases which he regards as unaccounted for. In some of these cases, occurring in the hospital ward, it appears to me that study of the detailed data that after all, the recorded evidence of contact with meningitis was slight, and that it might at least be equally probable that casual connection from the hospital was the real cause. This however can only be a matter for speculation. A further point to be borne in mind is the possibility (not recognized,

of course, by Dr Hope) that certain of the un-detected cases which remained at their houses (in any part of the city) caused infection in their neighbourhood as a result of aerial convection, not of direct or mediate infection.

The Ketherfield Road story does not seem to me to lend weight to the argument that the occurrences round the hospitals were merely fortuitous. The analogy is hopelessly incomplete. If it is desired to show by analogy that the occurrences round the smallpox hospitals were accidents and nothing more, there is wanted something of this kind: Namely - a series of facts as to the incidence of smallpox round three establishments which are the only three of their kind in or near the city - say three skin hospitals, three piano factories, or three gasworks provided they are in each case the only three - and are placed in different parts of Liverpool, and outside the smallpox hospital areas. If the analogy is to be of any value there should be found an excess of incidence of smallpox round each establishment, ^{and a graduation of incidence} ~~And-as-would-not-be-enough-to-~~ round each establishment. And it would not be enough to find that this excess of incidence and this graduation occurred when the whole epidemic period was taken; in the case of establishment A. they must be found during the period in which Park Hill Hospital was receiving cases; and ~~not at other times~~ not at other times; in the case of establishment B. solely while Priory Road Hospital was receiving cases; and in the case of establishment C. solely when Fazakerley Hospital was receiving cases. In the absence of some such demonstration, I do not see how to attach weight to the comparison to which Dr Hope invites attention.

of course, we do not (and cannot) know the exact cause
which remained in their houses (in any part of the city)
caused infection in their neighborhood as a result of
sexual contact, but of direct or indirect infection.
The hospital had been very busy for some time
and weight to the argument that the occurrence round the
hospitals were merely fortuitous. The analogy is hope-
lessly incomplete. It is desired to show by analogy
that the occurrence round the hospital hospitals were
occasional and nothing more, there is wanted something of
this kind: namely - a series of facts as to the incidence
of malig. round these establishments which are the only
type of their kind in or near the city - say three main
hospitals, three main factories, or three general
provided they are in each case the only three - and are
placed in different parts of Liverpool, and outside the
malig. hospital zone. If the analogy is to be of any value
there should be found an excess of incidence of malig.
round each establishment, and a proportion of incidence
round each establishment. And it would be enough to
find that this excess of incidence and this proportion
occurred when the whole epidemic period was taken; in the
case of establishment A, they must be found during the
period in which Park Hill Hospital was receiving cases; and
in the case of establishment B, not at other times; in the
case of establishment C, only while Park Hill Hospital
was receiving cases; and in the case of establishment D, only
when Park Hill Hospital was receiving cases. In the absence of
some such demonstration, I do not see how to attach weight to the
comparison to which Dr. Hope invites attention.

consider I find it somewhat difficult to follow Dr Hope's criticism in regard to rates. The statistical part of my report was intended for readers who could distinguish between actual figures given and rates calculated on those figures, and throughout my report I have given the actual figures side by side with the rates. In dealing with the case of Fazakerley Hospital I have in three separate places drawn attention to the necessity of caution in drawing inferences from rates based upon small numbers (pp. 12, 14, & 15). The fact is, of course, that in my report some of the rates are calculated on large figures, e.g. the rates for the more populous areas round Park Hill Hospital during the period (7 December 1902 to 20 June 1903) when that hospital was receiving cases on a large scale at the height of an epidemic; whereas others are calculated on small figures, e.g. the fortnight by fortnight rates, as also the rates on the small area within $\frac{1}{2}$ mile of Park Hill Hospital, which contains only 171 dwellings, nine of which were attacked, giving the rate of 526 per 10,000 referred to by Dr Hope. The smallness of the number of houses in such an area as this or as the Fazakerley neighbourhood, is a matter which had to be taken as it was found. The point which comes out in dealing with the mile areas round these several hospitals and the subdivisions of these areas is that whether there be taken the large figures for the large hospital (Park Hill) at the height of the epidemic, or the smaller figures for the smaller hospital (Priory Road) in the early portion of the epidemic, or the figures of the outside (Fazakerley) hospital with comparatively few houses round it, each basis of

massive smallpox incidence in their neighbourhoods

I find it somewhat difficult to follow Dr Hope's
explanation in regard to rates. The statistical part of
my report was intended for readers who could distinguish
between actual figures given and rates calculated on those
figures, and throughout my report I have given the actual
figures side by side with the rates. In dealing with the
case of Penzance Hospital I have in three separate places
drawn attention to the necessity of caution in drawing
inferences from rates based upon small numbers (pp. 12, 14,
& 18). The fact is, of course, that in my report some of the
rates are calculated on large figures, e.g. the rates for
the more populous areas round Park Hill Hospital during the
period (7 December 1902 to 30 June 1903) when that hospital
was receiving cases on a large scale at the height of an
epidemic; whereas others are calculated on small figures, e.g.
the fortnight of fortnight rates, as also the rates on the small
area within $\frac{1}{2}$ mile of Park Hill Hospital, which contains
only 14 dwellings, nine of which were attached, giving
the rate of 888 per 10,000 referred to by Dr Hope. The
smallness of the number of houses in such an area as this
or as the Penzance neighbourhood, is a matter which had to
be taken as it was found. The point which comes out in
dealing with the like areas round these several hospitals and
the variations of those areas is that whether there be
taken the large figures for the large hospital (Park Hill) or
the rates of the epidemic, or the smaller figures for the
smaller hospital (Preston Road) in the early portion of the
epidemic, or the figures of the outside (Penzance) hospital
with comparatively few houses round it, each bears its

consideration indicates in its degree and on the invasion rates, a like specialized incidence corresponding in point of time to the hospital operations. Furthermore where the figures are largest, and the conclusions to be drawn from the rates are consequently the most definite the indication of the excess of incidence, and the graduation of incidence are clearly manifest.

It is reading into my Report that which is not there to represent that I state distinctly there is only one explanation of smallpox incidence round hospitals, viz: dissemination of infection by aerial convection, and that I ignore all the considerations upon which so much stress is laid by Mr Power and other observers. Those who read my report carefully will see that it is limited, so far as prevalence of smallpox around the Hospitals is concerned, to the three considerations set forth above, and that I offer no explanation as to the cause of this prevalence; the statements in the report are strictly limited to observed facts.

My provisional attitude with regard to aerial convection of smallpox infection is set forth on pp. 9 and 10 of my report as follows :--

"Experience of the sort in question, which is
"well known, has demonstrated that excessive in-
"cidence of smallpox on populous areas in the
"vicinity of a hospital receiving a plurality of
"acute cases of the disease is no unusual occurrence
"and it can hardly be doubted that the relationship
"between the operations of these hospitals and the
"excessive smallpox incidence in their neighbourhoods

consideration indicates in its degree and on the incidence
taken, a like specialized incidence corresponding in point
of time to the hospital operations. Furthermore where the
figures are large, and the conclusions to be drawn
from the rates are consequently the more definite the
indication of the excess of incidence, and the greater
the number of instances are clearly marked.
It is leading into my report case which is not
there to represent that I state distinctly there is only
one explanation of similar incidence round hospitals,
viz: dissemination of infection by aerial connection,
and that I ignore all the considerations upon which so
much stress is laid by Mr Power and other observers.
Those who read my report carefully will see that it is
limited, so far as prevalence of similar round the
hospitals is concerned, to the three considerations
set forth above, and that I offer no explanation as to
the cause of this prevalence; the statements in the
report are strictly limited to observed facts.
My provisional attitude with regard to aerial
connection of similar infection is set forth on pp. 3 and 4
and 10 of my report as follows:--
"Evidence of the sort in question, which is
well known, has demonstrated that excessive in-
cidence of similar on persons seen in the
vicinity of a hospital receiving a plurality of
cases of the disease is no unusual occurrence
and it can hardly be doubted that the relationship
between the operations of these hospitals and the
excessive similar incidence in their neighbourhoods"

"is one of cause and effect. Further, it has been
"strongly indicated from careful study of various
"instances of 'smallpox hospital influence', that
"explanation of extra incidence of smallpox around
"such hospital, by assumption of hospital mismanage-
"ment or of lack of precautions in regulating the
"necessary traffic and business of the establishment
"does not suffice to account for the facts. The
"generally accepted, and so far as I am aware the
"only completely satisfactory, explanation of the
"peculiarities of smallpox incidence around hos-
"pitals receiving acute cases of the disease, is
"dissemination of infection by aerial convection; an
"explanation introduced many years ago by Mr W. H.
"Power, the Board's present medical officer, after
"detailed study of the behaviour of smallpox around
"Fulham and other London hospitals. He held that
"particulate matter capable of conveying infection,
"escaping into the air from the wards of a smallpox
"hospital, does on occasion and in suitable atmos-
"pheric conditions become wafted to considerable
"distances from such hospital.
"Hospital influence' in this sense has been
"traced in certain instances, where circumstances
"allowed the study to be made in respect of in-
"habited areas, as far as one mile from the hospital
"by some observers it has been thought to have been
"traceable though to a much less degree on in-
"habited areas situated even further than a mile
"from the hospital.

"is one of cause and effect. Further, it has been
"strongly indicated from careful study of various
"instances of 'hospital influenza', that
"explanation of extra incidence of influenza around
"such a hospital, by assumption of hospital management
"want or of lack of precautions in regarding the
"necessity traffic and business of the establishment
"does not suffice to account for the facts. The
"generally accepted, and so far as I am aware the
"only completely satisfactory, explanation of the
"peculiarities of influenza incidence around hos-
"pitals receiving some cases of the disease, is
"dissemination of infection by aerial conveyance; an
"explanation introduced many years ago by Dr. W. H.
"Tower, the Board's present medical officer, after
"detailed study of the behaviour of influenza around
"hospitals and other London hospitals. He held that
"particulate matter capable of conveying infection,
"suspended into the air from the words of a speaker
"hospital, does on occasion and in suitable situa-
"tions could be carried to considerable
"distances from such hospital.
"Hospital influenza, in this sense has been
"traced in certain instances, where circumstances
"allowed the body to be made in respect of in-
"fectious areas, as far as one mile from the hospital
"by some observers it has been thought to have been
"transmitted though to a much less degree on in-
"fectious areas situated even further than a mile
"from the hospital.

"It has not, of course, been affirmed that, whenever acute cases are admitted to a smallpox hospital situated near a populous area, demonstration of aerial convection will certainly be forthcoming if only the facts be strictly studied. There is ground indeed for belief that a smallpox hospital in a populous area does not, as a result of its actual operations, always whether aerially or otherwise, distribute smallpox in conspicuous fashion in its neighbourhood; and perhaps opinion has come to be entertained in some quarters that disadvantages such as accrued from Fulham and other smallpox hospitals may be regarded as the exception, not the rule. Similarly there has, when emergency has resulted in compulsory use as it were for smallpox of a hospital in a populous neighbourhood, arisen a tendency to minimize any mischief which may be alleged to be due to the hospital. A demonstration, therefore, of absence of spread of smallpox from hospital in the case of Liverpool, where three hospitals, two of them in the City, were receiving acute smallpox cases, and where in particular one of the hospitals (Park Hill) for a period of some 24 weeks at the height of the epidemic received acute smallpox patients in large numbers, would, if established, be not only particularly interesting to epidemiologists, but in its administrative aspects would be reassuring to smallpox hospital authorities."

of houses in 1908 had increased as follows :-

- 0 - 1/4 mile = 9 houses.
- 1/4 - 1/2 mile = 100 houses.
- 1/2 - 3/4 mile = 170 houses.

"It has not, of course, been affirmed that
 "however acute cases are admitted to a hospital
 "hospital situated near a populous area, demonstra-
 "tion of aerial conveyance will certainly be forth-
 "coming if only the facts be carefully studied.
 "There is ground indeed for belief that a
 "hospital hospital in a populous area does not, as a
 "result of its social organization, always exhibit aerial-
 "ity or otherwise, that is to say, in conspicuous
 "location in the neighborhood; and perhaps opinion has
 "come to be entertained in some quarters that dis-
 "tances such as occurred from Berlin and other hospitals
 "hospitals may be regarded as the exception, not the
 "rule. Similarly there has, when emergency has required
 "in consequence was as it were for hospital of a hospital
 "in a populous neighborhood, arisen a tendency to min-
 "imize any accident which may be alleged to be due to
 "the hospital. A demonstration, therefore, of absence
 "of spread of hospital from hospital in the case of
 "hospitals, that is to say, two or three in the
 "city, were receiving acute hospital cases, and where
 "in particular one of the hospitals (York Hill) for a
 "period of some 24 weeks at the height of the epidemic
 "received acute hospital patients in large numbers,
 "would, if established, be not only particularly interest-
 "ing to epidemiologists, but in its administrative
 "aspects would be interesting to hospital hospital
 "authorities."

Taking an average of 5 persons per house, the population resident within the area of half a mile from the hospital would in 1905 be 875 persons, a number

My personal belief, if it be desired that I should state it, is that aerial convection probably operated in the case of each Liverpool hospital. The data placed at my disposal by Dr Hope give little suggestion of support to the proposition that infection had occurred in the neighbourhood of any of these hospitals as a result of communications or traffic with the hospital. At most two or three instances of possible infection in this way have been traced. The assumptions required to explain the excess of incidence and the graduation of incidence in each instance by a prolonged series of unsuspected communications between the hospital and its neighbourhood, undetected by Dr Hope's staff, are it seems to me, assumptions altogether without warrant.

In view of Dr Hope's repeated references to Fazakerley Hospital the following notes may be useful,

The Fazakerley Smallpox Hospital is erected on a site outside the Liverpool City Boundary, and at the time of the Board's inquiry in 1898 as to the loan for this hospital site the surrounding population was given as -

0 - $\frac{1}{2}$ mile	=	4 houses	9 persons.
$\frac{1}{2}$ - $\frac{1}{2}$ mile	=	74 houses	377 persons.
or 0 - $\frac{1}{2}$ mile	=	78 houses	386 persons.

and it thus complied with the requirements of the Local Government Board with regard to the population resident around such Hospital.

The number of houses in 1905 had increased as follows :-

0 - $\frac{1}{2}$ mile	=	9 houses.
$\frac{1}{2}$ - $\frac{1}{2}$ mile	=	166 houses.
0 - $\frac{1}{2}$ mile	=	175 houses.

My personal belief, if it be desired that I should state it, is that aerial connection probably operated in the case of each Liverpool hospital. The data obtained at my disposal by Dr Hope give little suggestion of support to the proposition that infection had occurred in the neighbourhood of any of these hospitals as a result of communications or traffic with the hospital. At most two or three instances of possible infection in this way have been traced. The assumptions required to explain the excess of incidence and the graduation of incidence in each instance by a prolonged action of unassisted communications between the hospital and the neighbourhood, indicated by Dr Hope's staff, are it seems to me, assumptions altogether without warrant.

In view of Dr Hope's repeated reference to the Penitentiary Hospital the following notes may be useful. The Penitentiary Hospital is situated on a site outside the Liverpool City Boundary, and at the time of the Board's inquiry in 1908 as to the loss for this hospital etc the surrounding population was given as -

0 - 1/2 mile =	4 houses	9 persons.
1/2 - 3/4 mile =	74 houses	377 persons.
3/4 - 1 mile =	78 houses	388 persons.

and is thus supplied with the requirements of the local Government Board with regard to the population resident around such Hospital.

The number of houses in 1908 had increased as follows:-

0 - 1/2 mile =	9 houses.
1/2 - 3/4 mile =	100 houses.
3/4 - 1 mile =	178 houses.

Taking an average of 5 persons per house, the population resident within the area of half a mile from the hospital would in 1903 be 875 persons, a number which exceeds the limit fixed by the Local Government Board. The Board requires the areas surrounding smallpox hospitals that are built under their sanction, to be sparsely populated with a view to minimise as far as practicable the amount of smallpox spread from these hospitals. Residence within half a mile of a hospital erected under such conditions obviously in no sense guarantees immunity from smallpox infection to those persons liable to attack by this disease; but the paucity of resident population allows of ready control of smallpox arising from proximity to the Hospital. The Board is in no way responsible for any increase in the population resident around such ~~hospitals~~ ^{smallpox} hospitals subsequent to the Board's approval of the site.

My Report clearly sets out that the special areas within one mile of the Fazakerley Hospital contained 1,423 houses, and that of these no more than 33 houses were, in two years, invaded by smallpox. Numerically therefore the amount of smallpox disseminated in the mile area around it by Fazakerley Hospital was insignificant, and should have been correspondingly easy of control. Nevertheless relatively to their number these houses in the Fazakerley area suffered, as did the houses in the neighbourhood of the other two smallpox hospitals, a higher rate of invasion by smallpox than the houses in the City as a whole.

Considerable stress has been laid by Dr Hope on the fact that although the Hospital site at

Taking an average of 3 persons per house, the
 population resident within the area of half a mile from
 the hospital would in 1903 be 878 persons, a number
 which exceeds the limit fixed by the local Government
 Board. The Board requires the area surrounding
 hospital hospitals that are built under their sanction,
 to be sparsely populated with a view to minimize as
 far as possible the amount of malarial spread from
 these hospitals. Buildings within half a mile of a
 hospital erected under such conditions obviously in no
 sense guarantee immunity from malarial infection to
 those persons liable to attack by this disease; but the
 paucity of resident population allows of ready control
 of malarial arising from proximity to the hospital.
 The Board is in no way responsible for any increase in
 the population resident around such hospitals
 subject to the Board's approval of the site.
 My report clearly sets out that the special
 areas within one mile of the Tansley Hospital con-
 tained 1,423 houses, and that of these no more than 28
 houses were, in two years, invaded by malarial.
 Manifestly therefore the amount of malarial disease
 led in the area around it by Tansley Hospital
 was insignificant, and should have been correspond-
 ingly easy of control. Nevertheless relatively to
 their number these houses in the Tansley area
 suffered, as did the houses in the neighbourhood of
 the other two malarial hospitals, a higher rate of in-
 vasion by malarial than the houses in the City as a
 whole.
 Considerable stress has been laid by Mr Hope
 on the fact that although the Hospital site is

Fasakerley complied with the requirements of the Local Government Board at the time the land was purchased, yet nevertheless it has been shown by me in my report that the houses in the area around the hospital were not only not immune to invasion by smallpox but suffered a greater rate of invasion than the houses in the City of Liverpool taken as a whole; and from this it is wrongly inferred that I disapprove or condemn the Fasakerley Hospital site for the treatment of smallpox and that I differ from my three colleagues, who have had officially to report to the Board on this Hospital site. The answer to this is obvious. It is hardly necessary to point out that a house invasion rate of 3 per cent. in the case of a hospital like Fasakerley, which goes far to fulfil the Local Government Board requirements as to population, is a trifling matter administratively, by contrast with the bulk of smallpox arising from the same invasion rate in populous areas such as those around Priory Road or Park Hill.

(Sgd) Richard J. Reece,

6th. July, 1905.

I have the honor to acknowledge the receipt of your letter of the 14th inst. in relation to the matter of the proposed building at 100 West 11th Street, New York City. The Board of Health has been advised of the same and the same has been referred to the local Board of Health as the same is being processed, and notwithstanding it has been shown by me in my report that the houses in the area around the hospital were not only not liable to invasion by sewage but actually a greater rate of invasion than the houses in the City of New York taken as a whole; and that this is in view of the fact that I discovered on certain of the houses around the hospital also the presence of sewage and that I differ from my close colleagues who have had officially to report to the Board on this hospital site. The answer to this is obvious. It is hardly necessary to point out that a house invasion rate of 3 per cent. in the case of a hospital like the hospital which goes for to fulfill the local Government Board requirements as to population, in a building matter, is not consistent with the rate of sewage existing from the same invasion rate in popular areas such as those around Trinity Road or Park Hill.

(Sgd) Richard J. Hoess,
 Chm., July, 1908.